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## ACTION MEMORANDUM

November 15, 2005

**TO:** The Commission

**FROM:** The Division of Market Regulation

**SUBJECT:** The application of Bear, Stearns and Co. Inc. (“BS&Co.”), a registered broker-dealer and a subsidiary of The Bear Stearns Companies Inc. (“TBSCI”), its ultimate holding company, for Commission supervision as a consolidated supervised entity.

**RECOMMENDATION:** That the Commission issue the attached order approving the application of BS&Co.

**NOVEL, IMPORTANT OR COMPLEX ISSUES:** TBSCI would be the fifth investment bank holding company to be supervised by the Commission, and BS&Co. would be the fifth broker-dealer to obtain an exemption from the standard haircut method of calculating net capital charges and would instead be approved to use the statistical methods of new Appendix E to Rule 15c3-1 (“Appendix E”) of the Securities Exchange Act of 1934. The Commission approved the applications under Appendix E of Merrill Lynch, Pierce, Fenner & Smith Incorporated, Goldman, Sachs & Co., Morgan Stanley & Co., and Lehman Brothers Inc.

**ACTION REQUESTED:** Seriatim consideration by November 29, 2005.

**OTHER OFFICES OR DIVISIONS CONSULTED:** Office of Compliance Inspections and Examinations (Lori Richards and Mary Ann Gadziala)  
Northeast Regional Office (Rosanne Smith)  
Office of International Affairs (Sherman Boone)

**PERSONS TO CONTACT:** Michael A. Macchiaroli (202) 551-5525  
Matthew J. Eichner (202) 551-5531  
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## I. SUMMARY

Bear, Stearns & Co., a registered broker-dealer and a subsidiary of investment bank holding company The Bear Stearns Companies, has submitted an application to the Commission to be supervised at the group level as a consolidated supervised entity (“CSE”).<sup>1</sup>

As part of the review of the application, the staff has assessed the firm’s financial position and the adequacy of its internal risk management controls, including the mathematical models the firm will use for regulatory purposes. The staff also conducted on-site reviews to verify the accuracy of the information included in the application and to assess the adequacy of the implementation of the firm’s internal risk management policies and procedures.<sup>2</sup>

Based on this review, the staff believes that BS&Co. has adopted and implemented strong internal risk management controls and has sufficient financial strength to meet the requirements of Appendix E. Capital adequacy at the holding company level will be computed in a manner consistent with the international standards developed by the Basel Committee on Banking Supervision. In addition, TBSCI has executed the undertaking required by the rules in a form that is acceptable to the staff and is in compliance with the terms of that undertaking.

The Division staff therefore recommends that the Commission approve the application and issue the attached order authorizing BS&Co. to compute market and credit risk capital charges pursuant to Appendix E. By issuing the order, the Commission will place BS&Co. and the entire conglomerate under the Commission’s consolidated supervision regime.

Even after approval by the Commission, the nature of this supervisory regime requires that CSEs continually enhance risk controls related to financial and operational condition. Further, the standards developed by the Basel Committee on Banking Supervision continue to be clarified and interpreted, both by U.S. regulators and internationally. Some of this guidance will necessitate adjustments to the policies and procedures for computation of holding company capital adequacy. These expectations have been communicated to, and acknowledged by, TBSCI and other CSEs. Therefore, CSEs will have substantial motivation to continue to actively address issues identified during the application review process on an ongoing basis.

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<sup>1</sup> The application, a lengthy document, has not been attached to this memo, but is available upon request.

<sup>2</sup> The staff participating in the review process included staff from the Division of Market Regulation, the Office of Compliance Inspections and Examinations, and the Northeast Regional Office.

## II. REGULATORY FRAMEWORK FOR CONSOLIDATED SUPERVISED ENTITIES

The CSE rules<sup>3</sup> contain provisions applicable to the broker-dealer and provisions applicable to its ultimate holding company.<sup>4</sup>

### The Broker-Dealer Provisions

Firms that qualify for CSE treatment may apply a voluntary, alternative method of computing net capital. Under the alternative method, contained in new Appendix E to Rule 15c3-1, firms with strong internal risk management practices may utilize the mathematical modeling methods they use to manage their own business risk, including value-at-risk (“VaR”) models and scenario analysis, to compute deductions from net capital.<sup>5</sup> A broker-dealer calculating net capital adequacy using the alternative method must maintain tentative net capital<sup>6</sup> of at least \$1 billion and net capital of at least \$500 million. Moreover, if the tentative net capital of a broker-dealer using this alternative method falls below \$5 billion, it must notify the Commission.<sup>7</sup> The Commission then would consider whether to require the broker-dealer to take appropriate remedial action.

In addition, a broker-dealer that uses the alternative method must have in place comprehensive internal risk management procedures that address market, credit, liquidity, legal, and operational risks at the firm. These requirements are designed to help ensure the integrity of the broker-dealer’s risk measurement, monitoring, and management processes and to clarify accountability, at the appropriate organizational level, for defining the permitted scope of activities and level of risk.

A broker-dealer also must provide the Commission with specified financial, operational, and risk management information on a monthly, quarterly, and annual basis. The broker-dealer will continue to be subject to oversight by the Commission as well as its designated examining authority, primarily the New York Stock Exchange.

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<sup>3</sup> Exchange Act Release No. 49830 (June 8, 2004), 69 FR 34428 (June 21, 2004).

<sup>4</sup> If the ultimate holding company is an entity that has a principal regulator, as defined in the rules, it is subject to a streamlined regulatory regime to avoid duplicative or inconsistent regulation. TBSCI, however, is not an entity that has a principal regulator.

<sup>5</sup> These deductions are intended to help ensure that a broker-dealer maintains sufficient capital to account for various risks, including market, credit, operational, and liquidity risk, and the models and scenario analyses are tailored to compute these risks given each firm’s unique risk profile.

<sup>6</sup> “Tentative net capital” is defined in the CSE rules as net capital before deductions for market and credit risk.

<sup>7</sup> As discussed below, Bear Stearns intends, for purposes of this early warning requirement, to consolidate the tentative net capital of BS&Co. with the tentative net capital of Bear Stearns Securities Corp, a wholly-owned and fully guaranteed subsidiary of BS&Co.

## The Ultimate Holding Company Provisions

As a condition to granting a broker-dealer an exemption from the standard net capital rule, the broker-dealer's ultimate holding company must consent to group-wide Commission supervision if it does not have a principal regulator. Generally, Appendix E requires the ultimate holding company to execute a written undertaking in which it agrees, among other things, to do the following:

- Implement an internal risk management control system for the affiliate group;
- Keep records, and make reports regarding the ultimate holding company, including calculation of a group-wide capital adequacy measure consistent with the standards adopted by the Basel Committee on Banking Supervision ("Basel Standards")<sup>8</sup>;
- Consent to Commission examination of the books and records of the ultimate holding company and its affiliates that do not have principal regulators;
- Make available to the Commission information about the ultimate holding company or any of its material affiliates that is necessary to evaluate financial and operations risks within the ultimate holding company and its material affiliates; and
- Make available examination reports of principal regulators for those affiliates that are not subject to Commission examination.

The ultimate holding company must provide the Commission with monthly, quarterly, and annual reports. The reports must include specified consolidated financial and credit risk information, including a consolidated balance sheet and income statement audited by a registered public accounting firm; the capital adequacy measurement (statements of allowable capital and allowances for market, credit, and operational risk); the results of a registered public accounting firm's review of the risk management and control system of the ultimate holding company; and certain reports that the ultimate holding company regularly provides to its senior management to assist in monitoring and managing risk. The ultimate holding company must make and keep current records of

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<sup>8</sup> The Basel Committee has issued the "International Convergence of Capital Measurement and Capital Standards" ("Basel I") (1988) and the "International Convergence of Capital Measurement and Capital Standards, A Revised Framework" ("Basel II") (2004). The implementation date of Basel II is year-end 2006, except that the most advanced approaches have an implementation date of year-end 2007. The Basel Standards establish a common measurement system, a framework for supervision, and a minimum standard for capital adequacy for international banks. The CSE rules generally specify the use of the Basel Standards as implemented by the Board of Governors of the Federal Reserve System ("Federal Reserve").

funding and liquidity stress tests, the basis for the determination of credit risk weights for each counterparty, the basis for the determination of internal credit ratings for each counterparty, and a record of the calculations of allowable capital and allowances for market, credit, and operational risk.

These reports will assist the Commission in monitoring the financial condition, the risk management control system, and the activities of the affiliate group to detect any events or trends that may adversely affect the broker-dealer.

### **CSE Supervisory Program**

The Commission's supervisory program with respect to CSEs has four components:

First, the staff reviews the application. As part of the review, the staff assesses the firm's financial position, the adequacy of the firm's internal risk management controls, and the mathematical models the firm will use for regulatory purposes. The staff also conducts on-site reviews to verify the accuracy of the information included in the application, and to assess the adequacy of the implementation of the firm's internal risk management policies and procedures.

Second and following approval, Commission staff reviews monthly, quarterly, and annual filings containing financial, risk management, and operations data. These reports include consolidating financials (which show intercompany transactions that are eliminated during the preparation of consolidated financial statements) and risk reports substantially similar to those provided to the firm's senior managers. At least monthly, the holding company files a capital calculation made on a consolidated, group-wide basis consistent with the Basel Standards.

Third, the Commission staff meets monthly with senior risk managers and financial controllers at the holding company level to review the packages of risk analytics prepared at the ultimate holding company level for the firm's senior management. The focus is on the performance of the risk measurement infrastructure, including statistical models; risk governance issues including modifications to and violations of risk limits; and the management of outsized risk exposures. In addition, there are quarterly meetings focused on financial results, the management of the firm's balance sheet, and, in particular, the liquidity of the balance sheet.

Fourth, Commission staff conducts examinations of the books and records of the ultimate holding company, the registered broker-dealers, and material affiliates that are not subject to supervision by a principal regulator. The examinations focus on the capital calculation and on the adequacy of implementation of the firm's documented internal risk management controls.

### III. HOLDING COMPANY AND BROKER-DEALER

TBSCI, the investment bank holding company, and its subsidiary BS&Co., the broker-dealer applicant, are described below. A description of the remaining material affiliates of TBSCI is attached at Tab C.

#### **Ultimate Holding Company - TBSCI**

TBSCI is a U.S. investment banking firm that is not part of a bank holding company. It has broker, dealer, and other financial services affiliates. TBSCI is headquartered in New York, has principal offices in London, Dublin, Tokyo, Hong Kong, and other world financial centers, and employs approximately 11,000 people. For the fiscal quarter ending August 31, 2005, TBSCI reported net revenue of \$1.8 billion and net earnings of \$378 million. Bear Stearn's return on common stockholders' equity for the quarter was 16.9 percent. Total capital, consisting of equity and long-term borrowing, totaled \$52 billion.

TBSCI divides its activities into three business segments:

- The Capital Markets segment comprises the institutional equities, fixed income, and investment banking areas. The Capital Markets segment operates as a single integrated unit that provides the sales, trading and organizational functions for various fixed income, equity and advisory products and services. This segment produced 2004 net revenues of \$5.4 billion.
- The Global Clearing Services segment provides execution, clearing, margin lending, and securities borrowing to facilitate customer short sales. Prime brokerage clients include hedge funds and clients of money managers, short sellers, arbitrageurs, and other professional investors. As of November 30, 2004, the equity balance in client accounts totaled approximately \$248 billion. This segment produced 2004 net revenues of \$0.9 billion.
- The Wealth Management segment is composed of the Private Client Services and asset management areas. Private Client Services provides high net-worth individuals with investment services. Asset management manages equity, fixed income, and alternative assets for institutions and high net-worth individuals. This segment produced 2004 net revenues of \$0.6 billion.

#### **Broker-Dealer Applying for CSE Treatment – BS&Co.**

BS&Co. is a U.S. broker-dealer. The Commission is its primary regulator. As of September 30, 2005, BS&Co. had total assets of \$167.5 billion, total liabilities of \$163.8 billion, and excess net capital of \$1.4 billion.<sup>9</sup> Tentative net capital stood at \$4.2 billion, with deductions for market and credit risk, or “haircuts”, of \$2.7 billion.

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<sup>9</sup> Regulatory net capital includes qualifying subordinated debt.

Bear Stearns has asked for permission to consolidate the tentative net capital of BS&Co. with the tentative net capital of its affiliate Bear Stearns Securities Corp. (“BSSC”), a wholly-owned and fully guaranteed subsidiary of BS&Co., for purposes of meeting the \$5 billion tentative net capital early warning threshold. BSSC is a registered broker-dealer with approximately 450,000 active customer accounts. As of September 30, 2005, BSSC had total assets of \$117.6 billion, total liabilities of \$116.5 billion, a regulatory net capital requirement of \$1.1 billion, and excess net capital of \$2.7 billion. Tentative net capital stood at \$3.9 billion.

The Division staff believes that consolidation is appropriate for the limited purpose of determining BS&Co.’s compliance with the \$5 billion tentative net capital early warning threshold under the CSE rules and, therefore, recommends that the Commission grant Bear Stearns’s request. The current regulatory entity structure of Bear Stearns’s US broker-dealer operations reflects the firm’s response to customer preferences. The firm originally conducted its US securities business through a single legal entity. Several years ago, Stearns separated that business into dealer operations (BS&Co.) and broker operations (BSSC). The separation was intended to limit Bear Stearns’s customer securities business, now conducted through BSSC, from exposure to its proprietary securities business, now conducted through BS&Co. Bear Stearns argues that the separation provides additional customer protection and that it should not be penalized for maintaining this regulated entity structure. Moreover, BS&Co. has provided the Division staff with a legal opinion from outside counsel concluding that BS&Co. could merge with BSSC within 30 days from commencement of the merger process. A merger would produce a firm with tentative net capital in excess of the CSE early warning threshold. A pro forma consolidation of the two broker-dealers, as of July 31, 2005, shows tentative net capital of \$8.8 billion.

Should the application of BS&Co. be approved, BSSC will continue to compute regulatory capital requirements under the standard provisions of Rule 15c3-1, and not by application of Appendix E.

#### **IV. STAFF REVIEW OF INTERNAL RISK MANAGEMENT FUNCTIONS**

In addition to reviewing the proposed capital calculation, the staff spent significant time on-site at TBSCI’s headquarters examining the internal risk management control functions and processes described in the application. Division staff reviewed the models and related processes for measuring, aggregating, and limiting the firm’s exposure to market and credit risk, as well as the firm’s treasury and related functions, which are intended to assure adequate liquidity at the holding company level under all market conditions. These processes and functions are not only fundamental to effective internal risk governance, but they also generate critical inputs to the holding company capital calculations required under the CSE rules.



Examination staff in OCIE and NERO (“examination staff”) conducted targeted testing of the operational controls mandated by the CSE rules. The focus of this effort was to assess the adequacy of documentation, notably the firm’s policies and procedures, and then to test that the controls described in the documentation were in place. These reviews included, among other things, a review of the internal audit function, testing of the systems and processes intended to ensure that transactions are properly reflected in the books and records and in the risk management systems of the firm, and testing of the controls around the legal structure of transactions intended to assure enforceability and compliance with applicable laws and regulations.

While the staff identified various issues warranting follow-up, we concluded that these are not material to the overall financial and operational condition of the firm, nor to the overall adequacy of risk controls. The work of the staff, and related conclusions, are summarized below.

#### **A. Market Risk Management**

During July through September 2005, Division staff performed a review of the market risk management function at Bear Stearns. The review focused primarily on the independent market risk management function performed by the Risk Management Department (“RMD”). The staff interfaced primarily with RMD but also had discussions with business unit personnel and representatives of control functions. The review was an iterative process of on-site interactions with Bear Stearns staff, mixed with off-site review and analysis of information and document requests received. The staff found no material deficiencies in Bear Stearns’ market risk management systems, and concluded that the VaR models meet the qualitative and quantitative requirements of the CSE rules.

RMD is run by a Global Head of Risk Management, who reports directly to the firm’s Executive Committee, and includes over forty risk managers. RMD’s primary responsibilities include understanding the market risk profile of each trading area, consolidating market risk firmwide, bringing large market risks or issues to the attention of senior management and, along with business unit controllers (“BUC”), ensuring accurate mark-to-market pricing of positions. In addition, RMD is responsible for the independent model review process, and for the design and maintenance of the firmwide market risk management system known as Risk Information Organized, or “RIO”, which implements the VaR calculations, scenario analyses, and stress tests.

The department is organized geographically (with representation in New York, London, and Tokyo), functionally and, most importantly, by product-line into six primary risk monitoring groups: (1) Credit, (2) Credit Trading, (3) Municipals and Foreign Exchange, (4) Fixed Income Derivatives, (5) Mortgages, and (6) Equities. Risk managers in each of the above groups, while organizationally independent of the businesses, are physically integrated. Each risk manager (and corresponding business unit controller) sits on a trading floor in close proximity to the desks they cover. Within each risk monitoring group, the product-line teams perform virtually all risk monitoring tasks from

the review of individual transactions to the preparation of risk reports and commentary for senior management.

While each separate product-line risk monitoring group typically functions on a “stand-alone” basis, there are certain market risk control functions that are performed more centrally and cut across the various businesses. First, the design and maintenance of RIO (including the VaR calculations) is performed in a central function by the Financial Analytics and Structured Transactions (“FAST”) and Information Technology (“IT”) personnel<sup>10</sup> at the direction of the Global Head of Risk Management. While market risk measurement is a collaborative effort, principally between personnel from the FAST group, RMD and IT, FAST personnel have developed (and will continue to implement) the overall design and architecture, as well as the “nuts and bolts” analytics and technical specifications of the VaR system. RMD risk managers work in concert with FAST personnel to ensure that complex trades are represented properly in VaR and reflect current market conditions, including market conventions and parameter values.

Additionally, RMD has a separate model review team that performs the independent validation of models used for pricing, hedging, and calculation of risk sensitivities for the firm’s trading positions. While the model review team is distinct from the individual product-line risk monitoring groups, the individual model reviewers generally focus on particular products (e.g., equity derivatives) and are very integrated with the product-line risk managers, especially in supporting their efforts regarding price verification and risk sensitivity calculations for complex products.

The staff’s review focused on the market risk measurement, monitoring, and reporting of significant desk level market risk exposures, the aggregation of these exposures at the firmwide level, and the control processes around risk measurement and risk systems. Specific attention was given to businesses generating material or difficult to capture market risk exposures, including mortgages, credit trading, and equity derivatives.

While Bear Stearns’ independent market risk management is broadly consistent with industry standards, it does exhibit some fairly unique features. First, independent risk management is primarily focused on measuring and monitoring risk at the “desk” level, where the firm believes specific action can be taken. As such, while the firm has recently established the ability to aggregate risk at the firmwide level, the firm’s trading limits, including VaR, are set exclusively at the desk level. Secondly, while independent of the business units, RMD’s risk managers provide significant support to the business areas they monitor. They appear to function not only to facilitate the bi-directional flow of information between senior management and the business areas, but also as a “second set of eyes” for trading management. Finally, RMD is unique in its high level of

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<sup>10</sup> While these personnel do not have a direct reporting relationship to RMD, RMD funds their budget and has significant input into all personnel decisions for the group. These personnel have a “dotted-line” reporting relationship to the Global Head of Risk Management who is ultimately responsible for the design and maintenance of the RIO system.

involvement in price verification duties. At most peer firms, these responsibilities are handled primarily by business unit controllers.

The Division staff concluded that independent market risk management at Bear Stearns is functioning effectively and that market risk appears to be adequately measured, monitored and managed given the firm's current market risk profile.<sup>11</sup> The Division staff also found that the VaR models in use at TBSCI to calculate general market risk charges meet the qualitative and quantitative standards of the CSE rules and, in particular, are integrated into the firm's internal risk management process.

Finally, while the review uncovered no material deficiencies, follow-up is warranted in several areas, including Bear Stearns' expansion into energy trading. Further work is also planned focusing on VaR methodology, reconciliation, backtesting, and documentation around the delineation of responsibilities, particularly with respect to the on-going maintenance and design of RIO.

## **B. Credit Risk Management**

From August through September 2005, Division staff performed a review of the credit risk management function at Bear Stearns. The review centered primarily on the independent credit risk management function performed by the Global Credit Department ("GCD"). The staff communicated mostly with GCD but also had discussions with business unit personnel, including the risk management groups established within the Prime Brokerage and Corporate Lending businesses, and the operations staff. The review process consisted of on-site interactions with Bear Stearns personnel and off-site review and analysis of presentations, reports, and documents. The focus was generally on GCD's current and developing processes and infrastructure for credit risk management, the risk management of counterparties that are material or pose particular challenges, and risk metrics and modeling. The staff found no material deficiencies in Bear Stearns' credit risk management systems, and concluded that the exposure models and internal ratings processes are consistent with the requirements of the CSE rules.

The head of GCD reports to Robert Steinberg, a senior managing director and member of the Board of Directors. The head of GCD is also the chair of the formal credit risk decision-making body at Bear Stearns, the Credit Policy Committee ("CPC"), which establishes guidelines for GCD. The CPC, which is composed of senior officers of GCD as well as senior members of the market risk group, legal group, and business management, was established by the Executive Committee and has final responsibility and authority for counterparty credit risk management. It approves exposure measurement standards, reviews credit risk concentrations, and sets documentation

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<sup>11</sup> On September 8th, Bear Stearns and Calpine Corporation announced publicly that they agreed to form a new energy trading venture, CalBear Energy LP (CalBear). CalBear, a wholly owned Bear Stearns subsidiary, will focus on developing a significant customer business based on physical and financial natural gas and power trading and related structured transactions. CalBear trading operations will begin by the end of 2005.

policies. A subcommittee of the CPC, the Global Credit Committee, reviews and approves counterparty limits and collateral requirements.

The responsibilities of assessing counterparty credit worthiness, including conducting due diligence and assigning counterparty credit ratings, establishing credit lines and approving certain transactions, determining credit and collateral terms, measuring counterparty credit risk exposures, and the day-to-day monitoring and reporting of exposures are delegated to GCD. In short, GCD's mandate is to ensure that counterparty credit risks are understood and appropriately managed, and that the firm's credit risk profile is consistent with the firm's risk appetite.

GCD has approximately 80 employees, located in New York, San Francisco, London, Dublin, Hong Kong, and Tokyo. The group is organized into seven departments, each run by a managing director or senior managing director who reports to the Head of GCD. Responsibilities are divided among the regional offices according to counterparty location. Within the United States, coverage is subdivided by counterparty industry with, for example, a dedicated group covering financial institutions. There is also a department responsible for credit risk methodologies and measurement, a group responsible for evaluating and determining credit terms for loans secured by restricted, concentrated or less liquid securities, and a policy and administration department.

Bear Stearns' credit risk generating activities include over-the-counter ("OTC") derivatives trading, securities financing transactions or repos, including "warehouse facilities", prime brokerage, and corporate lending. OTC derivatives generate current as well as potential credit exposures to a variety of counterparties. The warehouse lending business finances large pools of whole loans for residential mortgage originators, with the financing secured by the underlying mortgage assets. The prime brokerage business provides secured financing to a large number of hedge fund counterparties via margin lending. Finally, the corporate lending business, among other activities, originates non-investment grade loans to finance event-driven transactions such as leveraged buy-outs.

Division staff focused their efforts on understanding the processes applicable to the counterparties that are most material or challenging from a risk management perspective. These included hedge funds, mortgage banks, and municipal counterparties. In addition, staff examined several key GCD risk management tools and processes that are broadly used in managing counterparty exposure. The methodology for measuring potential credit exposure, a primary tool for monitoring and limiting risk, was reviewed in detail. Staff also examined GCD's approach to assessing counterparty credit quality, including the scorecard-based approach to assigning internal credit ratings, a key input in determining counterparty limits.

The prime brokerage and corporate lending businesses have established their own credit procedures, as assessing risks in these areas requires some specialized techniques. Risk management of prime brokerage, in particular, requires a battery of analytics and skill set for understanding the risks inherent in the fund trading strategies. Division staff

examined these business-based control processes and infrastructures as well.

The staff concluded that the credit risk management function at Bear Stearns appears to be well-designed and effective, and that credit risks appear adequately measured, monitored, and managed given the firm's current credit risk profile. The firm's risk appetite is communicated to the business areas through the credit risk limits framework, as well as through the on-going dialogue between the respective credit risk officers and the business areas. Likewise, the measurement and reporting of credit risk exposures against these limits appears to be effective and to rely upon appropriate techniques. Finally, the processes around upfront credit permissioning, as well as post-transaction monitoring of risks, appear to be robust and comprehensive. The staff found that the approaches to the measurement of counterparty credit risk are consistent with the qualitative and quantitative requirements of the CSE rules.

Though the review uncovered no material deficiencies, several areas warranting further attention were identified. In particular, the staff plans additional work related to credit risk controls surrounding Bear Stearns' new energy trading venture. This will include, but will not be limited to, assessing GCD's ability to adequately measure the exposures associated with these new transactions. The staff will also continue to monitor credit risk management related to business areas that lend against illiquid assets. This activity includes derivative transactions entered into by Bear referencing hedge fund shares as the underliers. Finally, the staff will continue to work with GCD personnel in developing a satisfactory approach to validating potential exposure metrics.

### **C. Liquidity Risk Management**

Division staff reviewed Bear Stearns' liquidity risk management function, primarily to evaluate the firm's ability to assure adequate liquidity and funding at all times, including during periods of significant market fluctuations and financial stress. The review consisted of presentations, interviews, and discussions with senior management of Bear Stearns' Treasurer's Department ("Treasurer's Department"), as well as consultation with the internal auditors. The staff reviewed the governance structure, organization structure, lines of authority, policies, internal management reports, and various other documents including the Contingency Funding Plan, which is described below. The staff found no material deficiencies in Bear Stearns' liquidity risk management control system.

Bear Stearns' CFO and Treasurer monitor the firm's liquidity and leverage on a regular basis. They are supported by three assistant treasurers responsible for liquidity risk management, global funding, and bank relations. Each individual has clear responsibilities for informing the firm's senior management and communicating with third parties on matters relating to liquidity risk management and capital management. The Treasurer's Department serves as an independent risk oversight group responsible for managing global liquidity and funding risk, providing independent input to the business units on funding and liquidity risk, and providing relevant reports and

recommendations to senior management. Key elements of the firm's liquidity framework are the liquidity ratio, cash capital, and the Contingency Funding Plan.

The firm monitors its cash position and the borrowing value of unencumbered securities plus the unsecured portion of the firm's committed revolving credit facility in relation to its unsecured debt maturing over the next 12 months, the goal of which is to maintain the ratio of liquidity sources to maturing debt at 100 percent or greater. For purposes of this analysis, the ratio is computed both with and without the unsecured revolving facility.

As of May 31, 2005, the borrowing value of unencumbered securities was \$21.7 billion. The assets primarily comprise agency and non-agency mortgage- and asset-backed securities, investment grade and non-investment grade municipal and corporate bonds, and U.S. equities. Average advance rates on these different asset types range from 71 percent to 98 percent (haircuts of two percent to 29 percent), and are calibrated in most cases based on committed secured facilities that the firm and its subsidiaries maintain in different regions globally. Critical to the liquidity of the unencumbered assets is the size, availability, and development of this committed secured funding infrastructure. As of May 31, 2005 the liquidity ratio was 174 percent taking into account the unsecured revolving facility, and 163 percent without this source of liquidity.

The cash capital framework is used to evaluate the firm's long-term funding sources and requirements. Cash capital (i.e., equity plus long-term debt maturing in more than 12 months) required to support all of the firm's assets is determined on a regular basis. The two primary categories of cash capital usage, as described by the firm, are firmwide haircuts and illiquid assets/long-term investments. The first category represents the aggregation of the portion of assets that cannot be readily financed on a secured basis in a stressed environment. This component includes capital needed to support the vast majority of the firm's assets, including trading-related assets, inventory, reverse repos, margin loans, and committed funding obligations. The second category consists of items not easily or readily financed on a secured basis that are 100 percent financed by cash capital. These items include fixed assets, goodwill, merchant banking and other illiquid investments, restricted securities, excess capital in regulated subsidiaries, and other assets.

As of May 31, 2005 the firm's net cash capital position was \$305.3 million. Fluctuations in net cash capital are common and are due to fluctuations in total assets, balance sheet composition, and total capital. Treasury targets a minimum for net cash capital equal to 2.5 percent of firmwide haircuts, which on average approximates \$1.0 billion. In June 2005, the firm issued \$1.7 billion of long-term debt. Cash capital uses increased \$3.6 billion in June 2005 resulting in net cash capital of negative \$2.3 billion at the end of June 2005. Long-term debt issuances of \$2.6 billion in July 2005 combined with a reduction in cash capital uses of \$1.6 billion resulted in net cash capital of \$2.0 billion at the end of July 2005. Over the 12 months prior to May 2005, the firm's net cash capital position averaged \$1.1 billion.

Bear Stearns' liquidity risk management framework is supported by the maintenance of a formal documented Contingency Funding Plan ("CFP"). The purpose of the CFP is to provide a list of action steps to ensure the ability of TBSCI and its affiliates to manage a liquidity crisis on a consolidated basis. A liquidity crisis is defined as an event-driven loss of uncommitted, unsecured, confidence based funding. The objective is to allow the firm to meet its maturing obligations as they occur over a 12-month period with minimal disruption to ongoing business operations and without having to rely upon access to additional unsecured funding. The CFP includes a detailed delegation of authority and precise action steps for managing an event-driven liquidity crisis.

The firm funds its business on a global basis through diverse sources. These sources include common and preferred equity, long-term debt, commercial paper, repurchase agreements, securities lending, free credit balances, other short-term obligations, letters of credit, and committed and uncommitted credit facilities.

Short-term financing is obtained on both a secured and unsecured basis. Secured financing is obtained through the use of repurchase agreements, securities loaned, and master notes. Unsecured financing is obtained primarily by the issuance of commercial paper. As of May 31, 2005 Bear Stearns' balance sheet included \$65.7 billion of repurchase agreements and stock borrowed, \$10.0 billion of master notes, and \$6.3 billion of commercial paper.

Bear Stearns seeks stable and diversified funding sources not only in terms of the types of transactions and instruments used to provide funding, but also with regard to diversification of investors. Emphasis is placed on broad diversification of investors with limits on the maximum amount authorized from any one investor to protect the firm from investor concentration. There is also an emphasis placed on geographical diversification. Bear Stearns also monitors the maturity profile of its unsecured debt to minimize refinancing risk. The maturity of the long-term debt portfolio is monitored on an ongoing basis and structured within the context of two diversification guidelines. The firm has a general guideline of approximately no more than 20 percent of its long-term debt portfolio maturing in any one year, as well as no more than 10 percent maturing in any one quarter over the next five years. The firm's total capital at the quarter ended May 31, 2005 stood at \$49.3 billion consisting of long-term debt of \$39.7 billion and stockholders' equity of \$9.6 billion.

The review of the liquidity risk management functions of Bear Stearns identified two areas of concern, both of which are in the process of being resolved by the firm. First, there are no formal documented policies and procedures for the global treasury function at Bear Stearns, other than the Contingency Funding Plan. While it appears, based on the staff's review, that the firm has an adequate liquidity risk management system, documented policies and procedures are critical for consistency of the risk management process. Bear Stearns has agreed to develop a comprehensive set of policies and procedures to be completed by mid-November 2005.

Second, an integral part of the liquidity risk management process at the four previously approved CSEs is the maintenance of a parent company liquidity portfolio consisting of cash and highly liquid securities immediately available to the parent company that may be monetized or sold to provide liquidity anywhere in the holding company chain. While it is the staff's opinion that Bear Stearns' "parent company only" liquidity analysis and process is adequate, the current process might not prove sufficiently transparent to lenders, counterparties, and other market participants. The Division therefore recommended that Bear Stearns establish a parent company liquidity portfolio. If the securities to be included in the liquidity portfolio are held in a regulated entity, there must be a mechanism in place that allows these securities to be immediately available to the parent company on a daily basis without regulatory restriction. There are multiple ways to achieve this including the daily pledging of securities as collateral for intercompany loans to subsidiaries or via a reverse repurchase agreement between the parent company and the subsidiary.

Discussions were held with the Assistant Treasurer – Liquidity Risk Management, the Controller and the CFO during September 2005 to determine an acceptable structure and minimum amount to be established. Management at Bear Stearns, including the CFO, has agreed to establish a parent company liquidity pool consisting of a minimum of \$2.0 billion in cash equivalents held at the parent company to be in place by mid-November 2005 and a minimum of \$3.0 billion of high quality unencumbered debt and equity securities to be held in a third-party custodial account in the name of the parent company that are pledged as collateral for intercompany loans from the parent. Bear Stearns has indicated that this pledged collateral facility will be in place prior to December 1, 2005.

#### **D. Internal Controls Examination**

Examination staff in OCIE and NERO ("examination staff") conducted targeted testing of the operational controls mandated by the CSE rules. The examination staff focused on the following areas: internal audit; anti-money laundering controls; capital computations; Sarbanes Oxley internal controls; and the firm's internal control systems for managing market, legal and compliance, credit, funding and liquidity, and operational risks, including business continuity planning. The staff conducted various tests of the firm's implementation of its procedures and their compliance with the requirements under Exchange Act Rule 15c3-4 focusing on the following businesses conducted within material affiliates: credit derivatives – primarily credit default swaps, fixed income derivatives – primarily municipal and mortgage derivatives, residential whole loans, and commercial mortgages.<sup>12</sup>

Below is a summary of the most significant findings of the risk management and internal controls based review. A more complete description of the findings is appended at Tab G.

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<sup>12</sup> These primary business activities are conducted in the following affiliates: Bear Stearns Credit Products Inc.; Bear Stearns Capital Markets Inc.; EMC Mortgage Corporation; and Bear Stearns Commercial Mortgage, Inc.



## 1. Internal Audit

The examination staff conducted a review of TBSCI's Internal Audit Department ("IAD"). The review focused on the adequacy of the audit program and, in particular, its coverage of unregulated affiliates. The staff evaluated whether the IAD adhered to its stated audit procedures, and whether the internal audit staff communicated its findings to the Audit Committee of the Board of Directors and to senior management in a timely and appropriate fashion.

The staff's review noted the firm's policy of discarding certain audit workpapers 60 days after the issuance of the Audit Report. While IAD's procedures require that certain workpapers be maintained, the procedures also require that other supporting documents, such as the Potential Issues Log, general testing schedules, narratives describing procedures performed, and other underlying documents that evidence the review, testing, and potential findings of the audit, are to be discarded 60 days after the final Audit Report is issued. The staff found that the policy of discarding IAD audit supporting documents leaves no evidential support that IAD performed its planned audit work. The lack of workpapers also deprives IAD of a useful source of information in evaluating the need for and scope of future audits.

The firm has agreed to amend its policies and procedures to require the retention of lists of the sample items selected for testing, results of such testing, and any narratives prepared describing the overall work flows in the area. The new retention policy will apply to all audits commencing after November 1, 2005.

## 2. Operations Risk Management (Trade Processing and Data Integrity)

The examination of trade processing and data integrity by the examination staff traced the progress of selected transactions from entry into the front-office system to proper reflection in the firm's books and records. A particular focus was transactions booked in unregulated entities. Also of particular interest were transactions involving products that are not securities and, therefore, for which the relevant infrastructure has not been previously examined by the Commission. The review sought to verify not only that the resulting positions are properly reflected in the books and records of the firm, but also that the associated market and credit exposures are properly reflected in the relevant risk information systems. In some cases, the information flow to the risk systems consists solely of positions. In other cases, the information flow includes certain risk parameters that are calculated by the front-office systems. Reconciliation processes between systems were tested, as were the resolution of discrepancies identified through these processes.

The staff's review noted several minor weaknesses, and also that differences (or "breaks") between the front-office system used for mortgages and the back-office trade blotters do not appear to always have been resolved in a timely manner. As of July 15, 2005 there was a total of 492 differences or "breaks", of which, 234 were aged greater than 100 days. In response, the firm acknowledged the issue and, while noting that the

amounts involved are not material, indicated additional resources would be deployed to strengthen the process. As evidence of this commitment, the firm cites that the number of breaks aged greater than 100 days had fallen, by November 1, to 83 items. The staff will continue to monitor the firm's progress in addressing these issues during subsequent examinations.

### 3. Legal and Compliance Risk Management

In addition to a number of issues related to policies and procedures discussed below, the staff's review of the legal and compliance area noted several weaknesses in the firm's controls. The legal and compliance group has not formally documented the identification or assessment of all applicable rules, laws, regulatory requirements and risks pertinent to the entire organization. The firm's written procedures generally state that matters should be escalated to the appropriate parties, but there is no specific escalation process. As a result, the firm failed to maintain an audit trail of issues identified and escalated from subordinates to senior management. In addition, the firm's monitoring and surveillance system is based on an informal process and does not have the capability to track issues or trends that develop over time. The staff also noted that the Compliance Department has undergone significant personnel changes, raising concerns about the adequacy of staffing.

In response, the firm noted that the Director of Global Compliance has only been in the position since August 2005 and is in the process of reorganizing the group and addressing gaps in coverage. The firm also indicated that plans will be developed to improve the surveillance process. The staff will continue to monitor the firm's progress during subsequent examinations.

### 4. Policies and Procedures

The reviews conducted by the examination staff consistently identified issues with regard to the firm's written policies and procedures. The examination staff's review noted that in a number of areas the firm's written procedures were inadequate or incomplete. Highlighted below are a few examples noted by the examination staff regarding such issues:

- The firm's Market Risk Management function has a set of general policies but no procedures for its risk management functions describing how these are to be implemented. The firm has established limited policies addressing new trading limits, limit breaches, exceptions, limit reporting and all other risk management controls, but such policies appear in many cases to lack specificity.
- A review of the firm's price verification process revealed that existing policies lacked procedural controls to require trader level or portfolio level reviews based upon predetermined thresholds. Additionally, the policies failed to specify the Risk Management and Business Unit Controller responsibilities regarding price verification.

- A review of the firm’s pricing model validation policy disclosed a lack of specificity as to the procedures to be utilized to address concerns raised during the validation process. The staff reviewed ten model review reports from early 2004 to early 2005. The review disclosed that in one instance an “initial analysis” cited concerns about outdated models but no recommendations for corrective actions were made. In addition, three reports recommended advanced pricing models be implemented; however, as of the time of the staff’s review, the advanced models had not been implemented because the recommendation was not a high priority.
- A review of the inventory aging reports for the products reviewed by the staff noted the lack of policies and procedures for the aging of fixed income derivatives. As a result, the firm did not properly reflect the aging of certain fixed income derivatives positions. In addition, the procedures did not specify the timing of the distribution of the reports as the staff noted that risk managers received a report showing aged positions held by a mortgage subsidiary for the period ending May 31, 2005 on August 23, 2005, approximately 11 weeks late.
- The firm lacks formalized policies and procedures regarding the middle office and operational controls in processing transactions.
- A review of the firm’s unsigned confirmation backlog revealed that the firm used inconsistent practices in resolving outstanding unsigned confirmations. The firm’s Derivatives Documentation Handbook does not include guidelines defining the time frame within which the first follow-up attempt, and subsequent follow-up attempts, should be made with counterparties that have outstanding unsigned confirmations.
- With the exception of a limited contingency funding plan, the firm has not implemented written policies and procedures related to the funding and liquidity area.
- The firm has not yet fully developed comprehensive policies and procedures for its independent Operational Risk Management function, particularly with regard to the delineation of responsibilities and the process for collection and verification of events.
- The Derivatives Operations area does not have written procedures regarding how to resolve disputed margin calls or how to handle delinquent margin calls.

In addition to the lack of procedures, the staff also noted a number of instances where the firm failed to follow its own procedures. Examples of such instances include the following:

- The staff’s review of the Credit Risk Management area noted that the firm failed to perform an annual review for all counterparty’s limits and ratings on an annual

basis as required by its written policies and procedures. The staff's review of the September 22, 2005 "Clients to be Reviewed" report revealed that 745 counterparties (of a total of approximately 9,500 counterparties) were overdue for a credit review. Of these, nine were overdue by greater than 90 days.

- The staff's review of twelve scorecards (which were utilized in the credit ratings process) found that the credit analyst did not record the rationale as required in five of the eleven instances when one or more category ratings differed from the scorecard's suggested rating.
- The Legal and Compliance Group failed to document its review for Qualified Institutional Buyer compliance for Leveraged Finance transactions.
- The firm failed to follow its written procedures regarding the escalation and documentation of surveillance review exceptions of mortgage securities transactions (specifically, adjustable rate mortgage transactions).

In general, the firm accepted the staff's findings with regard to the need for additional or enhanced written policies and procedures. The firm also acknowledged the lapses noted by the staff, and agreed to make improvements to their processes. The staff will assess the firm's progress in strengthening its policies and procedures, and their implementation, during the next examination.

## V. CAPITAL CALCULATION

As required by the CSE rules, TBSCI will compute capital adequacy monthly at the group level in accordance with Appendix G.

*Allowance for Market Risk.* The firm has determined that most of its positions meet the Basel II definition of trading book assets and are therefore subject to a market risk allowance. This allowance will be calculated either using a VaR model or, in the case of certain less liquid products, using scenario analysis.

The model-based market risk charge will generally be the VaR measure multiplied by a factor of three, assuming acceptable backtesting results. Where specific risk is included in the model, but where the effectiveness of the model has yet to be demonstrated by, for example, positional backtesting measure, the multiplication factor will be increased by one. As Bear Stearns has yet to implement full positional backtesting, the initial multiplier will be four. Where specific risk is not included in the model, the market risk allowance will include a specific risk add-on, similar to that specified under Regulation Y of the Federal Reserve. As the firm amends its VaR models to more completely capture specific risk, it will likely seek approval to reduce the specific risk add-ons. The capital requirements arising from the specific risk add-ons are more than twice the general market risk charge arising from the use of the model. As of July 31, 2005, firmwide trading VaR was \$26 million. The capital charge associated with

this risk measure, before the addition of certain specific risk charges, was \$462 million.<sup>13</sup> Total market risk charges, including the specific risk add-ons, totaled \$1.7 billion.

*Allowance for Credit Risk.* The firm will calculate credit risk on warehouse lending, event and bridge loans, and non-investment grade loan syndications. Credit risk allowances are also computed for certain retained interests for commercial and residential mortgage securitizations, notably lower-rated and net interest margin (“NIM”) tranches. TBSCI is currently applying the maximum potential exposure approach to counterparty credit risk. Over the next year, the firm is expected to transition to the “expected potential exposure” approach described in “The Application of Basel II to Trading Activities and the Treatment of Double Default,” published by the Basel Committee in July 2005. This change will likely decrease the relevant allowances by approximately one-third. As of July 31, 2005, the total credit risk allowance was \$2.0 billion applying the current methodology.

*Allowance for Operational Risk.* Until the Commission determines that the firm may apply a model-based approach to calculating operational risk, the firm will use the basic approach permitted under Basel II. The operational risk allowance will be 15 percent of net revenues, averaged over the preceding three years. For the fiscal year ending November 30, 2004, the operational risk allowance was \$0.9 billion.

For purposes of its capital calculation, TBSCI has requested Commission permission to count certain long-term debt as part of its capital during a three-year phase-out period in accordance with the CSE rules. This inclusion of long-term debt would represent a departure from Basel II. In order to ensure that equivalency issues not be raised, we have informed the bank regulators of our intention to afford TBSCI and other CSEs this treatment during the phase-out period. They raised no objections. TBSCI has included long-term debt as Tier 2 capital up to a combined limit equal to 50 percent of Tier 1 capital, consistent with Basel II and Appendix G.

Pro forma group level capital calculations, as of July 31, 2005, are attached at Tab B.

BS&Co.’s broker-dealer market and credit risk capital charges will generally be computed similarly to the market and credit risk allowances at the group level.

Pro forma broker-dealer level capital calculations, as of July 31, 2005, are attached at Tab B.

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<sup>13</sup> Firmwide VaR is calculated using a 95 percent one-day confidence level. The capital charge is calculated using a 99 percent ten-day confidence level and a multiplier of four.

## **VI. CONCLUSION**

Based upon the application, the staff's review of the application, the financial condition and internal risk management control systems of TBSCI and BS&Co., and the written undertaking of TBSCI, the Division has determined that BS&Co. has met the requirements of Appendix E and is in compliance with other applicable rules promulgated under the Securities Exchange Act of 1934 and by self-regulatory organizations, and that TBSCI is in compliance with the terms of its undertaking, as provided to the Commission.

## **VII. RECOMMENDATION**

We recommend that the Commission issue the attached order approving the application of BS&Co. to compute capital charges for market and credit risk pursuant to Appendix E and for consolidated supervision under the CSE rules.

### **Attachments:**

- Tab A: Order Permitting BS&Co. to Calculate Capital Charges Pursuant to Appendix E
- Tab B: Pro-forma Capital Calculations for TBSCI and BS&Co.
- Tab C: Designated Material Affiliates of TBSCI
- Tab D: Report on Market Risk Management Review
- Tab E: Report on Credit Risk Management Review
- Tab F: Report on Liquidity Risk Management Review
- Tab G: Summary of OCIE's Examination of TBSCI and BS&Co.

UNITED STATES OF AMERICA  
BEFORE THE  
SECURITIES AND EXCHANGE COMMISSION

SECURITIES EXCHANGE ACT OF 1934  
Release No. XXX / November XX, 2005

ORDER REGARDING ALTERNATIVE NET CAPITAL COMPUTATION FOR  
BEAR, STEARNS & CO. INC., WHICH HAS ELECTED TO BE SUPERVISED ON A  
CONSOLIDATED BASIS

Bear Stearns & Co., Inc. (“BS&Co.”), a broker-dealer registered with the Securities and Exchange Commission (“Commission”), and its ultimate holding company, The Bear Stearns Companies Inc. (“TBSCI”), have indicated their desire to be supervised by the Commission as a consolidated supervised entity (“CSE”). BS&Co., therefore, has submitted an application to the Commission for authorization to use the alternative method of computing net capital contained in Appendix E to Rule 15c3-1 (17 CFR 240.15c3-1e) to the Securities Exchange Act of 1934 (“Exchange Act”).

Based on a review of the application that BS&Co. submitted, the Commission has determined that the application meets the requirements of Appendix E. The Commission also has determined that TBSCI is in compliance with the terms of its undertakings, as provided to the Commission under Appendix E. The Commission, therefore, finds that approval of the application is necessary or appropriate in the public interest or for the protection of investors.

Accordingly,

IT IS ORDERED, under paragraph (a)(7) of Rule 15c3-1 (17 CFR 240.15c3-1) to the Exchange Act, that BS&Co. may calculate net capital using the market risk standards of Appendix E to compute a deduction for market risk on some or all of its positions, instead of the provisions of paragraphs (c)(2)(vi) and (c)(2)(vii) of Rule 15c3-1, and

using the credit risk standards of Appendix E to compute a deduction for credit risk on certain credit exposures arising from transactions in derivatives instruments, instead of the provision of paragraph (c)(2)(iv) of Rule 15c3-1.

By the Commission.

Jonathan G. Katz  
Secretary



**THE BEAR STEARNS COMPANIES, INC. - CONSOLIDATED**  
**CSE Capital Computation**  
**As of 7/31/05**

CREDIT RISK	Gross balance	SEC CSE RWA
<b>Transaction type</b>		
Cash and Cash Equivalents	3,966	647
Segregated Cash and Customer Securities	5,594	-
Repo & reverse repo	167,023	1,804
Stock borrowing/lending	119,753	441
Margin lending	35,534	5,155
OTC derivatives	4,689	9,381
CTC Loans (Unfunded Commitments)	408	170
CTC loans drawn	502	1,047
Mortgage warehousing - Unfunded Commitments	707	9
Private Equity / Illiquid Assets	1,434	1,720
Broker Dealer Receivables	3,675	2,150
All other	4,172	2,109
<b>Gross Credit Total</b>	<b>347,457</b>	<b>24,633</b>
Repo and stock loan liabilities; margin credits	(129,102)	
Minus Assets included in Long Inventory	(4,689)	
Unfunded Commitments	(1,400)	
<b>Net Credit Assets</b>	<b>212,265</b>	
<b>MARKET RISK</b>		
	<b>4 X 10-day VaR</b>	<b>4 X 10-day VaR X 12.5</b>
Long Inventory 105,592	462	5,779
Short Inventory 34,053		
	<b>Non-VaR Charges</b>	
Specific Risk charges	963	12,038
Defaulted Consumer Loans	75	942
Other Trading Book Assets not in VaR	180	2,249
Alternative Methods	255	3,191
<b>Total Market Risk Charges</b>	<b>1,681</b>	<b>21,008</b>
<b>OPERATIONAL RISK</b>		
	<b>15% of Average Revenues</b>	<b>SEC CSE RWA</b>
	940	11,750
<b>TOTAL RISK WEIGHTED ASSETS</b>		
	<b>Total Assets Above</b>	<b>SEC CSE RWA</b>
<b>Total Expected Losses - Reserves</b>	331,121	57,391
		259
<b>SOURCES OF CAPITAL</b>		
Common Stock	185	185
Employee Stock Comp. Plans	2,106	2,106
Unearned Comp	(123)	(123)
Additional Paid-In Capital	3,878	3,878
Treasury Stock	(3,623)	(3,623)
Cumulative Preferred Stock - Series E	175	175
Cumulative Preferred Stock - Series F	94	94
Cumulative Preferred Stock - Series G	104	104
Retained Earnings	6,988	6,988
<b>Gross Tier 1 Capital</b>	<b>9,784</b>	<b>9,784</b>
Securitization Residuals	325	(325)
Minority Interests	486	486
50% Shortfall in Reserves	-	(129)
Goodwill & Identifiable Intangibles		(351)
Deferred Tax Assets		(1,713)
Recovery of Deferred Tax Assets		340
<b>NET TIER 1 CAPITAL</b>	<b>10,595</b>	<b>8,092</b>
Adjustable Rate Preferred	-	-
Capital Trust Preferred Stock	263	263
Subordinated Debt	-	-
Qualifying Long Term Debt	4,983	4,046
<b>Gross Tier 2 Capital</b>	<b>5,246</b>	<b>4,309</b>
Securitization Residuals	325	(325)
50% Shortfall in Reserves	-	(129)
<b>NET TIER 2 CAPITAL</b>	<b>5,571</b>	<b>3,854</b>
<b>TOTAL ALLOWABLE CAPITAL</b>	<b>16,165</b>	<b>11,947</b>
<b>TIER 1 CAPITAL / RWA</b>		<b>Ratios</b>
<b>TOTAL CAPITAL / RWA</b>		<b>14.10%</b>
		<b>20.82%</b>

<b>Detail</b>
<b>Pro-Forma Broker/Dealer Calculation</b> <b>7/31/2005</b>
<b>(\$ millions)</b>

	Current			CSE		
	BS&Co Cons	BS&Co Uncon	BSSC	BS&Co Cons	BS&Co Uncon	BSSC
Equity	3,562	3,562	1,130	3,562	3,562	1,130
Equity Subordination	1,200	-	1,200	1,200	-	1,200
Sub Debt	5,780	3,770	2,010	5,780	3,770	2,010
<b>Gross Capital</b>	<b>10,542</b>	<b>7,332</b>	<b>4,340</b>	<b>10,542</b>	<b>7,332</b>	<b>4,340</b>
Allowable Credits	11	11	-	11	11	-
Gross Allowable Capital	<b>10,553</b>	<b>7,343</b>	<b>4,340</b>	<b>10,553</b>	<b>7,343</b>	<b>4,340</b>
<b>Non Allowable Assets</b>	<b>2,885</b>	<b>3,882</b>	<b>133</b>	<b>1,216</b>	<b>2,213</b>	<b>133</b>
Non-Marketable Securities	2,279	2,269	10	610	600	10
Equity in BSSC	-	1,130	-	-	1,130	-
Swap Receivable	-	-	-	-	-	-
Other Non-Allowable	606	484	122	606	484	122
Other Charges	456	242	214	456	242	214
<b>Total Deductions</b>	<b>3,342</b>	<b>4,125</b>	<b>347</b>	<b>1,673</b>	<b>2,456</b>	<b>347</b>
<b>Tentative Net Capital</b>	<b>7,212</b>	<b>3,218</b>	<b>3,993</b>	<b>8,881</b>	<b>4,888</b>	<b>3,993</b>
Minimum Required TNC	-	-	-	5,000	1,000	-
<b>Excess TNC</b>				<b>3,881</b>	<b>3,888</b>	<b>-</b>
Haircuts(VaR for CSE)	2,430	2,377	53	553	500	53
Specific Risk	-	-	-	300	300	-
CSE OTC Derivative credit charges				100	100	-
25% of Haircuts	594	594	-	-	-	-
CSE Minimum net capital requirement					500	
5% of ADI	2,777	-	2,777	2,777	-	2,777
<b>Total Requirements</b>	<b>5,801</b>	<b>2,972</b>	<b>2,830</b>	<b>3,730</b>	<b>1,400</b>	<b>2,830</b>
<b>Excess Net Capital</b>	<b>1,410</b>	<b>247</b>	<b>1,163</b>	<b>5,151</b>	<b>3,488</b>	<b>1,163</b>
5.5% of ADI	3,054	-	3,054	3,054	-	3,054
<b>Total Requirements at 5.5% ADI</b>	<b>6,079</b>	<b>2,972</b>	<b>3,107</b>	<b>4,007</b>	<b>1,400</b>	<b>3,107</b>
<b>Excess Net Capital @ 5.5% ADIs</b>	<b>1,132</b>	<b>247</b>	<b>886</b>	<b>4,873</b>	<b>3,488</b>	<b>886</b>

## **2.1 Structure of the Company**

TBSCI is the parent company of BS&Co., a global investment banking, trading and sales firm. TBSCI was incorporated under the laws of the State of Delaware on August 21, 1985. TBSCI is a holding company that conducts its business activities through its broker-dealer and international bank and other subsidiaries, principally BS&Co.; BSSC; Bear, Stearns International Ltd. ("BSIL") and Bear Stearns Bank plc ("BSB"). TBSCI also conducts significant activities through other wholly-owned subsidiaries including: Bear Stearns Global Lending Limited, Custodial Trust Company, Bear Stearns Financial Products Inc., Bear Stearns Capital Markets Inc., EMC Mortgage Corporation, Bear Stearns Mortgage Capital Corporation, Bear Stearns Credit Products Inc. and Bear Stearns Forex Inc. As of November 30, 2004, Bear Stearns had 10,961 employees.

The TBSCI Organization Chart showing material affiliates is attached as Appendix 1 and a list of all TBSCI affiliates is attached as Appendix 2. Consolidated and consolidating financial statements for TBSCI and material affiliates are attached as Appendix 3. Below are brief descriptions of material affiliates and regulated entities.

BS&Co. and BSSC are broker-dealers and investment advisors registered with the SEC.. Together these entities are members of the NYSE, all other principal U.S. securities and futures exchanges, the National Association of Securities Dealers, Inc. ("NASD"), the Commodity Futures Trading Commission ("CFTC"), the National Futures Association ("NFA") and the ISE. BS&Co. is a "primary dealer" in U.S. government securities as designated by the Federal Reserve Bank of New York.

BSIL is a full service broker-dealer based in London and is a member of various European exchanges including Eurex Deutschland ("EUREX"), the International Petroleum Exchange ("IPE"), Euronext Liffe ("LIFFE"), Euronext Paris and Euronext Amsterdam. BSIL provides investors and issuers with a full range of products and services in international and US equities, fixed income, exchange-traded futures and options and foreign exchange. In addition, BSIL is a major sales and trading center within the Company's global fixed income, credit and equity-related derivative businesses. BSIL has an investment banking capability and also services the Company's growing prime brokerage business in Europe.

Bear Stearns International Trading Limited ("BSIT") is also based in London and provides investors and issuers with products and services in various non-dollar-denominated equity securities.

Both BSIL and BSIT are authorized and regulated in the United Kingdom by the Financial Services Authority ("FSA"), pursuant to The Financial Services and Markets Act 2000.

BSB, based in Dublin, Ireland, was registered in 1996 and subsequently granted a banking license on April 10, 1997 under the Irish Central Bank Act, 1971. BSB allows the Company's existing and prospective clients the opportunity of dealing with a banking

counterparty. BSB also serves as a platform from which the Company directs some of its international banking activities, gaining access to worldwide markets and thereby expanding its capacity to increase its client base and product range. BSB engages in capital market activities with particular focus on the trading and sales of OTC interest rate derivative products. BSB also provides custody and trustee services to the growing number of alternative investment funds domiciled in Ireland and in other offshore jurisdictions. BSB is regulated by the Irish Financial Services Regulatory Authority (formerly the Central Bank of Ireland).

Bear Stearns Global Lending Limited ("BSGL") provides loans to certain Bear Stearns customers. BSGL is incorporated in the Cayman Islands.

Custodial Trust Company ("CTC"), an FDIC-insured New Jersey state chartered bank, offers a range of trust, lending and securities-clearance services. As a bank, CTC has access to the securities and funds-wire services of the Federal Reserve System. CTC provides trust, custody, agency and securities lending services for institutional accounts; commercial and margin lending; the clearance of government securities for institutions and dealers; and the processing of mortgage and mortgage-related products. At November 30, 2004, CTC held approximately \$81 billion of client assets, including institutional clients such as pension funds, mutual funds, endowment funds and insurance companies.

Bear Stearns Financial Products Inc. ("BSFP") transacts business as a triple-A-rated counterparty to eligible clients, offering a wide range of derivative products. Eligible clients are those rated A3 or better by Moody's Investors Service, Inc. and A- or better by Standard & Poor's Ratings Services or counterparties otherwise acceptable to both rating agencies. BSFP transfers its market risk associated with derivative transactions to other affiliates of Bear Stearns. BSFP is incorporated in the state of Delaware.

Bear Stearns Capital Markets Inc. ("BSCM") is primarily engaged in executing derivatives transactions and hedges associated therewith. BSCM is incorporated in the state of Delaware.

EMC Mortgage Corporation ("EMC") is a mortgage servicer and lender based in Irving, Texas. EMC purchases both conforming and non-conforming, fixed rate and adjustable rate residential mortgage loans with servicing released or retained and sells such loans to investors. EMC also purchases and sells residual securities and mortgage servicing rights. EMC is incorporated in the state of Delaware.

Bear Stearns Commercial Mortgage, Inc. ("BSCMI") is primarily engaged in the acquisition and securitization of commercial mortgage loans for resale in the form of pass-through securities ("certificates"). These certificates represent fractional and undivided interests in pools of mortgage loans held in a trust. BSCMI is incorporated in the state of New York.

Bear Stearns Mortgage Capital Corporation ("BSMCC") buys conventional residential mortgage loans as secondary market conduit and resells to institutional investors as whole loans or to a special purpose entity to deposit into a trust which will issue mortgage-pass through certificates.

EMC, BSCMI and BSMCC are subject to reporting requirements and periodic examinations by individual state regulators as well as Housing and Urban Development ("HUD").

Bear Stearns Credit Products Inc. ("BSCPI") is engaged in credit derivatives transactions and hedges associated therewith. BSCPI is incorporated in the state of Delaware.

Bear Stearns Forex Inc. ("BSFX") is a foreign exchange dealer engaged in foreign currency transactions and hedges associated therewith. BSFX is incorporated in the state of Delaware.

Bear Stearns (Japan), Ltd. ("BSJL"), based in Tokyo, serves the needs of corporations, financial institutions and government agencies by offering a range of international fixed income and equity products as well as listed futures. BSJL also offers a range of derivative products within Japan with special focus on fixed income, credit and equity derivatives. Asset-backed securitization, mergers and acquisitions, corporate finance and restructuring services are also available for local and cross-border business. BSJL is registered with the Financial Services Agency of Japan. BSJL is a limited trade participant to the Tokyo Stock Exchange ("TSE") and the Osaka Securities Exchange ("OSE"), and has a membership on the Tokyo International Financial Futures Exchange ("TIFFE").

Bear Stearns Asia Limited ("BSAL"), based in Hong Kong, is TBSCI's primary operating entity in the Asia-Pacific region, excluding Japan. This office provides international equity sales, trading and research services to institutional and individual clients in Asia. BSAL is registered as a Securities Dealer with the Securities and Futures Commission ("SFC") in Hong Kong and is a member of the Hong Kong Exchange Limited.

Bear Stearns Hong Kong Limited is registered as a Commodities Dealer with the SFC in Hong Kong and its main business consists of sales of U.S. futures products to corporate and retail customers in Hong Kong.

Bear Stearns Singapore Pte. Limited ("BSSP") has a Capital Market Service license and is also registered with the Monetary Authority of Singapore as an exempt financial adviser. BSSP provides sales, execution and research services on fixed income securities to institutional investors in Asia.

Bear Stearns Asset Management Inc. ("BSAM") is registered with the Securities and Exchange Commission as an investment advisor under the Investment Advisors Act of 1940. BSAM provides investment management services to individuals, banks, investment companies, pension and profit sharing plans, trusts, estates, charitable organizations,

corporations and other business entities. BSAM also develops and manages private investment funds and structured investment products which principally include equity and fixed income hedge funds, private equity funds, venture capital funds, separate accounts and structured products. BSAM and its affiliates are general partners in hedge funds, private equity funds and venture capital funds.

Bear Wagner Specialists LLC (“BWS”), formerly Wagner Stott Bear Specialists LLC, is a broker-dealer registered with the SEC under the Securities Exchange Act of 1934. BWS is a wholly owned subsidiary of Bear Hunter Holdings LLC, a limited liability company that is jointly owned by TBSCI, Hunter Partners LLC and Hunter Partners Special Purpose LLC. BWS engages primarily in specialist and market-making activities on the NYSE, the American Stock Exchange, LLC (“AMEX”) and the ISE. BWS and its consolidated affiliates are members of the NYSE, AMEX, ISE, the Chicago Board Options Exchange (“CBOE”), the Chicago Board of Trade (“CBOT”), the Pacific Exchange, the National Association of Securities Dealers, Inc. and the Chicago Mercantile Exchange (“CME”).

Bear Stearns Residential Mortgage Corporation (“BSRMC”) originates residential mortgages in the United States. BSRMC provides mortgage brokers with an easy, streamlined solution for financing home mortgage loans and focuses on non-conforming loans which are included in the private label MBS market. BSRMC is incorporated in the state of Delaware.

In September 2005, the Bear Stearns Companies Inc. and Calpine Corporation formed an energy marketing and trading venture to develop a customer business focused on physical and financial natural gas and power trading and related structured transactions. CalBear Energy LP (CalBear), a wholly owned Bear Stearns subsidiary, has entered into an agreement with Calpine Merchant Services Company, Inc. (“CMSC”), a wholly owned Calpine subsidiary, that provides for CMSC to be its exclusive agent to execute and service power and natural gas trades with CalBear clients that have entered into master trading agreements with CalBear. CalBear's obligations under these agreements will be guaranteed by Bear Stearns.

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**Bear Stearns & Co. Inc.**  
**Consolidated Supervised Entity Market Risk Review**

CONFIDENTIAL (October 2005)

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SECURITIES AND EXCHANGE COMMISSION  
Division of Market Regulation  
Office of Prudential Supervision and Risk Analysis  
100 F St., NE  
Mail Stop 6628  
Washington, DC 20549

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## I. Scope and Methodology of Review

Pursuant to Bear Stearns' ("BS") application to become a Consolidated Supervised Entity ("CSE"), staff of the Office of Prudential Supervision and Risk Analysis ("OPSRA") reviewed the independent market risk management function at BS.<sup>1</sup> We interfaced primarily with the Risk Management Department ("RMD"), but also had on-site discussions with business unit personnel,<sup>2</sup> representatives of control functions (e.g., Business Unit Controllers), FAST<sup>3</sup> personnel, and others.<sup>4</sup> The bulk of the field work and analysis was done between July 2005 and September 2005. In total, we spent 13 days on-site meeting with BS staff; during the intervening periods we analyzed the information and document requests received.

The review was an iterative process of on-site interactions with RMD and other BS staff, mixed with off-site review and analysis of BS materials. The review focused on the market risk measurement, monitoring, and reporting of significant desk level market risk exposures (e.g., Mortgages), the aggregation of these exposures at the firmwide level, and the control processes around risk measurement and risk systems.

During the review, our goals were: (1) to assess, in general terms and by CSE standards, the adequacy of the market risk management functions at BS, including the modeling and use of key risk metrics; (2) to gain a firm understanding of the material market risks at BS and the Firm's various market risk management approaches and processes, and (3) to establish a supervisory framework by which to monitor and gauge market risk management developments in the future.

Our review did not focus on operational control issues, e.g., market risk data and data systems integrity.<sup>5</sup> Nor did we conduct any testing or validation of risk numbers or the Firm's capital ratios. Rather, we directed our efforts toward gaining a meaningful understanding of BS' market risk management infrastructure, in order to enable us to effectively carry out prudential supervision on an ongoing basis.

Overall, we find that independent market risk management at BS is functioning effectively. Market risk appears to be adequately measured, monitored and managed given the Firm's current market risk profile.<sup>6</sup> The Firm's risk appetite, as determined by senior management, appears to be effectively conveyed to the business areas through desk-level limits. Likewise, the measurement, aggregation, and reporting of market risk exposures against these limits appear to be effectively reported back to senior management. However, it should be noted, that a key feature of the independent market

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<sup>1</sup> The CSE market risk review team consisted of Jim Giles, Kevin Silva, and P.C. Venkatesh.

<sup>2</sup> During the review, the market risk review team met with various business personnel, including the Head of Mortgages, Head of Structured Equity Products, and the Head of Credit Trading.

<sup>3</sup> The Financial Analytics & Structured Transactions ("FAST") Group provides analytics, technology, strategies and quantitative research in fixed income and derivatives (i.e., quant group).

<sup>4</sup> Our primary contact at BS was Elaine Hutchinson, VP (RMD). For a list of BS staff contacted as part of this review process, see Appendix B.

<sup>5</sup> NERO was responsible for reviewing BS' market risk operational controls and data quality.

<sup>6</sup> See Section V *Follow-Up Items* of the report for details around BS' recent entrance into the energy trading business.

risk management function at BS is its focus on managing risk at the “desk” level. As such, compared to some of its peer Firms, there is not as heavy a reliance on the risk metrics generally used to aggregate risk at the firm level, such as VaR. This unique perspective provides the foundation for the organization of this report.

The first section provides an overview of the independent market risk management governance structure. The second section discusses the Firm’s market risk profile. The third section discusses market risk measurement, monitoring, and reporting. There is a particular focus on the risk measurement and monitoring at the “desk” level as this is at the core of the independent market risk management philosophy at BS. This is followed by a discussion of how market risk is aggregated at the firm level. Discussion of limits monitoring, risk reporting, and the control processes used to support the quality of risk measurement and risk systems completes this section. The final section discusses specific areas that OPSRA intends to follow up with BS market risk personnel through its on-going supervisory duties.

## **II. Independent Market Risk Management Governance Structure**

RMD is the independent market risk department at BS whose primary responsibilities include understanding the market risk profile of each trading area, consolidating market risk firmwide, bringing large market risks or issues to the attention of senior management, and along with business unit controllers (“BUC”) ensuring accurate mark-to-market pricing. In addition, RMD is responsible for the design and maintenance of the firmwide market risk management system known as “RIO” (Risk Information Organized), which contains the Firm’s Value-at-Risk (“VaR”) calculations and firmwide scenario analysis and stress tests, and for the independent model review process.<sup>7</sup>

### Organization and Structure of RMD

RMD is run by the Global Head of Risk Management, Robert Neff, who reports directly to the Firm’s Executive Committee<sup>8</sup> and includes over 40 risk managers. The department is organized geographically (New York, London, and Tokyo), functionally, and most importantly by product-line into six primary risk monitoring groups- (1) Credit, (2) Credit Trading, (3) Municipals and Foreign Exchange, (4) Fixed Income Derivatives, (5) Mortgages, and (6) Equities.<sup>9</sup> The risk managers in each of the above groups, while completely independent, are very integrated with the businesses or desks they cover. Each risk manager (and corresponding business unit controller) sits on a trading floor in close proximity to the desks they cover. Within each risk monitoring group, the teams are vertically integrated, allowing each product-line team to perform virtually all risk monitoring tasks.

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<sup>7</sup> The independent model review process supports RMD in its price verification efforts and in its efforts to understand the market risk profile of each trading area in that the models reviewed are generally used to price positions as well as calculate their risk sensitivities.

<sup>8</sup> The Executive Committee is the most senior management committee. The Committee manages the day-to-day affairs of BS. It is responsible for both management oversight, on a global, consolidated basis, and for certain transaction approvals. The Committee meets weekly or more often as needed.

<sup>9</sup> Detailed information on the various product-line risk management groups and desks covered by each group is contained in section IV *Market Risk Measurement, Monitoring, and Reporting* of this report.

While each separate product-line risk monitoring group typically functions on a “stand-alone” basis, there are certain market risk measurement and control functions that are performed more centrally and cut across the various product-line silos. First, the design<sup>10</sup> and maintenance of RIO (including the VaR calculations) are performed in a central function by FAST (“FAST RIO team”) and IT personnel<sup>11</sup> at the direction of the Global Head of Risk Management. Additionally, RMD has a separate Model Review team that performs the independent validation of models used for pricing, hedging, and calculation of risk sensitivities of the Firm’s trading positions. While the model review team is distinct from the individual product-line risk monitoring groups, the individual model reviewers generally focus on particular products (e.g., Equity Derivatives) and are very integrated with the product-line risk managers, especially in supporting their efforts regarding price verification and risk sensitivity calculations for complex products. Finally, RMD has a Credit Watchlist<sup>12</sup> that is used for the independent evaluation of the fundamental credit risks inherent in the Firm’s various trading positions. This analysis is performed by the Head of the Credit Group within RMD but spans across the various product-line risk monitoring groups (e.g., GM exposure may come from many different desks covered by different product-line risk monitoring groups).

#### Key and unique features of BS’ RMD

While BS’ independent market risk structure is broadly consistent with industry standards, it does possess some fairly unique features. First, while RMD fulfills the role of facilitating “two-way” communication of risk information between senior management and the business units, it also provides substantial support to trading-level management.<sup>13</sup> For example, RMD provides a lot of risk reporting and analysis to trading managers and appears to function as a “second set of eyes” for trading management. So while independent, RMD typically functions as much more of a partner with the businesses they monitor. This approach appears to be the by-product of a key principle of RMD: risk management should result in action. RMD sees its role not

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<sup>10</sup> In designing the Firm’s VaR methodology, the Global Head of Risk Management utilized his product-line risk managers where he deemed appropriate. The amount of input given by the product-line risk managers to FAST in developing the VaR methodology varies by desks. For certain desks which had been using VaR to monitor risk for years, such as Structured Equity Products (“SEP”), the product-line risk managers were instrumental in the design of VaR in RIO. Other desks, for which VaR is fairly new and used more often as a supplementary risk measure, risk managers were less involved. Please see Section IV of this report for further discussion of VaR.

<sup>11</sup> While these personnel do not have a direct reporting relationship to RMD, RMD funds their budget and has significant input into all personnel decisions for the group. These personnel have a “dotted-line” reporting relationship to the Global Head of Risk Management who is ultimately responsible for the design and maintenance of the RIO system.

<sup>12</sup> The Credit Watch list highlights the market risk associated with issuer-specific as well as industry concentrations, particularly those with a negative fundamental outlook as expressed by RMD’s Credit Group.

<sup>13</sup> At some of its peer firms, this level of support is provided by “quasi-independent” (i.e., independent of the desk) business unit risk managers. These business unit risk managers typically provide a “second set of eyes” for trading management. BS does not have a separate “quasi-independent” business unit risk management structure.

only to report on aggregated risk, but more importantly to affect trading and investment decisions.

This key principle appears to also result in another key feature of independent risk management at BS: primary focus on measuring and monitoring risk at the “desk” level. The Global Head of Risk Management as well as senior management in general want to have a deep understanding of the risk at the desk level, where ultimately specific action can be taken. This approach leads to the Firm’s trading limits,<sup>14</sup> as reported to senior management, being established primarily at the desk level, rather than at higher levels of aggregation such as at the Division or firm-level. Consequently, most metrics on which limits are set and monitored by RMD and the Limit Monitoring Group (“LMG”)<sup>15</sup> are typically the same as those monitored internally by the business unit for that particular desk. In addition, in contrast to many of its peers, BS VaR limits are not set above the desk level.

Finally, RMD is somewhat unique in its level of involvement in ensuring accurate mark-to-market prices (i.e., price verification). At many of its peer Firms,<sup>16</sup> the price verification process is performed primarily by the business unit controllers (“BUCs”) since the Controller’s organization is ultimately responsible for the accuracy of the financial statements. At BS, price verification, both the daily and more formal monthly process, is performed by both RMD and BUC. The division of price verification responsibilities between the two groups is largely a function of the complexity of the product, with the price verification on the more complex products generally being performed by risk managers in RMD.<sup>17</sup> In fact, the Global Head of Risk Management often states, “Price Verification is Job #1.” RMD feels that having risk managers perform these tasks provides synergies to their risk monitoring activities. Specifically, spotting price verification issues leads to discovery of potential market risk issues and vice-versa, especially for more illiquid and/or complex products.

#### RMD involvement in Management Level Committees

As previously mentioned, the Global Head of Risk Management reports directly to the Executive Committee, which provides support for control functions and oversight on risk-taking activities. To help RMD better meet their mission, BS has structured the organization to ensure that risk managers are an integral part of the committees (that oversee the Firm’s activities and exposures) including, but not limited to:

- The Risk Committee—which provides a high level of oversight to trading departments and trading strategies;

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<sup>14</sup> By Firm’s Trading limits we are referring to limits monitored by RMD and Limit Monitoring Group (“LMG”) and reported to senior management.

<sup>15</sup> See *Limits Monitoring* section of the report for more details.

<sup>16</sup> While the majority of the price verification responsibilities are discharged within the BUC organizations at most peer firms, some firm’s have created separate “price verification” units within the BUC organization to both elevate the importance of the mark review process as well as to provide BUC controllers with more time to focus on their other myriad set of duties.

<sup>17</sup> See the *Price Verification* section of this report for more details.

- The Model Review Committee—who works closely with the RMD to ensure trading models are independently vetted and controlled;
- The Mark-to-Market (“MTM”) Committee—which is responsible for ensuring that the approaches used to independently validate the Firm’s valuations are robust, comprehensive, and effective; and
- The New Products and Special Structured Transaction Committee—which is responsible for ensuring that new businesses and products are reviewed in advance for various risks and related concerns.

It is important to note that RMD not only receives support from these committees, but also plays a key role in committee decisions. This is evident by the fact that the Global Head of Risk Management or other senior risk managers within RMD are active members on many of the Firm’s management committees and Chairman on certain committees, such as the “Mark-to-Market Committee” and the “Model Review Committee.”

### III. Market Risk Profile

BS operates three principal segments: (1) Capital Markets, (2) Global Clearing Services, and (3) Wealth Management. The Capital Markets segment includes the Firm’s trading and investment banking operations. The Global Clearing Services segment provides execution, clearing, and margin lending and securities borrowing services. Prime brokerage for institutional clients, particularly hedge funds, is within this business. Finally, the Wealth Management segment includes both Private Client Services (i.e., retail brokerage) and asset management. The vast majority of market risk resides in the Capital Markets segment.

The Capital Markets segment is the largest of the three BS business lines and includes the following Divisions: Institutional Equities, Fixed Income, and Investment Banking. The Fixed Income Division is the largest of the three Divisions within Capital Markets. For example, of the \$5.3 billion of net revenues earned by the Capital Markets segment for fiscal year 2004, \$3.1 billion or roughly 58%, came from the Fixed Income Division. The remaining revenues were roughly split between Investment Banking and Institutional Equities.

The vast majority of the market risk comes from the trading operations within Fixed Income and Institutional Equities<sup>18</sup> and is monitored by RMD. Below, we provide an overview of the various businesses within Fixed Income and Institutional Equities:

#### A. Fixed Income:

The Fixed Income Division encompasses sales, trading, and research activities provided to institutional clients across many different products. The major product areas covered include: (1) Mortgage-backed securities (“MBS”) and other Asset-backed

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<sup>18</sup> BS’ Merchant Banking, the dedicated private equity arm of the Company, invests private equity capital in a variety of investments including leveraged buyouts, recapitalizations, and growth capital opportunities in a broad range of instruments. While this business falls under Investment Banking (“IB”), BS’ direct investment in these positions is included in a distinct Equity desk (Merchant/Illiquid) for inclusion in the Firm’s VaR and Scenario/Stress tests.

securities (“ABS”), (2) Credit products, and (3) Interest rate products.<sup>19</sup> The MBS/ABS product area is far-and-away the largest business for BS and its \$1.6 billion fiscal year 2004 net revenues represented approximately 52% of Fixed Income net revenues and 24% of the Firm’s net revenues. While the Firm has shown recent progress in its efforts to diversify its revenue streams (e.g., growth in credit products), BS remains skewed towards its mortgage businesses. Within the mortgage space, BS is a major player in many products and has become more of a vertically integrated business from origination through servicing.

#### (1) Mortgage Backed Securities

The various businesses within the MBS/ABS product area generally fall into one of the following four categories: (1) securitization businesses, (2) secondary trading businesses (3) distressed consumer receivables, or (4) servicing operations. The “securitization” businesses as stated here refer to BS’ mortgage desks that accumulate loans for securitization. The business model for these desks is to buy, securitize, sell, and earn a spread, not to take directional views on rates or credit spreads. These businesses are, as BS personnel like to describe them, “moving not storage” businesses. The secondary trading businesses are where the Firm facilitates customer flow and occasionally takes a directional bet. At BS, these desks do not generally drive financial results or risk exposures for the MBS/ABS product area. The distressed consumer receivables classification refers to both the Max Recovery business and the non-performing loan business run out of EMC. Max Recovery is BS’ Ch. 13 bankruptcy receivables business. BS buys these receivables at a deep discount and services these receivables in an effort to bring them to performing status and to either generate positive cash flow or sell at a profit. They use EMC Mortgage Corporation (“EMC”), BS mortgage originator and servicing operation based in Irving, TX to service these loans. In addition, EMC purchases both performing and non-performing loans. Performing loans may later be sold or may become product for securitizations for the ARMS or Non-Agency CMO desks. Finally, BS’ servicing arm, EMC Mortgage Corporation runs a large residential mortgage servicing operation, servicing over 200,000 loans.

The vast majority of BS’ profit and risk taking activities are within the “securitization” businesses,<sup>20</sup> both residential and commercial. BS’ largest residential mortgage securitization businesses include the following desks: (1) Adjustable Rate Mortgage (“ARMS”) and (2) Non-Agency CMO (i.e., primarily fixed rate). Generally these desks will purchase loans in bulk from large mortgage brokers for eventual securitization. However, more recently, BS has been able to source a growing number of both adjustable and fixed rate mortgages through its own residential conduit business, EMC.<sup>21</sup>

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<sup>19</sup> The Firm also has a municipal finance business trading both municipal bonds as well as municipal derivatives.

<sup>20</sup> In the 08/10/05 Daily VaR report, the ARMs desk had a 95% weekly VaR of approximately \$37 million. The next highest desks within MBS were Non-Agency CMO at \$27 million and Commercial Conduit at \$12 million. All these desks are in the securitization businesses category.

<sup>21</sup> EMC is a 120 person mortgage operation run out of Dallas, TX. It works with a number of small originators and is providing a growing source of collateral for the residential MBS securitization businesses. It also runs a large servicing operation for both residential mortgages and other consumer

BS was ranked #1 in ARMS securitizations for the fiscal year 2004 with a 23% market share. The ARMS desk generated \$346 million in net revenue for fiscal year 2004 or 21% of the MBS/ABS product area net revenue. On a stand-alone basis, this desk is consistently the largest contributor of VaR both for MBS desks and the Firm as a whole. The vast majority of the ARMs positions are Non-Agency. The unsecured loan inventory is comprised of hybrid ARMs (e.g., 5/1 ARM), LIBOR short-reset ARMs, and a fairly new BS Option-Arm product.<sup>22</sup> The securitized product consists of both simple passthroughs and credit tranching CMOs, with excess spread carved out in the form of an IO (interest-only) strip. The largest market risk of these positions relates to the prepayment risk associated with these loans and securities. This risk is the most concentrated in the IO tranches,<sup>23</sup> and BS holds a material amount of these securities.

BS was ranked #1 in Non-Agency CMO securitizations for the fiscal year 2004 with approximately 18% market share. The fixed-rate Non-Agency CMO business generated approximately \$435 million in net revenues or 26% of the MBS/ABS product area net revenue. On a stand-alone basis, this desk typically has the second largest VaR of all the MBS/ABS desks. The loan inventory is primarily fixed-rate mortgages focused on the subprime, 2<sup>nd</sup> lien, and jumbo/alt-A products. The predominate market risk factor for this product will depend on the underlying product. For example, the jumbo/alt-A product tends to be more sensitive to interest rates and prepayment speeds, whereas the subprime will tend to be more sensitive to credit spreads.

BS' CMBS business consists of both a "securitization business," also referred to as the Commercial Conduit business, and a secondary CMBS trading business. The combined CMBS securitization and secondary trading activity produced \$163 million in net revenues for fiscal year 2004 or roughly 10% of the MBS/ABS product area net revenues. BS' Commercial Conduit business in particular has shown tremendous growth over the past few years<sup>24</sup> and is a significant source of revenue and typically generates the third largest VaR after the ARMS and Non-Agency CMO desk for the MBS/ABS product space. The major risk factor in this space is credit spreads. The business generally hedges to a near flat position with respect to interest rate risk. However, the building up of inventory in the securitization pipeline will make the desk structurally long credit spreads.<sup>25</sup> With that said, the business has a variety of products it can use

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receivables (e.g., chapter 13 receivables) and purchases both performing and non-performing loans. In addition, BS has recently created its own origination company, BS Residential Mortgage Corporation, which will generate adjustable and fixed rate mortgages, focusing on lower FICO scores, investment property, and Jumbo loans.

<sup>22</sup> BS option-arm product is referred to as the MTA (moving treasury average) Option-ARM. As the yield curve has flattened BS has seen a shift out of the LIBOR short-reset ARMs into the MTA Option ARMs.

<sup>23</sup> As of August 23, 2005, BS had ARM IO tranches of \$323 million, mostly from MTA Option ARM and LIBOR ARM securitizations.

<sup>24</sup> The business originated over \$6.7 billion in loans in fiscal year 2004 compared to \$2.2 billion in fiscal year 2002.

<sup>25</sup> All things equal, this simply means that they are more exposed to losses as CMBS credit spreads widening.



to hedge out credit spread risk (e.g., derivatives linked to CMBS indices performance). The business has also expressed its ability to routinely sell out the lower and non-rated tranches of the CMBS securities contemporaneous with the closing of the securitization.<sup>26</sup> While the business recently has been able to quickly distribute out the lowest rated tranches, like all securitization businesses, this distribution capability is contingent on the credit climate. In adverse conditions, these niche buyers may exit the market causing BS to have greater difficulty in quickly selling these securities.

## (2) Credit Products

BS is active in all the major credit products areas including the following businesses: (1) Credit Trading, (2) High Yield and Distressed Trading, (3) Leverage Finance, and (4) Emerging Markets. Credit Trading includes both investment grade corporate bond trading as well as trading in credit derivatives.<sup>27</sup> The business activities are grouped mainly between the global structured business, which focuses on the structuring of customized trades such as synthetic Collateralized Debt Obligations (“CDOs”), and the customer flow business (both cash and single-name credit derivatives). The desk has shown tremendous growth recently mainly due to the explosive growth in the credit derivatives market over the past few years coupled with BS’ more recent focus<sup>28</sup> on credit derivative products. Credit Trading’s fiscal year 2005 annualized net revenues are projected at \$287 million or 35% of total credit products revenue up from \$46 million net revenues (9% of total credit products revenue) for fiscal year 2004.

The High Yield and Distressed businesses rely on fundamental credit analysis and the distressed businesses in particular require intensive due diligence. These businesses generated \$260 million or 55% of the total Credit Products net revenues for fiscal year 2004. While the 2005 annualized net revenues increased, the percentage contribution of this group declined because of the tremendous growth in credit derivatives and leverage finance. In contrast to the Credit Trading business, issuer-specific risk is a much larger component of the overall market risk. As such, risk monitoring activities are tailored to capture and measure this risk.

The Leverage Finance category consists of both bank loans originated through the Leverage Finance business within Investment Banking (e.g., typical event driven loans, acquisitions, dividend recapitalizations, etc) and bank loans

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<sup>26</sup> The business generally finds buyers, such as REITS or other real estate funds, for these lower and non-rated portions of the securities. Shortly after the loans are pooled together for an upcoming securitization, these subordinate bond buyers are contacted. These purchasers will typically either sign an exclusive agreement or will participate in a bid process to purchase the loans and will commence their own due-diligence roughly the same time the Rating Agencies are performing their due diligence on the collateral and borrower.

<sup>27</sup> The Credit Trading business is currently in the process of integrating both the cash high-yield and emerging markets desks. Earlier in 2005, the Credit Trading business was created by merging the corporate bond trading and credit derivatives trading desks to provide a more holistic view of risk and to better service clients.

<sup>28</sup> Since 2003, its volumes have increased 800%.

purchased in the secondary market for securitization in a Collateralized Loan Obligation (“CLO”). Both these businesses have grown tremendously over the past year as financial sponsors (e.g., private equity firms) have been extremely active and investor appetite for yield has been generally insatiable.

Emerging Markets is more of a boutique operation at BS. While not a large operation globally, they have a leading franchise in Latin America and the Caribbean. The business focuses mainly on Sovereign issuances, but also invests in corporate instruments. The bulk of the Sovereign positions have typically been in Central and South America (e.g., Mexico, Venezuela, etc.) With respect to corporate instruments, BS coverage expands to other areas, such as Russia and Asia.

### (3) Interest Rate Products

Compared to the other categories within the Fixed Income Division, the interest rate products category generally includes more liquid and lower margin products. With the exception of its municipal business and perhaps its foreign exchange business,<sup>29</sup> BS is not a market leader in many of the Interest Rate Products. Rather, the business seeks to focus on servicing a set of clients, for which it has a greater “wallet share” of their business. As such, while BS intends to maintain a reasonable presence in the various interest rate products and markets, the scope of their market-making and liquidity-providing activities in this space will be largely client-driven.

BS is active in the major product areas such as interest rate derivatives, foreign exchange (“FX”), government bonds, fixed income finance (i.e., repo business). Interest rate derivatives and foreign exchange produced the majority of net revenues, \$225 million and \$178 million respectively. Based on annualized fiscal year 2005 figures, this product space has declined in absolute and percentage terms for the Firm.

Interest rate derivatives traded at BS include swaps, options, mortgage derivatives, municipal derivatives, structured notes, and exotics. Foreign exchange trading is primarily focused on exchange spot forwards in New York and London while the Governments desk trades in highly liquid, very active, government agency instruments. As measured by VaR and interest rate sensitivity measures, interest rate derivatives typically exhibit more than three times the market risk exposure of the Governments and FX businesses at BS.

## **B. Institutional Equities:**

The Institutional Equities Division encompasses sales, trading, and research activities provided to institutional clients across many different products and generated slightly over \$1 billion in net revenues for fiscal year 2004 (approximately 20% of Total Capital Markets segment net revenues). The business, for the most part, is customer

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<sup>29</sup> The Foreign exchange business at BS includes a high volume of execution-only business, which does not result in large market risk.

driven<sup>30</sup> and is predominately U.S. based.<sup>31</sup> The major product areas covered include: (1) Domestic Equity Sales & Trading, including Block Desk, (2) Over-the-counter (“OTC”), (3) International Equity Sales & Trading, (4) Execution only services, (5) Risk Arbitrage, (6) Structured Equity Products (“SEP”) (i.e., Equity Derivatives), (7) Strategic Structuring and Transactions (“SST”), and (8) NYSE specialist (Bear Wagner).

The revenue generated by the Institutional Equities Division is diversified across the above-mentioned product areas. Domestic Equity Sales (including Block Desk) represented 24% of the fiscal year 2004 net revenues followed by 18% for Structured Equity Products, and 16% for Bear Wagner. Most of the listed and OTC trading is a pure customer flow business with not much capital at risk. The risk profile of Bear Wagner, BS’ NYSE specialist operation, appears modest as well. The majority of the market risk comes from the SEP and Risk Arbitrage businesses. SEP is BS’ equity derivatives business for its institutional clients, including other financial institutions and hedge funds. This business is predominantly customer focused with a longer term risk portfolio driven by its customers’ needs, but does include some proprietary positions as well. This business is much more complex than the cash equity businesses and generates “second order” market risk factors, such as forward volatility skew and correlation, not seen in the other Institutional Equities businesses. BS’ Risk Arbitrage desk is a large mergers and acquisition focused business that has been around for over seventy years. This business entails positioning for potential events (e.g., merger or acquisition). With SEP, this business is one of the largest drivers of risks within Institutional Equities.

## **IV. Market Risk Measurement, Monitoring, and Reporting**

### **A. Desk Level- Risk Metrics and Risk Monitoring**

As previously discussed, a key feature of the independent market risk function at BS is its primary focus on measuring, monitoring, and limiting market risk at the “desk” level. As such, the independent risk managers are organized by product-line and thus follow specific trading desks. The risk metrics they use to understand and monitor market risk differ from desk-to-desk as will the specific risk monitoring functions they perform.<sup>32</sup> However, there is a core set of responsibilities that risk managers perform

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<sup>30</sup> Institutional Equities has a small proprietary only trading desk, Strategic Structuring and Transactions (“SST”) which has special trading strategies such as statistical arbitrage, pairs trading, and dividend arbitrage.

<sup>31</sup> For fiscal year 2004, 80% of net revenues were U.S. based. The majority of international net revenues came from International Equity Sales and Trading and Structured Equity Products (i.e., Equity derivatives).

<sup>32</sup> Since the independent market risk function at BS is built upon the foundation of measuring and monitoring risk at the “desk” level, the market risk team felt it was important to understand the risk metrics used at the “desk” level. To achieve this, OPSRA spent an initial two days of fieldwork meeting with senior risk managers from each of the six product-line risk monitoring groups to better understand the metrics they use to measure risk, the limits that are set on those metrics, and the risk monitoring activities they perform at the “desk” level. See *Risk Management Department: Risk Metrics, Measures & Limits* for more details. Subsequent to these initial discussions, the market risk team had more targeted discussions with risk managers focused on some of BS’ more material and complex businesses, including Credit Trading, Mortgages, and SEP. These meetings were of an iterative nature and included on-line demonstrations of systems used, reports produced, and analysis performed by the risk managers.

regardless of which product-line group they are in. Some of these tasks will be more or less emphasized based on the desks covered.

The daily monitoring tasks performed by the various product-line risk monitoring groups help RMD fulfill its responsibilities as highlighted previously. The following is a summary of the main responsibilities or goals of RMD and the specific functions performed by the risk managers to fulfill these responsibilities:

#### Understanding the market risk profile of each trading desk

Typically, risk managers begin their day by gaining a deep understanding of the market risk profile of the desks they cover. To this end, risk managers engage in a number of morning activities including (but not limited to) monitoring daily market and trading activity, analysis of risk reports, profit and loss explanation, and interaction with traders, trading management, and other control areas. Through these activities, risk managers strive to understand the positions held by the desk, the risk sensitivities of those positions to the relevant market risk factors, and how the relevant market risk factors changed the previous day. With this knowledge, risk managers should be able to explain the P&L earned by the desk and reported to the risk managers through the traders' "P&L Flash."<sup>33</sup> If there is a disconnect between the risk profile and the P&L reported by the trader, the risk manager will investigate. This typically will include conversations with traders, Desk Heads, or business unit controllers. The Global Head of Risk Management views this profit and loss attribution process as key to the market risk management process. Obviously, the level of work and complexity around the P&L attribution process depends largely on the product being traded and as such varies greatly across product-line risk monitoring groups.<sup>34</sup>

#### Consolidating risk across the Firm

As RMD and senior management manage risk primarily on a "desk-by-desk" basis, in measuring risk, they focus largely on risk metrics key to each specific desk. This is done regardless of whether or not these are the risk measures the Firm uses to aggregate risk firmwide (i.e., VaR and scenario analysis/stress test). With that said, RMD is responsible for ensuring the accuracy and completeness of its VaR and

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<sup>33</sup> Risk managers receive P&L flash reports from traders. This report is the trader's estimate of the daily profit or loss. Some P&L flash reports will give the Total P&L as well as a breakdown of how P&L was earned, such as from trades, mark changes, and financing P&L (i.e., interest carry). The first P&L flash comes from traders around 5:00 PM of the trading day (Day T). The next morning, the risk managers will receive progressively more updated P&L flashes for each desk starting around 9:00 AM and culminating in a final P&L flash around 11:00 AM (T + 1).

<sup>34</sup> For example, as demonstrated during our on-site meetings with the SEP risk managers, the P&L explain process is quite different depending on the product area. For most of the non-exotic equity derivatives, the risk manager can use an automated front-office report ("Atlas P&L explain report"). As demonstrated to OPSRA, this report will give the daily P&L, the P&L by sensitivity (delta, gamma, theta, etc.), the trading P&L, and any unexplained P&L. If the unexplained P&L is large, the risk manager will investigate further. In contrast, for many of the exotic equity derivatives, the Atlas P&L explain report will generally not be sufficient, as these positions are exposed to higher order risk sensitivities, such as forward skew and correlation risk. These positions will require additional analysis, including using Lynx, an external calculator, to calculate the forward skew and correlation risk sensitivities.

scenario/stress test calculations. While the day-to-day running of VaR is performed largely by FAST and IT personnel, each product-line risk monitoring group has responsibilities associated with ensuring the accuracy of the aggregated risk measures used to consolidate risk across the Firm.

First, for most of the product-line risk management groups, the risk managers put together a set of VaR summary reports that are typically distributed to trading management and to the relevant traders for their specific desks. Secondly, for those desks where VaR is one of the primary risk metrics used (e.g., various derivative desks), risk managers look to VaR to help explain the risk profile of the desk. For other desks, VaR is mainly used to confirm the risk manager's understanding of the risk profile obtained from looking at other risk measures, such as interest rate or credit spread sensitivities.<sup>35</sup> If VaR is telling a different story than the other risk metrics, the risk manager will need to investigate further. This disconnect may be the result of a data issue, such as a bad feed or a trade booked or mapped incorrectly. Finally, generally speaking, each group has dedicated personnel responsible for ensuring the completeness and quality of the data that feeds into RIO for the calculation of VaR. These individuals may be performing VaR explain duties as well as performing some basic position reconciliations to confirm that all positions in front-office systems are included in RIO.<sup>36</sup>

#### Communication of large market risks or issues to senior management

After risk managers gain an understanding of the risk profile of the desks they cover and have ensured the Firm's VaR process has run correctly, they focus on communication of the risks to both the business units and senior management. As stated previously, while independent, RMD risk managers provide support and oversight to the trading management of the desks they monitor. Virtually all risk management groups in RMD provide risk reporting and analysis to the business units (i.e., trading management). Senior RMD risk managers generally will have weekly or bi-weekly scheduled meetings with the heads of the businesses they monitor as well as more frequent informal contact. In addition, RMD risk managers produce many reports, such as VaR summary reports, aged inventory reports, limit reports, and others for business unit consumption.<sup>37</sup>

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<sup>35</sup> The risk metrics used at BS to communicate interest rate and credit spread sensitivities are referred to as Interest Rate POPs (IR POPs) and Credit Spread POPs (Spread POPs). These metrics are typically just the IR DV01/100 and Spread DV01/100, respectively. However, in some instances, they use these terms interchangeably.

<sup>36</sup> For example, during our on-site meetings and follow-up discussions with the Mortgage Group risk managers, the specifics of how VaR inputs were reconciled and VaR explain conducted by the Mortgage Group was discussed. Within the Mortgage Group, these processes are centralized and performed primarily by John Sun, VP (Mortgage Group). Mr. Sun begins by reconciling both MV and interest rate sensitivities between the firmwide risk system, RIO, and the PRISM, a mortgage front-office management information system. Once Mr. Sun is comfortable with the position and interest rate sensitivity data input into RIO for the VaR calculations, he will start the process of compiling a set of RIO Summary VaR reports for the mortgage desks, including the related VaR explain analysis. If necessary, he will seek input from the risk manager(s) primarily responsible for the particular desk in question. All risk managers will get these summary VaR reports and will review the desks that they cover.

<sup>37</sup> During the CSE review, OPSRA met with the heads of the Credit Trading, Mortgages, and SEP businesses to discuss how they manage risk and their interactions with RMD risk managers. During these

In addition to the production of risk reports and analysis for trading management, their morning risk monitoring activities culminate in the preparation of a comment(s) for *Daily Risk Highlights*.<sup>38</sup> Risk managers use *Daily Risk Highlights* to update senior management on anything they deem of interest to senior management. These comments may include a discussion of market moves, large risk positions, positions over limits, etc. In particular, the comments tend to be very focused on P&L explanation as well.

### Ensuring accurate mark-to-market pricing

Once the morning risk monitoring activities are complete and the key risk information disseminated, risk managers typically use the rest of their afternoons to dig deeper into the positions and risk of the desks they cover. As the Global Head of Risk Management stated, “The Firm is not paying risk managers to play the averages but to dig for problems.” One of the key areas that risk managers dig into is the accuracy of marks on positions.<sup>39</sup> As previously stated, “Price verification is Job #1.” The amount of time spent on price verification duties will depend greatly on the product area covered. Some groups spend one-third to one-fourth of their time on price verification activities. These activities include more ad-hoc daily digging into issues and a more formal monthly price verification process that supports the closing of the books by the controllers. For some groups, risk managers also use their afternoons to do “aged inventory” analysis. This analysis is especially crucial for the securitization desks which are said to be in the “moving not storage business.” While the primary reason for the analysis of aged inventory is to understand what positions are not moving, this analysis generally may also spotlight potential “mis-marked” inventory and as such complements price verification activities.

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discussions, it was clear that trading management works closely with and relies heavily on RMD risk managers. For example, with respect to the Mortgage businesses, senior risk managers within the Mortgage Group meet with Tom Marano, Head of Mortgages, on a bi-weekly basis (every Tuesday and Thursday). During the Tuesday meeting, they review the Mortgage Department Weekly Package produced by the risk managers and discuss position changes, aged inventory, and any other current issues or concerns. In particular, the Head of Mortgages stated that he relies heavily on the aged inventory report, produced by the risk managers, in getting traders to “move product.” For more details, see *Appendices G-L* which discuss the support provided by each product-line risk monitoring group to the business areas.

<sup>38</sup> Please see *Risk Reporting* section for more details.

<sup>39</sup> During our fieldwork, there were several examples of areas where risk managers performed in-depth analysis for price verification purposes. One example was particularly noteworthy. Within SEP, the risk managers were aware that certain exotic trades (e.g., Napoleon cliquets) exhibited significant sensitivity to the volatility of the implied volatility parameter. The markets for these products are still relatively one-way; thus, any market observations (i.e. external quotes) of volatility are suspect. Additionally, the pricing model used to book all equity derivatives does not shock the volatility parameter; rather it uses a “static” volatility parameter. To more accurately capture the effects of this sensitivity to volatility of volatility, Ashley Everington (Model Review) produced a spreadsheet to revalue these products using a stochastic volatility model. Currently, the stochastic volatility model has been rolled out to all Cliquet products and the SEP risk managers use it as a benchmarking model. Risk managers are now able to automatically compare the differences in marks from using either model and can use this information to make valuation adjustments to marks if necessary. For more details, see *Appendices G-L* which discuss the risk monitoring activities performed by each product-line risk monitoring group.

In Appendices G - L, we discuss in more detail the risk monitoring activities performed by each product-line risk monitoring group. Special attention will be placed on highlighting the unique features of risk monitoring by each specific product-line group and within each group for the specific desks covered. Each appendix provides an overview of the following:

- (1) The organization of the specific risk monitoring group including which desks they cover;
- (2) The key risk metrics and associated limits used by that group in monitoring risk;
- (3) The daily monitoring tasks performed by the group; and
- (4) The production of risk reports and analysis, for both trading management and senior management.

## **B. Risk Aggregation at the Firm Level**

### **(1) VaR**

This section provides an overview, and general background, of the VaR methodology at BS. A companion document provides substantially more detail and discussion of the VaR components.

In our judgment, the bank's VaR methodology is generally adequate and within the mainstream/range of industry practices. The basic framework is quite similar to that employed at many peer firms. The analytical and statistical components are generally based on clear and straightforward theoretical principles. The firm employs a broad range of risk factors—the set of general market factors is similar to that at other firms and a wide set of residual risks are captured. The revaluation approaches are also quite standard.

In the course of our review, we have also identified several implementation aspects and details for future review. For some of these, we expect to recommend that the bank carry out sensitivity and additional empirical analyses to assess their impact on measured VaR. These recommendations are described in the companion document and are discussed in general terms under the "Follow-Up Items" section of this report.

#### **VaR at BS—General Background**

Organization, responsibilities, etc.

Market risk measurement is a collaborative effort, principally between personnel from the Financial Analytics and Structured Transactions (FAST) group, the Risk Management Department (RMD) and Information Technology (IT).<sup>40</sup> FAST personnel have executed (and will continue to implement) the overall design and architecture, as well as the "nuts and bolts" analytics and technical specifications of the VaR system. Risk Monitors/Managers, members of RMD, work in concert with FAST personnel to ensure that the VaR specifications remain properly aligned with the firm's books (e.g., complex trades are represented properly in VaR) and current market realities (e.g., changes in market conventions, changes in empirical properties (parameter updates),

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<sup>40</sup>Four individuals from FAST and six from IT are dedicated to market risk measurement projects.

updated mapping of instruments to risk factors, etc.)<sup>41</sup> The IT group has created a platform, RIO (Risk Information Organized) to run the risk models, create various reports and deliver them via the RIO interface through the firm.

While the collaborative process appears to have worked reasonably well, the roles and responsibilities appear to be somewhat loosely defined. OPSRA staff feel that more precise delineation and formalization of roles and responsibilities would be desirable.

### History and evolution of VaR at BS

The current VaR system is the product, in response to internal and external imperatives, of a concerted effort to have in place a firmwide view of market risk.<sup>42</sup> Prior to that, most derivatives desks already had their own, customized VaR-like methods. The challenge for FAST was to integrate the different approaches so as to fashion a reasonably consistent and uniform methodology, while respecting the unique/diverse needs of each/different desks.<sup>43</sup> The FAST team opted to use Historical Simulation (hereafter, HistSim) as the core approach, which they believed could more easily accommodate the nuanced requirements of different desks. The modelling of specific risks and aggregation would be done at the “top”, i.e., outside the HistSim framework. In the process, some desk-approaches were totally revamped while others were only modified in minor ways.

### Future plans

FAST personnel outlined, in very informal terms (i.e., no timetables) their general plans and priorities re: the VaR system. One goal is to “harmonize” treatment of a product across desks—e.g., the risk of a given swap should be the same whether viewed by FID or by the mortgage desk—at present, they can differ because of different risk factors (maturities used in risk factor estimation, etc.) With the passage of time, the bank has accumulated more data, and plans to carry out extensive re-estimations—primarily for specific risk parameters. Moreover, data quality has also been improving for some products (e.g., credit derivatives) possibly warranting a re-estimation in those areas. On a more general note, the “educational” process re: VaR continues.

### **A Brief Digression: Basics of VaR**

The basic purpose of a VaR system is to produce a (probability) distribution of possible portfolio values (or changes thereof) k-days (e.g., k=1, or k=5) ahead.<sup>44</sup> Typically, this is accomplished in three generic steps<sup>45</sup>: (i) scenario generation<sup>46</sup>—

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<sup>41</sup>Other functions performed by Risk Managers vis-à-vis VaR are discussed elsewhere in the report.

<sup>42</sup>The “LTCM crisis”, impending CSE requirements were among the stimuli cited.

<sup>43</sup>The Fixed Income division was much more concerned about incorporating lots of tenors and maturities, whereas for the Mortgage desk far fewer yield curve points are required.

<sup>44</sup>I.e., the distribution specifies the possible portfolio values as well as the likelihood/probability of each value.

<sup>45</sup>True for Historical Simulation and Monte Carlo Simulation, but not for the Variance-Covariance method.



generating the distribution of possible joint outcomes of the underliers or risk factors that instrument/position values (or changes thereof) depend on; (ii) revaluation—revaluing each instrument/position in the portfolio at each simulated scenario/joint outcome; and (iii) value or P&L distribution—for each scenario, summing up all the instruments' values (changes) yields the portfolio value/change for that scenario; sorting the portfolio/value changes yields the P&L forecast distribution, from which target quantiles can be selected.

Three approaches are commonly in use, often one in conjunction with another—i.e., the approaches are not mutually exclusive. These have acquired the labels: (i) Historical Simulation, (ii) Monte Carlo (“MC”), and (iii) Variance-Covariance (“V-COV”). HistSim and Monte Carlo are actually just methods of scenario generation—step (i) above—and place no constraints on how steps (ii) and (iii) are carried out. With V-COV, such a clean separation is generally not possible. Institutions with large, diverse portfolios nowadays generally use HistSim as the core approach, supplemented by MC, or less commonly, by V-COV. One reason for the popularity of HistSim is that it is nonparametric—no (explicit) assumptions regarding the risk factors' statistical distribution or parameters are required. The other two methods, in contrast, are parametric—they do require such statistical assumptions.

Under the HistSim approach, histories of past joint outcomes of the risk factors are assembled—successive observations could be at daily or weekly intervals, for example. Scenarios are generated by making random draws from the history, by assuming that each historical observation is equally likely<sup>47</sup> to recur over the VaR-horizon—i.e., the next day or week.

Clearly, HistSim is best suited for risk factors for which high-quality (reliable, long histories) data are available. This criterion is usually satisfied by most of the important “general market”/systematic risk factors (e.g., Treasury and swap curves, FX rates), but also by certain issuer-specific factors—e.g., stock prices.

Under the parametric approach, key statistical parameters—the mean, standard deviation and possibly correlations—of a risk factor are first estimated either subjectively, or using whatever (possibly limited) data are available. It is also assumed that the risk factor follows a familiar distribution—the Normal assumption is by far the most common, although the t-distribution is also used occasionally.

Discussion of approaches to revaluation and aggregation (steps (ii) and (iii)) is subsumed under discussion (to follow) of the bank's approaches to these steps.

## **Overview of BS' VaR Methodology**

### **Scenario generation**

BS employs HistSim scenario generation for most systematic risk factors as well as for equity returns (where available). At present, the bank has about three and a half years' of data for most of the series—the target is to be running VaR on four years of

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<sup>46</sup>Not to be confused with the other common use of this term to refer to a predefined set of joint outcomes for the risk factors.

<sup>47</sup>If desired, different weights can be assigned to each historical observation. One popular variant is to weight recent observations more heavily (this is called “exponential weighting”).

prior history. The data are for weekly, rather than daily, observations, in line with BS' standard of one-week VaR horizon.<sup>48</sup>

The bank also employs the parametric approach, chiefly for idiosyncratic or residual risks. Roughly speaking, these are security-specific risks or risks (variations in instruments' prices) not explained by the systematic factors. In all cases, the factors underlying these risks are assumed to be Normally distributed and all correlations are assumed to be zero. Of course, P&Ls from different positions exposed to a particular factor are assumed to be perfectly correlated (e.g., issuer-specific P&L for all bonds of a firm).

For certain risk factors with insufficient histories, proxying is employed. Exploiting the risk factor's putative relationship with an HistSim risk factor, either synthetic histories are generated or parametric properties are estimated.

More detailed discussion of risk factors used by BS can be found under the heading "Salient VaR features by product area."

## Revaluation

For some basic products such as cash equities, the reval follows more or less directly from the factor change. For more complex products, alternate revaluation schemes become necessary. As a general rule, positions are not subject to "full" revaluation at every simulated scenario, because of the computational cost. Instead, computationally less-burdensome approaches are adopted. Under any approach, however, the actual calculations are done by Front Office systems and supplied to the VaR system.

One approach is to use (approximate) revaluation schemes based on "risk sensitivities".<sup>49</sup> These are analogs of analytic partial derivatives—namely "Greeks", PV01's, and the like. Being "local" risk measures, these should perform quite well for "near-linear" instruments<sup>50</sup> and may be acceptable for options that are "monotonic"<sup>51</sup>

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<sup>48</sup>Arguably, the appropriate VaR horizon is different across desks, dependent, e.g., : on the time required to hedge or defease risks, the expected holding period, etc. For many derivatives desks, a one-week horizon might be too long.

<sup>49</sup>A simple example is how a straight bond might be revalued. Under "full" revaluation, each individual cash flow of the bond would be re-priced (discounted) at the appropriate simulated rate—and this has to be done for each simulation scenario. Under approximate revaluation, first, the bond's PV01 is calculated—this is the change in the bond's value if the current yield curve underwent a parallel upward shift of 1bp. (This is one, and not the only, way of calculating PV01. It is obviously very closely related to the duration measure.) Then, for all simulation scenarios, the bond's change in value is approximated as the PV01 times the simulated change in the yield— considerably fewer calculations than full re-pricing. For option-like instruments, the so-called Greeks are used for this purpose.

<sup>50</sup>For a linear instrument, the change in value is effectively a simple, constant multiple of the change in the risk factor. The crucial aspect is that the multiplier to be applied is more or less constant across the range of risk factor values. For a nonlinear instrument, applying such a constant multiple results in a poor approximation, relative to full revaluation, at larger values of factor changes. Adding higher-order sensitivities alleviates but does not cure the problem.

<sup>51</sup>The directional impact of a factor change determines whether or not an instrument is monotonic. An instrument is monotonic, e.g., if its value always increases as the risk factor decreases, over the whole range of risk factor values. A non-callable bond is a simple example of a monotonic instrument. At any yield level, its value always decreases (increases) as its market-required yield rises (falls). In contrast, a callable bond behaves like a non-callable bond over a range of yield levels, but changes character below a

Another approach is to use revaluation grids (usually 2-dimensional). The grid is a table of instrument values, obtained by applying full revaluation, at selected values of each underlier/dimension. Inter- and extra-polation are then used to estimate instrument values at other values of the underliers. BS uses these grids, for example, for equity derivatives, with the stock price and implied volatility as the two dimensions.<sup>52</sup>

### Aggregation

It is straightforward to compute a position's value (or value-change) for each HistSim scenario—by multiplying factor sensitivities by risk factor changes or by looking up the reval grids, as appropriate. For a given HistSim scenario, simply adding up the P&Ls for all positions gives the aggregate, portfolio P&L for that HistSim scenario. Repeating this for all HistSim scenarios (i.e., for all historical dates) yields an aggregate P&L HistSim series. Treating gains as negative losses, and sorting the P&L losses from lowest to highest, the 95th percentile of the sorted distribution is the estimated HistSim VaR (at the 95th percentile). Note that this aggregation exercise can be carried out any desired level—desk, division, firm-wide, etc.

The bank combines this with the P&L “risk” arising from the parametric risk factors by using what may be called a parametric approach. The bank assumes that the HistSim P&L and the parametric-risk P&L(s) are draws from independent Normals with different variances. The combined variance is then just the sum of the individual variances, and the combined VaR is just 1.65 times the combined standard deviation.

### Assessing the VaR system

There are four broad dimensions along which the output quality of a VaR system can be evaluated: (i) integrity/quality of input position data; (ii) quality of scenario generation; (iii) quality of revaluations; and (iv) quality of aggregations. These are also the main channels through which “inaccuracies/errors” can creep into a VaR system.

The companion document highlights, desk by desk, areas where the qualities of scenario generation and/or revaluation deserve further discussion/analysis.<sup>53</sup> Here, we note certain issues with the bank's approach to aggregation.

One of the strengths of the HistSim approach is its nonparametric nature. In the aggregation stage, however, the bank's calculations rest entirely on parametric arguments. E.g., the bank assumes: (i) that the P&L due to HistSim factors is Normally distributed, and (ii) that the “combined” P&L is also Normally distributed. If the actual distributions were fatter-tailed than the Normal, the measured VaR would understate the “true” VaR. We will discuss this point further with the bank.

### Salient VaR features by product area

To gain a better appreciation for the bank's VaR system, this section highlights how principal risks for different product types are addressed.

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certain yield level, as it becomes more likely that the bond will be “called.” Many derivatives with complex payoffs are typically not monotonic.

<sup>52</sup>A 2-dimensional grid captures the “cross-partial” effect—the instrument's change in value for a given change in the stock price also depends on the concurrent change in implied volatility.

<sup>53</sup> OPSRA did not assess the quality of input data during the CSE review.

## Credit Products

The principal risk for credit products is due to spread changes. A security's spread change is assumed to be driven by: (i) the change in a rating/industry index spread, (ii) the change in an issuer-specific "average spread"<sup>54</sup>, and (iii) issuer-specific term structure effects<sup>55</sup>. The first is captured via HistSim and the last two via parametric add-on, with different types of assumed inter-correlations. This general approach is applied (with some tweaks) to a wide array of products exposed to issuer-credit-risk, including corporate bonds (other than those already in default), emerging market bonds, credit derivatives and municipal bonds. Additionally, for defaulted debt and credit derivatives, risk due to changes in anticipated recovery are also considered.

P&L's stemming from HistSim risk factors are aggregated in the "natural" way. P&L from the non-HistSim factors are "added in" via the parametric approach with different types of assumed inter-correlations. Thus, for the i'th issuer, all sources of issuer-specific "residual volatility" are added up (i.e., they are perfectly positively correlated). Maturity-specific risks are correlated within an issuer but uncorrelated with the "residual volatility" above.

### Noteworthy items

#### Restructuring risk

The bank also accounts for "restructuring" risk which stems from the fact that credit default swaps on the same issuer may differ as to the set of credit events under which they pay off—in particular, some CDS's do, and some do not, recognize "corporate restructuring" as a credit event. The bank uses the CDS of one type of provision (e.g., Modified Restructuring for North American investment grade names) as a VaR benchmark, and hence CDS's with alternate provisions would carry a "basis risk," which is captured in VaR.

#### Correlation risk for synthetic CDOs

The values of a CDO's tranches change as the market revises its views on the distribution of the overall future default rate of the CDO's reference asset pool. It has become common practice to model the distribution of the overall default rate via a so-called correlation parameter (a higher correlation means greater uncertainty about the future default rate—i.e., higher probabilities of more extreme (very high or very low) default rates). Although the correlation parameter is not directly observed or directly traded, it is possible, under certain assumptions, to compute implied correlations from prices of actively traded standardized tranches—these are the so-called base correlations. The bank has compiled a 2-year history of weekly observations on base correlations of each of 5 tranches of 18 different indices—these are the standard, actively-traded tranches. Tranches of custom or bespoke CDOs are mapped to one or more of these standard tranches.<sup>56</sup> Sensitivities of the tranches to base correlations are

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<sup>54</sup>Average across all issues for that issuer.

<sup>55</sup>Maturity-specific deviations relative to the issuer's average spread.

<sup>56</sup>For standard tranches with insufficient history, there is a fallback procedure. This should become less important as time passes and better historical data is accumulated.

supplied by the desk. This “correlation-risk” contribution to VaR is assumed to be statistically independent of other VaR contributions for aggregation purposes.

It should be noted that this is an area with relatively high “model risk”—models are relatively immature and are being fine-tuned. BS and other institutions are studying the behavior and performance of alternative models. We have flagged several specific items for further review and will also be keeping abreast of industry-wide developments.

### Interest rate products

Products in this desk face exposure to changes in yields/rates across the spectrum of maturities. The bank employs a factor-model to estimate interest rate risks that are “common/systematic” across the maturity spectrum, which are then represented as HistSim factors. Interest-rate related risks (of individual securities) that are security-specific or non-systematic are captured via parametric (non-HistSim) methods. A single, HistSim, implied volatility risk factor is also used.

This approach is applied to government bonds desk and the fixed income derivatives desk.

### Mortgage products

A 5-factor model is used to estimate the systematic components of interest-rate changes, and to develop associated HistSim risk factors. Changes in the “mortgage basis” (which encapsulates the refinancing incentive) are decomposed into a “systematic” and a “residual” component. The systematic component, due to the systematic IR changes alone, is determined internally within the bank’s pricing model—as such there is no explicit risk factor for this component. The residual component is the variation in the mortgage basis not explained by changes in Treasury and swap rates, for which a HistSim factor is used.<sup>57</sup> It is worth noting that, across institutions, a variety of approaches are used for “mortgage VaR”; BS’ implementation has some innovative aspects.

The above approach to interest rate risk is applied to all residential mortgages.

#### Residual risks for residential mortgages

The starting point is a bank-developed model, with the acronym PORC, that is used for valuation and risk analyses of residential mortgages.<sup>58</sup> Residual risks are estimated by examining the unexplained price-variation, relative to the PORC model, of different types of mortgage instruments. The actual estimation and aggregation of residual risks are quite elaborate and described in greater detail in the companion document.

Estimation is carried out only for agency securities. Residual risks for jumbo primes and Alt-A’s are parametrized by agency “residual-risk” standard deviations, inflated by 10%—this is to account for their observed higher residual price-volatility, relative to agencies. For prime and Alt-A ARMs, “residual-risk” standard deviations that are 50% of those applicable to fixed-rate non-agencies, are used.

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<sup>57</sup>A single implied volatility factor is used—the 1-year option on the 10-year swap rate.

<sup>58</sup>Inputs to the model include Treasury and swap curves and implied volatilities for points on those curves. The residual term of the mortgage basis is also an input. As already noted, the systematic component of the mortgage basis (current coupon on 30-year fixed less the 10-year swap rate), is derived from the swap and Treasury rates HistSim risk factors.

Subprimes are believed to behave differently than mortgages of higher credit-quality in at least two respects: (i) they exhibit low interest-rate related prepayment sensitivity, but (ii) are sensitive to credit perceptions. Accordingly, the residual risk approach is more akin to that of credit products. The bank first estimates “cash-flow” or “zero-volatility” spreads and durations for each position. Via empirical estimation, the volatility of the cash-flow spreads is divided into two components, a market-wide component common to all positions and an issuer-specific component based on the loan originator.

For scenario generation and aggregation, both the market-wide component and the originator-specific component are handled via the parametric approach. Each security or whole loan is mapped to a particular issuer. All risks attributable to a particular issuer/originator are assumed to be perfectly correlated. P&L variations from the market-wide component are assumed to be perfectly correlated across all (subprime) positions, but uncorrelated with the originator-specific variation.

#### Commercial mortgages

Products include whole loans held for securitization as well as secondary market securities (tranches of previously issued CMBS). These products are subject to both interest rate risk and credit risk.

HistSim risk factors for commercial mortgage-backed securities (CMBS) include: (i) interest rate changes— weekly changes on USD CMT (Constant Maturity Treasury) rates for five different maturities,<sup>59</sup> and (ii) changes in the spreads of CMBS indices of different ratings—4 investment grade CMBS categories, 2 sub-investment grade and one IO. These spreads are viewed as “systematic” credit-risk indicators. The bank believes that deal-specific credit risk is minimal, and hence no attempt is made to capture it.

Each whole loan position awaiting securitization is tranching in the same proportions as the most recent deal, whereby the above treatment for CMBS securities can be applied.<sup>60</sup>

#### ABS & CDOs

Interest rate data on USD CMT rates for 5 different terms are used. Each bond is mapped into one of the 5 terms based on expected life; floaters are mapped into the shortest bucket.

Spread data are collected for these ABS categories: auto, credit card, home equity, manufactured housing, high LTV loans and student loans. For CDOs, spread data on high yield bonds, high yield loans and asset-backed securities are collected. Spread indices are further broken down by rating categories, fixed/floating (for some products) and seasoning. These capture the broad market components of these instruments’ credit risk. Each bond is mapped into a spread bucket based on tranche type.

Bond-specific credit risk components are also calculated using the same approach and parameters as for corporate bonds. Assuming equivalence of ratings to

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<sup>59</sup>Unlike residential mortgages, commercial mortgages contain provisions preventing or severely discouraging prepayments by borrowers (e.g., an extended lockout periods of 10 years). So a CMBS essentially behaves like an ordinary non-callable bond with respect to changes in default-free interest rates.

<sup>60</sup>However, tranches below B are assigned the credit risk of the B-tranche. The very junior tranches tend to be very small portions of the overall transaction, and the bank has also indicated that they tend not to retain these pieces.

the corporate bond scale, the specific risk volatility associated with a corporate rating is applied.

### Equity and Equity Derivatives

The principal risk factors relate to movements in stock prices (single-name and indices) and in the term structures of implied volatility. For the price-levels of equities, the preferred HistSim factor is name-specific weekly return histories. When such historical data are insufficient or unavailable, proxies are developed using procedures described subsequently. To the extent possible, name-specific implied volatility term structures are also fed as HistSim factors.

Where computationally feasible, revaluation grids/matrices are used to capture the nonlinearities and the cross-partials inherent in option positions.

The bank captures the market risk of positions in the Risk Arbitrage desk as follows. The principal source of market risk is whether or not there is a deal-break risk over the VaR-horizon ( e.g., 1 week). If the deal breaks, the loss is estimated by assuming that Target's stock price reverts to its pre-announcement level. If there is no deal-break over the next VaR-period, the market may revise its estimate of  $p$ , resulting in a change of the "spread" between the Offer price and the Target's current stock price—with attendant changes in portfolio value. The volatility of this spread is estimated from an historical database (internal to BS). Using a deal's current implied deal-break probability, a separate simulation generates events of deal-break and "no deal-break"; appropriate valuations (i.e., based on spread-volatility for the no deal-break case and from the price-reversion for the deal-break case) are then applied.

### Foreign Exchange (FX)

The bank trades cash and derivatives FX instruments. The principal risk sources are changes in FX rates and in implied volatilities, with changes in interest rates being of secondary importance. Each of these risk sources has HistSim risk factors. Where implied volatility histories are lacking, a proxy history is created by using the realized standard deviation of the FX rate over the prior three months. For derivatives, revaluation is accomplished via a grid, with the FX rate and the implied volatility as the two dimensions.

## (2) Scenario Analysis

Compared to some of its peer Firms, BS' use of firmwide scenario analysis and stress tests is relatively new. During summer 2004, RMD began the process of selecting a set of scenarios/stress events to run on a firmwide basis.<sup>61</sup> Currently, BS runs a set of nine historical scenarios<sup>62</sup> and eight hypothetical stress events.<sup>63</sup> For the

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<sup>61</sup> Prior to the creation of RIO, BS had some limited firmwide stress testing capabilities. The previous stress testing was a manual spreadsheet based approach that produced monthly results on a firmwide basis. However, the stress test results were much less comprehensive and transparent than the current set of RIO based scenario/stress events.

<sup>62</sup> This set of scenarios covers many historical scenarios commonly used by the industry, including BS' peer firms. For a complete list of the scenarios BS currently runs (or has tentative plans to run in the future) see *Appendix D: Scenario Analysis Summary Report*.

historical scenarios, BS computes a daily, weekly, and monthly stress result. For the daily scenario, one specific day was chosen which represented the largest move in the relevant risk factors. The weekly and monthly moves were then determined from that day going forward.<sup>64</sup> For the hypothetical stress tests, where the shock is already pre-determined, BS reports the full result (100%) as well as 25% and 50% of the full stress test. This set of scenarios/stress tests compares favorably with industry practice and covers the main market risk factors that BS' trading businesses are exposed to: (1) credit spreads; (2) interest rates; (3) equity prices; and (4) f/x rates.

Both the historical and hypothetical scenarios involve applying an instantaneous shock to BS' current portfolio. As such, the positions are frozen and no assumptions are made about the ability to trade, rebalance, or hedge the portfolio over time.<sup>65</sup> With respect to the historical scenarios, this shock is based on the actual move in risk factors (e.g., rates, spreads, etc.) observed during the event. While determining the appropriate shock to apply to a particular position may appear to be an objective procedure, the specification of the correct shock to apply in an historical scenario can be quite subjective. For many positions, exact historical data is not available and the use of proxies are involved in coming up with the "shock" to use in the historical scenario. There is a wide spectrum of available data and markets. This may range from having the exact data to see the historical move for a certain position to having no data due to the market not existing during the event.<sup>66</sup> To ensure the reasonableness of the assumptions in this process, RMD met in an iterative process with traders, Heads of Businesses, and the product-line risk managers following the businesses. With the exception of the 1987 Stock Market scenario for the SEP whitebook, it appears that this process resulted in "buy-in" from both the business areas and the individual product-line risk managers.<sup>67</sup>

In addition to specifying the shocks to use in the scenario, one must determine the sensitivities of the positions to the specified changes in the risk factors. For scenario analysis (whether historical or hypothetical), BS uses the same methods for calculating risk sensitivities as it uses for calculating risk sensitivities for use in VaR. For many of

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<sup>63</sup> During the CSE review, OPSRA requested and received an on-line demonstration of the Scenario/Stress test capabilities within RIO. The demonstration included looking at the summary report as well as drilling down to the individual whitebook or desk level for certain scenarios. In addition, OPSRA was able to view historical time series of the various scenario/stress test results as well as some of the major assumptions (i.e., shocks) used in the various historical scenarios. For certain scenarios, OPSRA requested screen prints of the above information and had follow-up discussions with both risk managers and the business areas (e.g., 1987 Stock Market scenario).

<sup>64</sup> There was one exception to this general practice. With respect to the 1994 Fed rate hike, RMD decided to look at the entire "cycle" of Fed rate hikes which encompassed approximately 15 months and set the dates based on the largest one day, one week, and one month moves. The largest one week move happened to be nested within the largest one month move. In contrast, the largest one day move in rates actually pre-dated the Fed's announcement.

<sup>65</sup> This results in recognizing all the benefits and costs, at once, of the positive (negative) gamma/convexity in the portfolio.

<sup>66</sup> For example, the CMBS market did not exist in 1987 and thus this entire space requires the firm to proxy the CMBS positions to other positions which did exist during that time frame.

<sup>67</sup> The main issue regarding the 1987 Stock Market scenario for the SEP whitebook dealt with how the volatility shock was calibrated. See *Follow-Up Items* section of this report for further details.



the derivative and mortgage positions, this includes the use of pricing grids, which perform a full revaluation at certain pre-specified shocks.<sup>68</sup> For the Equity Derivatives desk (“SEP”), BS has plans to enhance the current partial revaluation grid<sup>69</sup> used for scenario analysis/stress tests. Other desks, where linear representation is sufficient, BS uses linear approximations (e.g., delta-gamma-vega) to determine the risk sensitivities to apply to the pre-determined shock within the scenario/stress event.

Similar to its other risk metrics, BS does not set firmwide limits<sup>70</sup> on scenario/stress tests. However, limits are generally not placed on scenario/stress test results at the whitebook/desk level either. Rather than setting and monitoring limits based on the scenario and stress test metrics, BS instead uses this analysis mainly as a monitoring tool to alert senior management to particular concentrations in risk factors. The firmwide results for all the historical scenarios and hypothetical stress tests as well as a breakdown by whitebook for the 1998 Russia/LTCM and 1987 Stock Market scenarios are distributed daily in the *Daily VaR & Stress Package* to those in senior management authorized to approve limit excessions as well as to the CFO. As seen during our review, particular in the case of the 1987 Stock Market scenario, these results do lead to dialogue<sup>71</sup> between senior management, business, and independent risk management.

While it appears that these results have become somewhat integrated into senior management discussions, there appears to be much less focus on these results in the day-to-day interactions between trading management and RMD product-line risk managers. Unlike the more commonly-used metrics (e.g., MV, IR POPs, Spread POPs, VaR), generally speaking, scenario and stress test results are much less a focus in the daily or weekly reports that the individual product-line risk managers provide to trading management.

As part of our on-going supervisory duties, we attend to monitor, in two respects, the status of the scenario and stress test functionality at BS. First, while the current list of scenarios, both historical and hypothetical, is robust by industry standards, RMD plans on making additional enhancements to its capabilities. These enhancements

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<sup>68</sup> For certain exotic derivatives, namely Options on baskets of stocks, BS is unable to use grid pricing to calculate risk sensitivities due to the amount of calculations required in shocking both price and volatility on multiple assets. For these products, BS uses a delta-gamma-vega approximation.

<sup>69</sup> The shocks to volatility included in the pricing grid for calculating VaR for the SEP whitebook do not extend out to the shock seen in the 1987 Stock Market Scenario. As such, BS uses FAST extrapolation routines to extend out from where the pricing grids end to the observed shock during the 1987 event. The FAST RIO team believes that, at this level, they are pushing up against the limits of the ability of the extrapolation routines. With that said, they believe that the use of this extrapolation procedure, versus doing a full revaluation across a wider set of shocks, is overstating the sensitivities of many of the equity derivatives to the shock in volatility.

<sup>70</sup> Within the industry, there are differing practices regarding setting limits on scenario and stress test results. While many firms set limits on scenario/stress tests at both firmwide and lower levels of aggregation, some firms have chosen not to set limits on these results for various reasons. For example, some firms believe that there is no meaningful or credible way to assign a probability of these events occurring and thus don’t believe it is appropriate to set limits based on the results.

<sup>71</sup> It was noted that Warren Spector, President and Co-Chief Operating Officer, had engaged the Head of SEP in discussions on both the results and the calibration of the 1987 Stock Market Scenario, one of the main historical scenario for the Equity businesses.

include potentially adding new hypothetical stress tests,<sup>72</sup> greater reporting tools, and the ability to change the liquidity assumptions<sup>73</sup> for a scenario on a desk-by-desk basis, etc. Secondly, OPSRA plans to follow up specifically on changes to the 1987 Stock Market scenario with respect to the SEP business<sup>74</sup>.

### C). Limit Setting and Monitoring

The Executive Committee has designated the Global Head of Risk Management with the responsibility for ensuring that an effective market risk limit structure is in place and to update the Committee on key market risk limits and the typical usage of these limits on no less than an annual basis.<sup>75</sup> Outside of the Executive Committee, a smaller subset of senior management<sup>76</sup> is giving the authority for setting market risk limits and for approving excessions on a day-to-day-basis. While each of these senior managers can approve excessions and/or set limits unilaterally, typically they will act in concert, particularly when setting new limits.<sup>77</sup>

As discussed earlier, the metrics on which market risk limits are set vary from desk-to-desk, with some desks more focused on VaR and other desks more focused on MV or risk sensitivity measures. At BS, market risk limits are generally set at the desk

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<sup>72</sup> For example, one set of stress tests currently in development focuses on consumer credit areas, such as MBS/ABS. One of the stress tests contemplated would be to shock credit spreads for both High Grade MBS/ABS and High Yield MBS/ABS. As discussed in the VaR methodology section, for those Non-Agency residential mortgage securities and loans that are determined to be prime or near-prime (e.g., Alt-A), there is no credit spread component, per se, captured in VaR. Having a separate stress test that captures the effect of a credit-spread widening event for consumer credit product should be beneficial in quantifying a potential risk (i.e., event risk) not otherwise captured.

<sup>73</sup> Currently, each historical scenario, whether daily, weekly, or monthly, assumes all desks experience the relevant shocks based on the same time period. In the future, RMD envisions having the capability to create a scenario based on different time buckets (day, week, and month) for the various desks based on the liquidity within that business. For example, in a credit-spread widening scenario, one could pick daily or weekly changes in spread for a product that is more liquid and pick monthly for a product with less liquidity (e.g., distressed debt) and see the combined scenario.

<sup>74</sup> See *Section V. Follow-Up Items* for details.

<sup>75</sup> This update will include a discussion of the progression of limits over time as well as a discussion of the utilization of those limits and the related P&L earned. From a governance perspective, this update is important, as it is sole time the entire Executive Committee is updated holistically on market risk limits. However, in practice, discussion around limits and limit changes occur throughout the year as warranted.

<sup>76</sup> This group includes Warren Spector, President and Co-Chief Operating Officer, Robert Steinberg, SMD, Jeff Mayer and Craig Overlander, Co-Heads of Fixed Income, and Bob Neff, Global Head of Risk Management.

<sup>77</sup> For example, while the Global Head of Risk Management can approve new limits, he is reluctant to make this decision without prior discussion with others in senior management. Rather than increasing limits, he generally will approve a temporary excession of a limit, which will keep the exposure on the senior management's radar screen (e.g., will remain on the daily LMG email as an approved excession). In addition, he views the setting of limits as a strategic business decision (i.e., allocation of risk capital) in addition to a risk management issue and thus believes this decision should not be solely made by RMD.

level or at the whitebook level.<sup>78, 79</sup> For example, while VaR is measured and aggregated at many different levels, from trader up to the firmwide level, BS does not set limits above the whitebook level (e.g., no limits set for sub-groups, such as all Interest Rate Products, or at the firmwide level).

Monitoring of these market risk limits is a shared responsibility at BS. On a day-to-day basis, the monitoring of exposures versus limits is one of the daily responsibilities of the individual product-line risk managers within RMD as well as BUCs for certain products.<sup>80</sup> Limits that risk managers and BUCs monitor are generally classified into two groups: (1) operating or trading limits and (2) max or management limits. Operating limits can be limits set at lower levels of granularity or limits at the same level of aggregation as management limits but at a lower threshold. For example, in the mortgage product space, there are operating and max MV limits set at each Mortgage desk (e.g., ARMs desk Max MV limit is \$10.5 billion vs. Operating MV limit of \$9.5 billion). The operating limit threshold is lower than the max limit and serves as an early warning indicator to help trading management stay within its risk appetite. The risk managers will provide the heads of the various businesses reports showing their business' usage of its operating limits. Max or management limits are more formal limits and require notification to both the Head of Risk Management and Senior Management. In addition, they generally require one of the following actions: (1) the desk reduces exposure to under the limit, (2) a temporary excession approval is granted, or (3) a permanent increase in the limit is granted (a much less frequently used action).

To facilitate in the monitoring and communication of max or management limit overages, BS created a limit monitoring group ("LMG") within BUC. LMG has the responsibility for reporting and monitoring firmwide limit breaches. LMG is made aware of any limit breaches and any changes in limits by the responsible risk managers or BUCs on a Trade +1 day basis. LMG then compiles these breaches and organizes them by whitebooks and reports them to senior management on a trade+2 day basis via email.

There are two sets of email notifications circulated by LMG on a trade+2 day basis. First, when a maximum desk level limit is breached, LMG will send an email to the relevant trading manager and copy the corresponding risk managers and BUCs on the email. This email will instruct the trading manager to bring the exposure back in line with existing limits or have the excession approved via email by the appropriate individual and forward the approval back to LMG for documentation purposes. In addition, LMG will compile across all desks a "Summary of Violation Notices and Notification Levels" and distribute this report on a daily basis to those individuals within senior management that have authority for granting excessions approvals and setting limits.

This summary report has four sections. The first section includes a list of limit violations for which no approval has been received to date. The second section includes continuing violations which have been approved (i.e., granted a temporary excession

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<sup>78</sup> In many cases, the whitebook level is the same as the desk level (e.g., Block trading within Equities is both a desk and its own whitebook). However, in other product areas, there are several desks within a whitebook. For example, within the MBS whitebook, there are several individual desks where max limits are set (e.g., ARMs, Non-Agency CMOs, Agency CMOs, Commercial Conduit, etc).

<sup>79</sup> For a complete list of whitebooks, please see the *BS Firmwide VaR Report* on Tab 8 of the Bear Stearns & Co, Inc. CSE application.

<sup>80</sup> Please see *Limit Monitoring and Price Verification Responsibility* document for a complete division of these responsibilities between risk managers and BUCs.

approval). The third section is a list of “Notification levels,” which includes a listing of firmwide individual issuer (top issuer) and bank and bridge loan exposures which have reached their notification levels. As opposed to the first two sections, these items do not require approval and do not represent violation of trader limits, rather they just serve the purpose of keeping senior management abreast of large single issuer exposures. The fourth section is an excel file that contains Manager excesses within trading manager authorization levels and excesses cleared T+1. This file includes both a listing of trading manager level violations (i.e., operating or trading limits) which do not require senior manager approval as well as a list of limit excesses cleared, both trading manager and desk level. The first list provides senior management with more detailed limits if the desire. The second list provides senior management with insight into how quickly limit excesses, both those requiring senior manager approval and those not requiring such approval, are cleared.

While senior managers are kept apprised of limit violations primarily through the daily firmwide limit violation email distributed by LMG, VaR limit utilization is also included in a Daily VaR and Stress Testing Summary report distributed to senior management. In addition, while the reporting of limit excessions to senior management resides with LMG, if violations remain on the list without approval, RMD is responsible for following up on the items. RMD is the policing function when it comes to enforcing limits.

## **D. Risk Reporting**

The primary goal of BS’ market risk reporting is to highlight the material trading risks of the Firm to senior management in a transparent and timely manner, which will provide management with meaningful information with which to make decisions. This goal is illustrated in the following Executive Committee’s mandates for the Risk Management Department: (1) The Executive Committee wishes to re-iterate the importance of the “no surprises” culture and the role Risk Management plays in placing a spotlight on key risks to support the ability of senior trading management to assess the advisability of the risk-taking and (2). The Global Head of Risk Management is responsible for aggregating market risk information across the various trading businesses in order to present senior management with a consolidated view of risk

RMD attempts to fulfill these responsibilities through the production and distribution of various reports as well as through periodic Committee meetings. The granularity and distribution of these reports will vary as will the timing of the various meetings. RMD will provide risk reporting to both product-line trading management as well as the senior management of the Firm. The risk reporting to product-line trading management will be desk-specific and more granular in nature.<sup>81</sup> Much of the risk reporting to senior management, while more holistic in nature, still provides a focus on the key exposures by desk. The various risk reports to senior management fall under two general categories: (1) compilation or aggregation of key risk information from each product-line risk monitoring group and (2) aggregated risk factor reporting, such as VaR and Scenario Analysis from RIO.

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<sup>81</sup> For more details, please see earlier discussion of the production of risk reports for business unit management by the various RMD product-line risk monitoring groups.

Many of the customized reports the various risk managers produce for trading management are also provided to certain members of senior management.<sup>82</sup> In addition, every product-line risk monitoring group within RMD produces comments for the “*Daily Risk Highlights*” report.<sup>83</sup> This report is a brief, daily summary of any items deemed of interest to Senior Management. The items that are typically discussed in this report are analysis/explanation of large P&L moves as well as discussions of any large trades, risk profiles, market moves, or limit breaches. In addition, the risk manager may utilize this report to highlight exposure across desks for a particular issuer.<sup>84</sup> The *Daily Risk Highlights* report is produced as a compilation of the comments from all the product-line risk managers. Prior to the report being distributed, it is reviewed and edited for content by the Global Head of Risk Management or his designee within RMD. Then the report is distributed to senior management, including the Executive Committee, the Heads of Fixed Income and Equity, etc.<sup>85</sup> In addition, generally each product-line risk manager’s comments will go to the trading management of the desks he or she covers.

In addition to the compilation of the desk level risk highlights, RMD distributes a Daily VaR and Stress Testing Summary Report<sup>86</sup> to those individuals in senior management authorized to approve limit excessions as well as to the CFO. The VaR summary report includes a weekly VaR at the 95% confidence interval, the change from the previous day, the % of limit utilized, and historical comparisons. The VaR amounts are reported at various levels of aggregation within the Summary report.<sup>87</sup> In addition, long and short MV and other key risk sensitivity measures, such as IR pops and Spread pops are provided on the report for the relevant whitebooks and desks.

The Daily VaR and Stress Testing Summary Report also includes a set of stress scenarios based on historical events, such as the 1998 Russian Default/LTCM scenario and the 1987 Stock Market Crash, and hypothetical stress tests, such as a parallel shift up and down in interest rates by 25/50/100 basis points. The package includes a summary report which provides the firmwide results for each of these historical

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<sup>82</sup> In some cases, custom reports have been generated based on specific requests from members of senior management. For example, Warren Spector asked for the creation of a mortgage report that included MV information on all credit sensitive mortgage products, whether or not credit spreads is the main driver of risk.

<sup>83</sup> See Appendix E for a sample of the Daily Risk Highlights Report.

<sup>84</sup> For example, on August 10<sup>th</sup>, there was a particular name for which BS breached its firmwide limit notification level for BBB rated issuers. The risk manager discussed the market event that pushed the exposure above limits and the exposures to the issuer across the firm (credit trading, bank debt, equity). The Global Head of Risk Management noted that Senior Management finds this type of analysis very useful.

<sup>85</sup> While senior management will generally discuss any areas of concern with the Heads of Fixed Income or Equities, it was stated that it is not uncommon for certain members of the Executive Committee to call a risk manager directly concerning a comment posted in *Daily Risk Highlights*.

<sup>86</sup> See Appendices C and D for the August 11<sup>th</sup> Daily VaR and Stress Testing Summary Reports (as of August 10<sup>th</sup>).

<sup>87</sup> VaR is shown at the Firm level, sub-total level (i.e., Credit, Interest Rate, Equity, and F/X whitebook subtotals), individual whitebooks, and for certain desks within particular whitebooks, such as MBS desks where VaR is reported for the various desks within MBS whitebook (e.g., ARMs, non-Agency CMO, etc).

scenarios and hypothetical stress tests as well as separate reports for certain historical scenarios where the results are provided at the firmwide level as well as at a more granular levels (whitebook and desk level). In contrast to VaR, where the Firm has set limits at the whitebook/desk level, there are no similar limits against either the historical scenario or hypothetical stress test results.<sup>88</sup>

It should be noted that while these aggregated VaR and scenario analysis/stress test risk metrics are provided to senior management, senior management focuses more on the *Daily Risk Highlights* report, as that report discusses notable changes in VAR but also explains the reasons behind the reported change, whether it be changes to risk sensitivities or positions. RMD prides itself on this product and views it as a cornerstone of its value-added service.

Effective communication of risk information requires open dialogue, not just the production of risk reports. RMD has multiple points of interaction with senior management to discuss risk issues. First, on a weekly basis, the Firm's Risk Committee meets. The Risk Committee meets every Monday and is composed of the Heads of each of the trading departments, the senior managers within RMD, and is chaired by Alan ("Ace") Greenberg who also chairs the Executive Committee. The purpose of the weekly meeting is to provide a forum for the Heads of the various trading businesses and RMD to discuss what risks are being taken and how the businesses are making or losing money. Generally, there is a reporting and discussion of the profit or loss generated and the key risk metrics for each business. In times of market stress, senior management will use this forum to give broad direction to the various Heads of Businesses.

On a monthly basis, the Global Head of Market Risk reports to the Executive Committee. He is expected to advise the Executive Committee of key risks, to foster the Committee's understanding of how trading businesses are making or losing money and to highlight other issues he deems material. At each month's meeting, the Global Head of Risk Management will provide the Committee with the *Risk Summary by Trading Desk* report.<sup>89</sup> This report will provide a desk-by-desk risk summary for the current month and comparisons to previous months and years as well as the month-to-date change and percentage rank. The risk metrics displayed on this report will vary desk-by-desk.<sup>90</sup> Along side the risk summary for each desk is the actual P&L history of that desk. The purpose of this report is to highlight the growth (or decline) in risk of the various businesses and the related performance of these businesses to provide a risk/return profile to facilitate decision making.

While the distribution and discussion of the *Risk Summary by Trading Desk* report occurs at every month's meeting with the Executive Committee, the focus of the discussions are topical in nature. Additional agenda items are prepared for the meeting to focus on current issues. These discussions and related materials could be related to large transactions occurring during the month, noteworthy market events, risk exposure

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<sup>88</sup> Industry practice varies regarding setting limits on firmwide Scenario/stress tests. Some firms set limits at many levels of aggregation for specific scenarios, while others, including BS, do not generally set limits on these metrics.

<sup>89</sup> This report is very similar to the Risk Summary by Trading Desk report given to OPSRA during our monthly market and credit risk meetings. See *Appendix F: Risk Summary by Trading Desk* for sample copy.

<sup>90</sup> Risk metrics used include Gross MV, Long MV, Net MV, Spread Pops, and VaR. The risk metric used on this report for many of the desks (e.g., origination businesses), is simply Net MV.

to certain industries, names, segments of the capital markets, operational concerns, etc. For example, below is a sample of supplementary agenda items<sup>91</sup> for the past 12 months of monthly discussions: (1) Ford/GM/other auto exposure-update on risk position, (2) Credit derivatives market update and performance-impact of spread widening and upheaval in correlation market, (3) ARM IO-position update, risk exposure, (4) Latin America credit default swap markdown, (5) LIBOR curve remark. The Global Head of Risk Management compared the discussions of these meetings to the monthly meetings with OPSRA in that they include an overview of the risk and P&L by desk, but have a heavy focus on issues. In fact, all of the sample supplemental agenda items shown above were discussed with OPSRA personnel during our monthly risk meetings.

## **E. Control Processes around Risk Measurement and Risk Systems**

BS utilizes a number of controls to ensure the accuracy of risk measures that are generated by the Firm's risk systems. These controls include, but are not limited to, daily profit-and-loss ("P&L") explanations, VaR reconciliation, price verification, model review, and backtesting of VaR results. Daily P&L explain is covered in section IV.A. "Desk Level-Risk Metrics and Risk Monitoring;" thus, this process will not be covered here. The VaR reconciliation process is used to ensure that positions in RIO, where VaR is calculated, tie to the internal books and records (specifically the general ledger). Price verification is useful for identifying miss-marked positions that could cause erroneous risk measures. Price verification by risk monitors on more model intensive, complex products, may also lead to discovery of inadequate measure of sensitivities. The model review process is designed not only to ensure accurate marks for those positions marked to model, but to also ensure that the models generate accurate risk sensitivities to be used by the Firm in calculating VaR and other aggregated risk metrics. Finally, backtesting procedures provide empirical evidence of the accuracy of VaR.

### **(1). Reconciliation process**

In an effort to preserve the integrity of VaR results (and ultimately the capital calculation), BS conducts monthly VaR reconciliation on position level data.<sup>92</sup> Bear Stearns' *Objective*, with respect to VaR reconciliation, is to ensure that all Firm trading positions are included in the market risk component of the capital calculation at the consolidated and broker-dealer level. To achieve this objective, the Firm uses both a Standard and Non-Standard Approach.

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<sup>91</sup> See "Executive Committee Monthly Meeting with Risk Management-Selected Agenda Items-June 2004 to July 2005" for a more comprehensive list of additional topics discussed during the monthly meetings with the Executive Committee.

<sup>92</sup>As part of our market risk review, OPSRA met with Susan Flynn, AD (BUC) and Jim Collins, MDP (Regulatory Reporting) to walk through the VaR reconciliation process. During the meeting, we covered the reconciliation objective, the methodologies (standard and non-standard), and current results (including exceptions and areas of improvement).

### Standard Approach for VaR Reconciliation

The *Standard Approach* is to reconcile VaR inputs to DataWarehouse,<sup>93</sup> then reconcile DataWarehouse to Bear Stearns' General Ledger ("G/L"). The Information Technology ("IT") department provides the data files necessary to reconcile to the Firm's G/L. Files are primarily segregated by whitebook, and (because of how information is stored in and obtained from front office systems) are not uniform from one whitebook to the next. This lack of standardization dictates that different whitebooks be reconciled at various levels (i.e., at the security level, account level, or portfolio level).<sup>94</sup> Additionally, the value (or values) being reconciled will depend on the product type: Cash Instruments are reconciled on Market Value; Swap Instruments are reconciled on Risk Factor between VaR and the front office system, then on Market Value between the front office and DataWarehouse; Futures Contracts are reconciled on Contract Quantity or Underlying Quantity. The standard approach is primarily utilized on the following cash desks: High Yield/Leverage Finance, Emerging Markets, Municipals, Governments, Mortgage Backed Securities, Fixed Income Investments, Risk Arbitrage, International Equity Trading, Firm Investments, Over the Counter ("OTC"), Block Stock, Strategic Structure Transaction ("SST"), and Foreign Exchange.

### Non-Standard Approach for VaR Reconciliation

Due to product complexity, or the atypical nature of the business lines, Bear Stearns uses a *Non-Standard Approach* for Structured Equity Products ("SEP"), Credit Derivatives, the Finance desk, and the Bear Wagner business unit. For SEP, VaR files are reconciled to front-office reports based on market value. The Firm then leverages off of a pre-existing reconciliation process (performed by Business Unit Controllers ("BUCs")) to reconcile front-office systems to the general ledger.

Credit Derivative reconciliation requires additional assistance from the IT division in the form of security level re-aggregation and VaR file authentication. Without re-aggregation and authentication, it would be extremely difficult to reconcile the numerous legs of a credit derivative instrument to the security-level data that is stored in the front-office system. After IT re-aggregates instruments back to the security level, the VaR file is then reconciled to the front-office based on Market Value. Similar to SEP reconciliation, Credit Derivatives are reconciled between the front-office system and G/L using a pre-existing reconciliation process performed by BUC.

The other business lines that fall under the non-standard approach—the Finance desk and the Bear Wagner business unit—are works in progress that are close to completion. The VaR reconciliation process for the Finance desk is non-standard because Finance desk data is not stored in the DataWarehouse system. Consequently, instead of reconciling to front-office reports, VaR files are reconciled to back office systems. For the Bear Wagner business unit, the reconciliation process attempts to reconcile VaR to Bear Wagner's general ledger. The Firm has identified accounts that are missing from the VaR valuation and is in the process of (1) determining the level of materiality and (2) determining what would be required for inclusion in VaR.

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<sup>93</sup> DataWarehouse is a repository of the Firm's inventory that is used primarily for independent price verification.

<sup>94</sup> Most of the reconciliations are done at the portfolio level because of the difficulty involved in pairing off positions when there is no instrument ID associated with VaR data.



### Exception Handling

Bear Stearns applies an *Exception Handling* process for items that are missing from the VaR calculation, for items that should not have been included but were, and for items where back office data do not reconcile to VaR values. When an exception item is identified, the position is sent to Risk Management for feedback. During earlier phases of development, exceptions were typically systematic type issues where, for example, data feeds for an entire desk were not correct. Currently, most exceptions arise because of disconnects between front and back office systems. In addition to notifying RMs on incorrect or missing positions, VaR reconciliation personnel meet month with Risk Managers and FAST personnel to assess the materiality of any incorrect positions and their impact to VaR on a whitebook level and on a firmwide level.

### **(2). Price Verification**

Bear Stearns emphasizes the importance of independent mark-to-market (MTM) price verification for three main reasons:

- 1) Daily and ongoing P&L is a primary management tool,
- 2) Trader compensation is highly correlated to P&L, and
- 3) Accuracy of disclosed financial statements is dependent on correct valuation of assets and liabilities.

### Requirement for MTM Verification

Bear Stearns' "Policies and Principles" encourages daily MTM verification, but the sheer number of positions at the Firm makes this infeasible. Risk managers do, however, verify certain marks on a daily basis as part of their P&L explain process. The "normal expectation" is that MTM verification will occur monthly for all positions; however, the "quarterly standard," as set forth by the MTM Committee, only requires quarterly MTM verification.<sup>95</sup> Additionally, there are certain positions, which if approved by the Head of Risk Management or the MTM Committee, are eligible for an exception to the quarterly standard.

### Responsibility for MTM verification

Responsibility for MTM verification is segregated by trading desk and between RMs and BUCs. For each trading desk, RMs are primarily responsible for mark verification on more difficult to price instruments (e.g., credit derivatives). Business Unit Controllers typically verify prices for products that receive vendor pricing feeds daily or for products where there are robust liquid markets. *Ultimately, RMs have primary responsibility for the prevention of material mismarks on all desks and accordingly*

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<sup>95</sup>During a meeting with Susan Flynn, she pointed out that although the "Policies and Principles" only mandate the "quarterly standard," market risk managers on all of the desks are expected to conduct monthly MTM verification and that an important part of her job is to ensure full coverage on a monthly basis. Ms. Flynn also covered responsibilities for MTM verification, daily and monthly verification processes, and how results are communicated to senior management.

*maintain responsibility for the MTM verification process.* Risk managers also have primary responsibility for:

- Setting policy with respect to the models, sources, and revaluation techniques used to verify marks.
- Deciding how trading books (or positions within books) are assigned between Risk Managers and BUCs.
- Determining the appropriate verification schedule for positions.
- Determining the appropriate output and management report to document the MTM verification process.
- Outlining the standards for saving work product in order to provide an appropriate audit trail of the MTM function.
- Taking the lead role in dealing with external auditors and regulators regarding MTM verification policies.

Business Unit Controllers (1) are accountable for the production of timely, accurate financial statements; (2) make the final decision on whether or not to revalue a position; (3) set the level of materiality for MTM adjustments; (4) have final authority to set reserves; and (5) are responsible for XPOS maintenance and reconciliation.

#### Daily MTM Verification Process

Daily mark-to-market verification occurs in the course of normal daily market monitoring and market risk review. Typically, risk managers verify marks for positions that merit review and explanation as part of their daily P&L explain process. These positions are generally large, new, or complex in nature. Daily mark verification for smaller positions usually only occurs if a mismatch would be large enough to significantly impact P&L.

Certain trading desks, typically cash desks, receive daily vendor pricing feeds. These pricing feeds allow Bear Stearns, through a system called XPOS, to generate daily XPOS reports that enable comparison of internal trader marks to independent vendor marks. Bear Stearns' "Policies and Principles" do not, however, require RMs or BUCs to review XPOS information on a daily basis.

#### Monthly MTM Verification

Monthly MTM verification is also known as the monthly XPOS process, which typically spans a 2-3 week period immediately following month-end. The focus of the monthly XPOS process is on the accuracy of prior month-end marks. For example, August 31, 2005 marks will be verified during the first 2-3 weeks in September. The Firm's expectation is that all positions will be independently verified during the monthly XPOS process; however, the "quarterly standard" set forth by the MTM Committee states that, "each position should be independently reviewed at least quarterly."<sup>96</sup> For certain positions, the Global Head of Risk Management or the MTM Committee can grant an exception to the "quarterly standard." If, for example, a trading desk had numerous small positions, RMs and BUCs might be allowed to use sampling instead of position-by-position mark verification.

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<sup>96</sup> Bear Stearns Risk Management "Policies and Principles," Section 4f

Risk managers and BUCs use three primary pricing methodologies during their MTM verification process. The first method involves using various *independent pricing sources* such as:

- Active broker/dealer quotes
- Reuters/Telerate
- Firm-purchased pricing services (e.g., IDC, Muller, or Bridge)
- Cooperative data sharing arrangements (e.g., TRACE, Totem/Markit, and Valuspread)
- Counterparty valuation for specific trades

The use of independent pricing sources works well for exchange traded equities, liquid cash instruments, and plain vanilla derivatives. Other instruments, however, require the use of internal models to generate a “*calculated independent price*.” These are typically instruments where Bear Stearns receives pricing information in the form of yields, yield spreads, volatilities, or dividend rates; then, this information, in conjunction with Bear Stearns’ pricing models, is used to generate a calculated independent price.

A third method is “Risk-Based MTM Verification.” This approach is used as an alternative to trade level verification. Mark-to-market exposures and cushions are determined by comparing a desk’s pricing inputs (e.g., rates, spreads, or volatilities) with independent inputs. The exposures or cushions are then estimated by multiplying the inputs to price sensitivities and assessing the magnitude of the differences. This approach is used infrequently, and only with the approval of the MTM Committee or the Global Head of Risk Management.

### Communication of Results

Communication of MTM verification results flows from RMs and BUCs to traders, trading managers, senior RMs, senior BUC managers, and to the MTM Committee. Depending on the nature and scale of the MTM issue, RMs and BUCs may discuss concerns with traders directly. Risk Managers or BUCs also notify trading managers on the status of the monthly review process (even if no discrepancies are found). If MTM discrepancies are discovered, involving the trading manager can help facilitate needed MTM changes and to deal with any personnel issues. Additionally, trading managers may have additional market information that can help to resolve MTM concerns.

Senior Risk and BUC managers are kept apprised of MTM verification findings as well as pricing sources and processes used to derive the findings. Senior managers in turn provide guidance regarding how to proceed with MTM concerns. If RMs or BUCs feel that senior risk or BUC managers are not properly raising concerns, then they are permitted to take their concerns directly to Executive Committee members (or other senior managers). However, OPSRA notes that Risk Managers and BUCs are reminded that, “Senior risk or BUC managers should be made aware that a staff member feels this is necessary prior to the step being taken.”

At least monthly, the MTM Committee is notified of the results of the independent MTM process. Results are communicated through a memo that is drafted using a prescribed MTM memo template. The purpose of the MTM memo is to provide an overview of any issues, and any detail or supporting documentation can be presented at the MTM Committee meeting separately.

### **(3). Model Review**

RMD is responsible for the independent review of models used for pricing of the Firm's trading positions. The Executive Committee has assigned the Global Head of Risk Management the responsibility for ensuring that an effective, independent model review process is in place. The Global Head of Risk Management is to periodically report back to the Executive Committee on the functioning of this process and to alert the Executive Committee of any material problems associated with the Firm's use of models in its trading businesses as highlighted by the independent model review process.

Historically, the independent validation of pricing models at BS was typically done in an informal manner by the product line risk managers in RMD as part of their price verification process. However, with the growing responsibilities of the product line risk managers and the regulatory pressures on the industry to form distinct independent model review teams, BS decided to formalize its model review practices<sup>97</sup> and created a Model Review Group within RMD. In addition, in 2003, the Global Head of Risk Management recommended to the Executive Committee that the control environment around the validation of models be strengthened by the establishment of the Model Review Committee ("MRC"). Subsequently, the MRC decided that a formal review of the existing pricing models was warranted. With that mandate, a list of models was compiled by the Front Office, FAST, and Risk Management. The initial list consisted of models used to price, hedge, and calculate risk sensitivities for the credit derivatives, equity derivatives, and fixed income derivatives businesses.<sup>98</sup>

The scope of models subject to independent validation by the Model Review Group within RMD and subsequent approval by MRC may include: (1) models used to price inventory positions; (2) models used to value reserves; (3) models used to calculate Greeks; and (4) models used to generate risk parameters for senior management, external and regulatory reporting. However, to date, the focus of the Model Review Group has been almost entirely<sup>99</sup> on the derivative businesses (where the pricing and hedging of positions are heavily dependent on models). The group has had much less involvement in areas such as Mortgages, where the models are used for calculation of risk sensitivities that feed into the VaR and Scenario Analysis calculations but are generally not used for pricing positions.

A review of a model is required in the following circumstances: (1) a new model is formally released into production; (2) an existing, but not yet validated model becomes a booking model; (3) substantive changes are made to a previously validated model; (4) a model has reached its "re-review date,"<sup>100</sup> or (5) the nature or volume of the trading

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<sup>97</sup> This more recent formalization of model review practices, especially regarding documentation of the process, is something that OPSRA personnel have seen across the industry.

<sup>98</sup> As of the start of our review, the entire initial list of models had been reviewed (i.e., no backlog). The current focus is now on reviewing new models as well as re-reviewing models on a pre-determined basis or as needed. In addition, they continue to run regression testing of validated models as new releases occur to ensure that no changes have been made that they are unaware of.

<sup>99</sup> However, at the request of the Global Head of Risk Management, the Model Review group did perform a review of both the models used for the performing and non-performing loans within its EMC business.

<sup>100</sup> The re-review date is set by the MRC during the process of making a recommendation regarding a model being validated. However, the model validation group will re-review a model before this date if conditions warrant (e.g., product-line risk manager requests or business grows substantially).

has changed dramatically.<sup>101</sup> There are a variety of ways that the model reviewers and MRC are made aware of the need to review a model. For example, when model developers within FAST formally release models into production, they are required to add the released models to various lists to which model reviewers and most of the committee members of the MRC have access. However, some of the notification requires more judgment and collaboration between groups.

The Model Review Group has the following objectives for its reviews: (1) determine that the models have been tested, documented and released according to FAST and IT standards;<sup>102</sup> (2) ensure the correctness of the model implementation; (3) understand model limitations and recommend ways of addressing them; and (4) determine if models are being used in a fashion consistent with their intended use. In order to achieve these objectives, the Model Review Group will examine the following items, where applicable: (1) the scope of the model; (2) the mathematical and financial assumptions within the model; (3) specifics of model input parameters and whether they are market observable; (4) numerical implementation; full or partial independent benchmarking is required;<sup>103</sup> (5) calibration techniques; (6) model risk associated with the pricing approach;<sup>104</sup> (7) model integration within the Firm's trading and/or risk systems; (8) Greek's calculations and risk reporting; and (9) practical use of the model.

The results of a model review are reported to FAST, the relevant trading desk and the product-line risk managers within RMD, if significant issues arise. The primary written output of the independent model review process is a brief summary document<sup>105</sup> by the model reviewer. This summary document provides the findings and recommendations of the model reviewer. It is presented to the MRC for approval and discussed, if necessary, during the MRC meetings. Once the model validation results are approved, the business area will need to address any adjustments or recommendations from the MRC. MRC recommendations may include the following: (1) no issues; (2) use of the model subject to certain conditions; (3) additional tests or research to be performed; or (4) the model is unsatisfactory, with a suggestion for an

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<sup>101</sup>The Model Review Group relies primarily on informal communication with those closest to the trading activity for determining if models are being used in a fashion inconsistent with their intended use or if the nature or volume of trading using the model has changed significantly. The model validation personnel (both in London and NY) sit next to the product-line risk managers on the trading floor and thus are in constant communication with the people closest to the trading activity. In addition, for complex models, regular analysis of trades in the trading book is performed.

<sup>102</sup> See "FAST Derivatives Quantitative Support: Development Procedures and Documentation" for details.

<sup>103</sup> The model review group views this as an important feature of their model validation process. In fact, they asserted that it is not sufficient to just perform boundary/sufficiency tests, but rather independent testing, through alternative approaches, is critical to validating models.

<sup>104</sup> These issues will affect the valuation adjustments booked for the respective inventory positions. These valuation adjustments may be labeled model valuation adjustments/reserves or included in other valuation adjustments such as liquidity, etc.

<sup>105</sup> For more details, see "Model Review Template" which is attached to the "Model Review Presentation to SEC, September 15, 2004. The model reviewer is charged with the responsibility of maintaining appropriate backup documentation to support the summary document.

alternative model where possible. The time allowed<sup>106</sup> to the business area for making the recommended adjustments is determined on a case-by-case basis and depends on the seriousness of the deficiency and/or the magnitude of the trades being priced or hedged with the model. While the MRC has the responsibility for making the final recommendations regarding the use of models, enforcement of these recommendations lies with RMD.<sup>107</sup>

During our review, several key features of the Model Review Group became evident. First, the group is very integrated with the product-line risk managers they support. Within the various derivative businesses, the model review personnel sit along side the respective product-line risk managers. In addition to validating models that are used to generate risk sensitivities analyzed by the product-line risk managers, the model review personnel also support the risk managers in their price verification duties for the more complex areas, including when necessary, producing alternative models for the risk managers to use in what-if analysis or benchmarking purposes.<sup>108</sup> Secondly, the Model Review Group places great importance on the need to perform independent testing within their model reviews. Rather than relying primarily on performing boundary or sufficiency tests, the model review team at BS subjects every model reviewed to some form of independent benchmarking.<sup>109</sup> Finally, the scope of the model validation activities to date has focused primarily on the models used to price, hedge, and produce risk sensitivities for the derivative products. The group has not been nearly as integrated into the large securitization businesses where models are typically used to generate risk sensitivities feeding VaR and Scenario Analysis calculations but not generally used to price the instruments. Currently, the Model Review Group is not validating the risk sensitivities for the mortgage books that feed into the VaR and Scenarios Analysis calculations. It has been acknowledged that the model based risk sensitivities used in calculating VaR for certain mortgage desks are often quite different from the empirical risk sensitivities based on prices observed in the market. OPSRA is sensitive to the risk measurement challenges in this area, particular with respect to products that have relatively little historical data. However, given the magnitude of the Firm's mortgage businesses, we believe these models warrant an independent review by the Model Review Group.

During our review, the OPSRA market risk review team reviewed a sample<sup>110</sup> of the model reviews conducted by the Model Review Group. This included reviewing the summary model review documents written by the Model Review Group, reviewing of the

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<sup>106</sup> The Model Review Group tracks progress on suggested modifications and reports this quarterly to the MRC.

<sup>107</sup> In practice, most disagreements regarding the validity of a model get worked out before the model comes in front of the MRC and almost never would rise to the level of requiring Executive Committee action.

<sup>108</sup> For example, within SEP, Ashley Everington, Model review-SEP, worked with the product-line risk managers for SEP in creating the ability to run a stochastic volatility model for benchmarking purposes for the entire book of Cliquet Exotic Equity Options.

<sup>109</sup> This may include the Model Review group building parallel models to conduct independent tests.

<sup>110</sup> The sample of model reviews spanned across the main derivative businesses and included models used within the exotic equity derivative business, structured credit derivative business, fixed income derivative business, and the EMC Performing loan business.

MRC minutes for the corresponding periods, and an on-site discussion of the sample model reviews. As part of our ongoing supervisory duties, we have asked to be briefed on any significant developments with respect to model validation, including but not limited to significant new model reviews, changes in scope of the model validation efforts, etc. More specifically, we intend to follow up on any changes in scope of coverage by the Model Review Group with respect to the mortgage product area.

#### **(4). Backtesting**

In anticipation of its future CSE application, RMD began its backtesting of VaR roughly one year ago. At first, they rolled out this process on a desk-by-desk basis. Once a substantial amount of desks were included, they began tracking results on a firmwide basis. Currently, they are now backtesting at the individual whitebook level;<sup>111</sup> Credit, Interest rate, Equity and Foreign Exchange sub-total levels; and firmwide level. Each day's reported P&Ls are compared to the previous day's reported VaR,<sup>112</sup> scaled to the following confidence intervals: (1) 99% (2) 95% (3) 90%, and (4) 70% levels.<sup>113</sup> Losses greater than reported VaR are considered violations in that confidence interval and are tracked. Risk managers monitor these backtesting results and investigate the actual situations that caused the backtesting violations.<sup>114</sup> In addition to daily backtesting, RMD performs weekly backtesting.<sup>115</sup>

RMD back tests its VaR against three types of actual P&L: (1) Dirty P&L; (2) Static ("Clean") P&L; and (3) Fee-Adjusted P&L. Dirty P&L is simply the P&L signed off by the BUCs and comes directly from MRS, the management reporting system.<sup>116</sup> Static P&L, also known as positional or clean P&L, takes yesterday's positions and applies mark changes to come up with the static P&L. This process relies on using the DataWarehouse system, which houses daily price quotes primarily to support the price verification process, to provide a makeshift "clean" P&L. This P&L would also exclude fee and commission revenue, unless they were somehow included in the mark. Finally, Fee-Adjusted P&L takes the accounting P&L from MRS and removes fees and commissions and then adds back a factor to represent daily gross credits.<sup>117</sup> The fee-

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<sup>111</sup> This is the level at which the BUCs sign off on P&L.

<sup>112</sup> VaR as reported in RIO generally is calculated on one-week horizons, but is scaled to one-day for reporting and backtesting purposes.

<sup>113</sup> The 90% and 70% are more diagnostic points. The 95% is used since this is the measure generally used for internal risk management purposes and the 99% is calculated for regulatory capital purposes.

<sup>114</sup> Elaine Hutchinson, VP (RMD) is the primary person responsible for monitoring the backtesting process and investigating exceptions. During the CSE review, Elaine provided OPSRA with an on-line demonstration of the backtesting capabilities within RIO, including discussions of specific examples of the analysis she performs regarding investigating VaR exceptions (e.g., incorrect prices resulting in false VaR exception for Credit Trading).

<sup>115</sup> For weekly backtesting, the P&Ls are summed for the calendar week and compared to the average weekly VaRs reported during the corresponding week at the various confidence intervals.

<sup>116</sup> The MRS system is the Firm's P&L system and is reconciled to the G/L monthly.

<sup>117</sup> Daily gross credits are in effect expenses paid to sales people. To reflect a net Fee-adjusted P&L, they back out both the fee income (gross) as well as the expenses paid on that income, the gross credits.

adjusted P&L does not take out the effects of position changes or financing charges. Currently, only the Dirty P&L and Fee-adjusted P&L are available for backtesting at both the firmwide level and at all the individual whitebooks.

The somewhat limited backtesting results to-date provide some comfort that the Firm's VaR methodology is both reasonable and captures the material risk factors. For example, at a firmwide level, there have been no breaches of VaR (as measured against either Dirty P&L or Fee-adjusted P&L) at either the 99% or the 95% confidence level for either one day or one week time intervals. Also, at most of the individual whitebooks,<sup>118</sup> there have typically been no breaches of VaR or the number of exceptions fell within those expected given the confidence interval used (i.e. 1% exceptions for 99% confidence interval). However, with that said, there are certain enhancements to the current process that OPSRA is recommending.<sup>119</sup>

## V. Follow-Up Items

As noted above, the overall effectiveness of market risk management at BS appears adequate. However, while our review uncovered no material deficiencies, we note below several areas that we intend to follow up with RMD. Included in this section are areas of particular interest to OPSRA, such as BS' entrance into energy trading and future implementation of a new "front-to-back" derivatives system, as well as areas where OPSRA has specific recommendations for the Firm. With that said, the items below should not be viewed as an exhaustive list of areas for which OPSRA has an interest in further discussions with the Firm.

### A. New Businesses

#### CalBear Energy LP

On September 8<sup>th</sup>, BS and Calpine Corporation announced publicly that they agreed to form a new energy trading venture, CalBear Energy LP ("CalBear"). CalBear, a wholly owned BS subsidiary, will focus on developing a significant customer business based on physical and financial natural gas and power trading and related structured transactions. BS anticipates that CalBear trading operations will begin in the fourth quarter of 2005. This new venture will be BS' first major entrance into the energy trading business. As a result, this business will create a new set of market and credit risks for BS.

OPSRA market and credit risk review teams met with senior market and credit risk managers to discuss how this new venture will impact the Firm's market and credit risk profile and how they plan to measure and manage these risks.<sup>120</sup> These discussions

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<sup>118</sup> Certain whitebooks within the Equities sub-total, such as Block Stock Trading have generated a higher level of backtesting exceptions. With respect to the Block Stock Trading desk, the risk manager stated that the desk was generally less diversified than other desks but that the magnitude of these exceptions were immaterial (i.e. not missing any risk factors).

<sup>119</sup> See *Follow-up Items* section of this report for specific enhancements OPSRA is recommending.

<sup>120</sup> For more details, see *Bear Stearns/Calpine Energy Trading Venture* presentation given to OPSRA on September 21, 2005.



focused on the business rationale for this relationship, the organizational structure of the venture, and the market and credit risks associated with the business, including the measurement and risk monitoring of these risks. In these initial discussions, RMD stated that it expects CalBear to maintain a balanced trading book with individual transactions limited to a maximum of three years in tenor. In addition, the business will have an initial 1-day 95% VaR limit of \$5 million.

OPSRA will conduct a focused review of this new business as it becomes operational. In particular, this review will include an in-depth review of the market risk measurement<sup>121</sup> and risk monitoring activities associated with this business. This review will include on-site discussions with both RMD (and other BS personnel) charged with oversight responsibilities as well as on-site discussions with Calpine traders, operations, and risk management personnel charged with the day-to-day running of the business.

## **B. New Systems**

### **Calypso**

On May 11, 2005, Calypso Technology, Inc. announced that Bear Stearns chose Calypso as its front-to-back system for derivatives. Bear Stearns, driven by rapid growth in derivative products, chose Calypso to improve efficiency by consolidating trading and processing for credit, interest rate and equity derivatives. Initially, Calypso will be run in parallel with the current front and back office systems until Bear Stearns is satisfied with the system's capabilities. At that time, Bear Stearns intends to replace the various disaggregated systems that currently exist. The Firm estimates that Calypso should be up and running by mid 2006; however, as is often the case with new systems, there is a small level of uncertainty surrounding the full capability of the system and the implementation time-frame. OPSRA will monitor the Calypso implementation on a regular basis requesting updates during monthly CSE meetings.

## **C. Aggregated Firm-Wide Risk Measures**

### **(1) VaR Methodology**

An companion document provides some specific suggestions, but the basic themes are these.

As might be expected, embedded within such a large-scale VaR system are numerous assumptions (implicit and explicit), approximations, parameter estimates subject to change with market conditions and so on. Potential inaccuracies and mismeasurements can creep into a VaR system through these (and other) channels. As a general rule, we would like reasonably rigorous empirical and/or conceptual support for the "key" assumptions, parametrizations and so on. We suggest sensitivity analyses as a means of identifying influential assumptions, parameters, etc. These tests could be narrowly focussed and some could be run "off-line" (outside the main VaR calculation). Some general targets:

- Prima facie key parameters—especially those subjectively estimated, or believed to be prone to high estimation error.
- distributional assumptions—e.g., Normal vs. fat-tailed alternatives
- Revaluation methods (approximations vs. full revaluations)

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<sup>121</sup> CalBear plans to incorporate Calpine's existing VaR process, which uses a vendor product, SAS Risk Dimension, for calculating its VaR.

- Data issues—e.g., proxying methods
- Other assumptions—e.g., that deal-specific risk is minimal for CMBS trades.

## **(2) VaR Reconciliation**

### Open Items

There are certain instances (e.g., for Bear Wagner) where BS has recognized that positions are not included in the VaR calculation. The Firm is in the process of assessing the materiality of such positions, and of determining how best to include the positions in the VaR calculation. Additionally, for a majority of the trading desks, BS has had a repeatable reconciliation process in place for several months. There are, however, some *Open Items* for whitebooks where the Firm has not developed a complete reconciliation process:

- Foreign Exchange (“FX”) – Exotic Options and Futures Contracts
- Fixed Income Derivatives (“FID”) – There are a small number of outstanding issues
- MBS Whitebook – Swaps not booked in Summit
- Finance Desk

With respect to FX Exotic Options and Futures, BS is in the process of reconciling these items (and anticipates no major problems). The Firm believes that 99% of these products are included in VaR, but BS still needs to develop a repeatable process that proves their inclusion. For FID, reconciliation for mortgage derivative strategies have not been fully vetted; thus, the Firm is finding it difficult to produce a file that accurately portrays the positions. Again, BS is confident that 99% of the instruments are captured in VaR, but a repeatable reconciliation process is not in place. In the MBS whitebook, there are a small number of swaps that are not booked in the Summit system; thus, not currently being reconciled, but are believed to be included in the VaR calculation. These instruments are primarily non-interest rate derivative type instruments (e.g., Pay as you go CDS on ABS and Mortgage CMBS Index Swaps). With respect to the Finance Desk, data is not stored in DataWarehouse, which adds an additional level of complexity with respect to developing a repeatable reconciliation process. BS does not believe that any of the reconciliation issues are significant, and they anticipate resolution by the end of November 2005.

### Process Improvement

To help reduce the number of reconciliation exceptions, BS has identified two areas where improvement is needed. The first is to develop a standardized reconciliation process so that the process can be more fully integrated with existing back-office systems. Achieving this requires standardization of VaR data so that data files are more closely matched to back office systems. The Firm also identified the need to develop a systematic means of assessing the impact of incorrect positions in VaR. Currently, assessing the impact is a manual process that requires position-by-position analysis and review. Bear Stearns hopes to move toward a more automated system, whereby the positions would be fed to IT and VaR would be recalculated and the impact automatically assessed. This process is in the infancy stage; thus, no determination on

time or feasibility has been made. OPSRA will request regular updates on the progress of the Open Items and for the Process Improvements.

### **(3) VaR Backtesting**

While the limited backtesting results calculated to date provide some comfort that the Firm's VaR methodology is both reasonable and captures the main drivers of risk at the firmwide level, there are some enhancements that are necessary. First, the focus of backtesting at BS has been almost exclusively based on exception reporting. While that is a necessary part of the backtesting process, by itself, it is not sufficient. The Firm should also develop the capacity to analyze the VaR against various clean and dirty P&L measures over-time in a format that displays trends and shows the magnitude of exceptions at the various levels of aggregation. Once this capacity exists, it should be integrated into the day-to-day backtesting processes to provide benefit to the internal risk management of the Firm rather than to solely function as support for regulatory requirement.

Secondly, with respect to static (i.e. clean P&L), the Firm is currently backtesting against this P&L measure only for certain cash businesses where it has a daily feed of marks. However, even for desks where RMD has a daily feed of marks, the file used is subject to frequent data quality control issues. This is the result of the file being captured on trade date, prior to the controllers scrubbing the data. As a result, this file does not contain mark adjustments that the BUCs make to arrive at the official P&L. These data quality issues lead to a lack of "proof and control" around the static P&L measure. In fact, personnel in RMD have to manually review VaR exceptions to determine if it is a false exception caused by mis-marks in the file used. This current manual process is not entirely effective because only days where exceptions are noted are researched (i.e. days in which exceptions are not found but might actually exist are not tested/researched under the current approach). It was suggested that a fairly simple IT solution could be found to provide an "adjusted mark" file for those desks where a feed is currently available within the DataWarehouse system. With respect to rolling out backtesting against static P&L to the non-cash desks, OPSRA realizes the complexities involved and views this as more of a longer-term initiative for the Firm.

### **(4) VaR Processes and Documentation**

#### **Delineation of Responsibilities**

As VaR is becoming more integrated into the firm's risk-measurement apparatus, we believe it would be helpful to systematize related administrative aspects.

Market risk measurement is a collaborative effort, principally between personnel from the Financial Analytics and Structured Transactions (FAST) group, the Risk Management Department (RMD) and Information Technology (IT). While the collaborative process appears to have worked reasonably well, the roles and responsibilities appear to be somewhat loosely defined. We believe that more precise delineation and formalization of roles and responsibilities is necessary.<sup>122</sup>

In the same vein, it may also be helpful to have more formal policies and procedures —e.g., to provide more concrete guidelines concerning regular or routine tasks such as frequency of parameter updates.

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<sup>122</sup>For example, clearly establishing the "primary ownership" of, and the process for, changing/modifying a risk factor is necessary. Likewise, assignment of responsibilities for documenting the implementation and operational details of the VaR system is also necessary.

### Documentation

The firm should aim to produce a more self-contained, comprehensive set of documents laying out the implementation and operational details of the VaR system. [A companion document provides more specific suggestions, but the basic points are these.] First, the quantitative document should supply more information regarding the underlying Front Office models and revaluation methods used—for models in the public domain, generic, “high-level” description would suffice (e.g., 2-factor Hull-White model); for internal models, more description would be required. Similar comments apply to statistical estimation procedures, algorithms, etc. The document also lacks information on certain products that are in VaR—e.g., options on CDS, inflation trades, mortgage derivatives, etc. In other cases, elaboration would help—e.g., the treatment of unfunded commitments.

Second, it would be helpful to have a more detailed, categorical description of the data—sources, the actual series used, scrubbing procedures, etc.

Third, as the group carries out tests (e.g., to choose between alternative series/methods, etc.), it would be helpful to document and maintain a record of the more important ones.

### **(5) Scenario Analysis**

Acceptance of the reasonableness of any risk metric is needed in order for it to be useful in risk management. In this vein, RMD, as part of the process of developing a firmwide scenario analysis capability, met, in an iterative process, with traders, Heads of Businesses, and the individual product-line risk managers to ensure the reasonableness of the assumptions within the various historical scenarios to be run by the Firm. It appears that this process generally resulted in “buy-in” from both the business areas and the individual product-line risk managers for the various scenarios.

However, during the CSE review, it became evident that there was not “buy-in,” from either the Head of SEP or the risk managers within the Equities Group, regarding the reasonableness of the 1987 Stock Market scenario for the SEP whitebook. The primary area of concern pertained to how the volatility shock was specified. The scenario called for an instantaneous shock of all equity prices down 20% and implied volatilities up 30%. The consensus of both the business area and RMD was that it was inaccurate to apply the shock to volatilities without allowing the implied volatilities to adjust to the changing in the spot price (of the underlier) vs. strike price (i.e., the moneyness of the option) caused by the 20% down shock in the underlying equities. Given the current portfolio, the risk manager for SEP-America estimated that the scenario result for SEP would be reduced by approximately \$50 million, if the scenario allowed the implied volatilities to move along the volatility surface prior to applying the shock.<sup>123</sup> The FAST RIO team is currently in the process of implementing the new methodology, which will allow the implied volatilities to move along the “volatility surface.” OPSRA intends to monitor these and other developments regarding firmwide scenario analysis at the Firm.

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<sup>123</sup> The actual impact from implementing the new methodology will change as the position and structure of the books change.

## D. Model Review

The Independent Model Review group has not yet conducted a detailed review of valuation models used in the Mortgage desk. While there are no immediate concerns about any of the models, this is a very big business area for the bank. It is also an area where model-generated valuations and risk-sensitivities (which are fed to the VaR system) often diverge from those used by the traders, especially for new, less liquid products. While recognizing that the divergences may be irreconcilable (because models in this area are said to be less effective (relative to, e.g., equity or fixed income derivatives) at reflecting transient market “technicals” and institutional quirks), it seems nevertheless important to rigorously document these divergences. Additionally, some models are developed and maintained by traders, often on a spreadsheet; these models may not conform to desired model-documentation standards in terms of transparency, clean code, etc. We believe it would be highly desirable for Independent Model Review to carry out detailed reviews of models in the mortgage area.

## VI. Conclusion

Overall, we find that the independent market risk management function at BS is functioning effectively and that market risk is adequately measured, monitored and managed given BS' current market risk profile.

While BS' independent market risk management is broadly consistent with industry standards, it does have some fairly unique features. First, independent risk management is primarily focused on measuring and monitoring risk at the “desk” level, where the Firm believes specific action can be taken. As such, while the Firm has recently established the ability to aggregate risk at the firmwide level, the Firm's trading limits, including VaR, are set exclusively at the desk or whitebook level. In addition, RMD risk managers are organized along product-lines to facilitate risk monitoring at the desk level. Secondly, while independent of the business units, RMD's risk managers provide significant support to the business areas they monitor. They appear to function not only to facilitate the bi-directional flow of information between senior management and the business areas, but also as a “second set of eyes” for trading management. Finally, RMD is somewhat unique in its level of involvement in price verification duties. At most peer firms, these responsibilities are handled predominantly by business unit controllers.

These unique characteristics appear to be at the heart of the culture of independent risk management at BS. These characteristics have both advantages and disadvantages. For example, risk managers role in price verification for certain products may create an advantage in that spotting mark issues may lead to discovering potential market risk issues and vice-versa. However, these activities require a substantial portion of the risk managers' efforts.

Finally, while our review uncovered no material deficiencies, we have several areas in which we intend to follow up with RMD. Some of these follow up items include taking a deeper dive into certain areas not covered fully in the review, such as BS' new entrance into energy trading. Other items are specific recommendations that we have for the Firm. The monthly review process will be an appropriate forum for many of these future discussions. However, for other discussions we anticipate conducting focused, on-site reviews as appropriate (e.g., BS' new energy trading business CalBear Energy Trading LP).

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## **Appendix A: Summary of work papers (April 20, 2005 to September 21, 2005)**

<u><i>Bear Stearns Presentations/Responses</i></u>	<u><i>Date presented/submitted</i></u>
Trading Risk Management Review	April 20, 2005
Bear Stearns & Co. CSE Application	May 04, 2005
Corporate Lending Presentation	May 18, 2005
Loan Portfolio Management	
Loan Approval and Management Process Outline	
Loan Approval & Management Process-Exhibits	
Model Review Presentation	May 18, 2005
Bear Stearns Risk Management-Policies and Principles (documentation)	June 15, 2005
Quantitative Documentation of VaR Models	June 23, 2005
Q&A on Model Review	July 5, 2005
FAST Derivatives Quantitative Support: Development Procedures and Documentation	
Model Review Follow-Up Conference call	July 6, 2005
Risk Management Department- Metrics, Measures And Limits- Presentation and related materials	July 19 & 22, 2005
Whole Loan MBS Overview (Non-Agency CMO Business)	July 20, 2005
Limit Monitoring Process	July 22, 2005
Revised VaR Manual	July 22, 2005
CSE Kick-off Meeting Presentations	July 28, 2005
SEP Heat Maps (06/30/05)	August 5, 2005
RIO Technical Documentation (07/28/2005)	August 12, 2005
Aggregation of Risk Information for Senior Senior Management	August 17, 2005
SEP Risk Management- Day-in-the-Life Presentation and related materials	August 18, 2005

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Mortgage Risk Management Group-Day-in-the-Life Presentation and related materials	August 23, 2005
Mortgage Department- Risk reports	August 23, 2005
Credit Trading Risk Management-Day-in-the-Life Presentation and related materials	August 24, 2005
RIO Demonstration	August 24, 2005
VaR Methodology- Discussion only	August 25, 2005
Scenario Analysis/Stress Testing-discussion And on-line demonstration	August 25, 2005
Backtesting-discussion and on-line demonstration	August 25, 2005
MBS ABS Department-Business presentation	September 6, 2005
VaR Methodology-Follow up discussion	September 6, 2005
Credit Derivatives Trading- Business presentation	September 7, 2005
SEP- Business presentation	September 7, 2005
VaR Reconciliation	September 7, 2005
Commercial Mortgage Group Presentation	September 21, 2005
Bear Stearns/Calpine Energy Trading Venture Presentation	September 21, 2005

OPSRA Supplemental Notes & Analysis

Backtesting	(Giles)
Credit Group Metrics, Measures and Limits	(Silva)
Credit Trading Metrics, Measures and Limits	(Silva)
Credit Derivatives Day-in-the-Life Risk Monitoring	(Silva)
Credit Trading Day-in-the-Life –Business Unit	(Silva)
Commercial Mortgage Group-Business Unit and Risk Monitoring	(Giles)
Fixed Income Derivatives Metrics, Measures and Limits	(Silva)
Limit Notification and Monitoring Process	(Giles)

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Mark-to-market (MTM) Verification	(Silva)
Model Review	(Giles)
Mortgage Group Day-in-the-Life Risk Monitoring	(Giles)
Municipals and FX Metrics, Measures and Limits	(Silva)
RIO Overview	(Silva)
Risk Reporting	(Giles)
RMD Overview	(Silva)
SEP Day-in-the-Life Risk Monitoring	(Giles)
Scenario Analysis	(Giles)
VaR Methodology	(Venkatesh)
VaR Reconciliation	(Silva)



## **Appendix B: BS Personnel Consulted for CSE**

### **Risk Management Department (RMD) Personnel**

Bob Neff	SMD, Global Head of Risk Management (RMD)
Kan Ahluwalia	SMD, Head of Risk Management for Europe and Asia (RMD)
Elaine Hutchinson	VP, Firmwide Risk (RMD)

#### Credit Group

Marc Galligan	SMD and Head of Credit Group (RMD)
Helen Wong	MD, Bankruptcy/High Yield (RMD)

#### Credit Trading Group

Oliver Jakob	MD, Credit Trading (RMD)
Dan Hojdar	AD, Credit Trading (RMD)
Patrick O' Kelly	AD, Credit Trading (RMD)

#### Equities Group

James Bell	MD, Equities Group (RMD)
William Chan	MD, Equities Group (RMD)
Steve Luxton	AD, Equities Group (RMD)
David Goulding	VP, Equities Group (RMD)
Jonathan Heritage	VP, Equities Group (RMD)

#### Fixed Income Derivatives Group

Matthew Garter	MD, Fixed Income Derivatives Group (RMD)
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#### Mortgage Group

Phil Lombardo	SMD and Head of Mortgage Group (RMD)
John Schrader	MDP, Mortgage Group (RMD)
John Sun	VP, Mortgage Group (RMD)

#### Model Review Group

Slava Obraztsov	MD, Model Review (RMD)
Ashley Everington	Model Review (RMD)
Simon MacNair	AD, Model Review (RMD)

#### Municipal and FX Group

Michael Bellacosa	MDP, Muni and F/X Group (RMD)
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### **Other Control Function Personnel**

Susan Flynn	AD, BUC
Jim Collins	MDP, Regulatory Reporting

**FAST RIO Team**

Manoj Singh	MDP, FAST
Greg Brozak	MDP, FAST

**Business Unit Personnel**

Credit Derivatives

Mark Davies	SMD, Head of Credit Derivatives
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Mortgages

Tom Marano	SMD, Head of Mortgages
Jeffrey Verschleiser	SMD, Non-Agency CMO
Christopher Hoeffel	SMD, Commercial Mortgage Group
Randy Reiff	SMD, Commercial Mortgage Group

Structured Equity Products (SEP)

Steve Meyer	SMD, Head of SEP
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**Appendix C: Firmwide**

Active Filters: Late Edition; As of date: 20050810; Comparison date: 20050809; Entity: ALL; Location: ALL

8/10/2005	<b>Bear Stearns Firm-Wide VaR Report</b>											
Late Edition	VaR			Historical Risk Comparison				Risk Manager MV		Key Risk Measures		
	Weekly 95% (\$M)	Change	% of Limit	% of Last Period Average			Historical % Rank	Long (\$MM)	Short (\$MM)			
				Week	Month	Year						
<b>Firm-Wide Total</b>	<b>60,055</b>	<b>(8,305)</b>	<b>-</b>	<b>90%</b>	<b>89%</b>	<b>120%</b>	<b>78%</b>					
<i>Firm-Wide Total Daily 95%</i>	26,858	(3,714)	-									
<b>Ann. Statement vers. Daily 95%</b>	22,693	(4,050)	-	39%	37%	41%	31%					
<b>Reg. Cap. vers. 10 Day 99%</b>	93,610	(13,521)	-									
<b>Credit White Books (all risk factors)</b>	<b>Weekly 95% (\$M)</b>	<b>Change</b>	<b>% of Limit</b>	<b>% of Last Period Average</b>			<b>Historical % Rank</b>	<b>Long (\$MM)</b>	<b>Short (\$MM)</b>	<b>IR POP</b>	<b>SPR POP</b>	<b>Other</b>
				Week	Month	Year						
<b>Credit Sub-Total</b>	<b>23,914</b>	<b>(1,068)</b>	<b>-</b>	<b>95%</b>	<b>90%</b>	<b>99%</b>	<b>80%</b>					
<b>Bankruptcy/High Yield</b>	26,627	323	-	103%	96%	109%	69%	8,185	(578)	(110)	23,393	
<b>High Yield</b>	1,876	85	63%	105%	91%	93%	56%	343	(302)	71	86	
<b>Bank Debt</b>	9,457	(16)	47%	102%	89%	75%	5%	4,572	0	0	12,252	
<b>CLO Collateral</b>	13,634	103	151%	101%	102%	184%	90%	2,283	(0)	0	11,159	
<b>Distressed Debt</b>	11,220	533	75%	107%	108%	106%	89%	986	(277)	(181)	(104)	
<b>Credit Trading</b>	10,119	(1,460)	-	88%	79%	82%	12%	72,198	(71,499)	1,406	(5,232)	
<b>Emerging Markets</b>	2,463	(296)	55%	88%	75%	97%	74%	957	(663)	853	930	
<b>Municipals</b>	2,239	272	64%	108%	99%	102%	65%	793	(88)	1,103	1,579	
<b>Interest Rate White Books (all risk factors)</b>	<b>Weekly 95% (\$M)</b>	<b>Change</b>	<b>% of Limit</b>	<b>% of Last Period Average</b>			<b>Historical % Rank</b>	<b>Long (\$MM)</b>	<b>Short (\$MM)</b>	<b>IR POP</b>	<b>SPR POP</b>	<b>Other</b>
				Week	Month	Year						
<b>Interest Rate Sub-Total</b>	<b>42,159</b>	<b>(5,137)</b>	<b>-</b>	<b>85%</b>	<b>79%</b>	<b>95%</b>	<b>58%</b>					
<b>Governments</b>	3,292	(191)	44%	103%	107%	92%	24%	9,643	(11,739)	51		
<b>Interest Rate Derivatives</b>	10,173	(1,748)	41%	81%	92%	109%	86%			(1,583)		
<b>MBS Desks</b>	38,149	(1,232)	-	93%	86%	86%	16%	55,912	(171,002)	(1,708)	23,517	
<b>ABS/AUTO</b>	1,963	(26)	26%	98%	73%	45%	3%	1,721	(119)	154	986	
<b>ARMS</b>	29,711	(362)	119%	91%	86%	90%	25%	15,693	(134,819)			
<b>CBO</b>	1,942	4	55%	87%	72%	69%	47%	573	(288)	(257)	1,191	
<b>CMBS Secondary</b>	2,128	29	61%	103%	114%	132%	89%	1,624	(958)	439	(338)	
<b>Commercial Conduit</b>	12,177	(30)	101%	98%	99%	143%	94%	5,747	(2,151)	325	14,855	
<b>EMC</b>	8,880	(45)	-	102%	120%	245%	99%	2,117	(1,961)	1,954	3,893	
<b>Agency CMO</b>	5,602	768	28%	113%	94%	45%	15%	8,392	(10,602)			
<b>Flow Desk</b>	2,292	(734)	31%	58%	47%	73%	32%	6,175	(5,815)			
<b>Non-Agency CMO</b>	26,955	(199)	135%	98%	97%	147%	86%	14,901	(17,076)			
<b>Other</b>	6,329	(884)	-	109%	121%	143%	99%	2,084	(172)	2,892	4,207	
<b>Finance Desk</b>	1,420	(43)	37%	99%	94%	120%	71%	0	0			
<b>Fixed Income Investments</b>	9,026	(406)	-	102%	109%	127%	96%			(1,445)		
<b>Proprietary Trading</b>	2,474	(447)	33%	107%	138%	103%	66%	18,425	(11,330)	740	211	
<b>REIT</b>	5,228	(5)	-	100%	96%	90%	5%			(2,267)		
<b>Max Recovery</b>	5,983	0	85%	100%	102%	239%	97%	567	0	0	0	
<b>Equity White Books (all risk factors)</b>	<b>Weekly 95% (\$M)</b>	<b>Change</b>	<b>% of Limit</b>	<b>% of Last Period Average</b>			<b>Historical % Rank</b>	<b>Long (\$MM)</b>	<b>Short (\$MM)</b>	<b>Delta (\$M)</b>	<b>Gamma (\$M)</b>	<b>Equity Vega (\$M)</b>
				Week	Month	Year						
<b>Equity Sub-Total</b>	<b>34,177</b>	<b>(674)</b>	<b>-</b>	<b>100%</b>	<b>123%</b>	<b>156%</b>	<b>99%</b>					
<b>Equity Derivatives</b>	7,605	676	30%	94%	99%	141%	90%	30,596	(22,184)	144,522	163,541	6,303
<b>Risk Arbitrage</b>	8,946	99	60%	99%	104%	118%	81%	835	(344)	0	0	0
<b>International Equity Trading</b>	1,203	113	60%	120%	124%	143%	84%	65	(42)	22,636	0	0
<b>Firm Investments</b>	1,106	(24)	-	99%	107%	130%	53%	33	0	32,852	0	0
<b>OTC</b>	155	60	15%	120%	143%	158%	80%	5	(1)	3,723	0	0
<b>Block Stock Trading</b>	653	(212)	65%	126%	142%	142%	77%	8	(0)	7,660	0	0
<b>SST</b>	1,516	156	30%	112%	120%	67%	28%	358	(273)	10,993	0	0
<b>Bear Wagner</b>	3,118	(132)	-	99%	90%	100%	48%	811	(915)	(37,894)	(423)	(173)
<b>Merchant/Illiquid</b>	32,122	(1,006)	-	100%	125%	142%	98%	1,728	0	1,469,854	0	0
<b>Foreign Exchange White Books (all risk factors)</b>	<b>Weekly 95% (\$M)</b>	<b>Change</b>	<b>% of Limit</b>	<b>% of Last Period Average</b>			<b>Historical % Rank</b>	<b>Long (\$MM)</b>	<b>Short (\$MM)</b>			
				Week	Month	Year						
<b>Foreign Exchange Sub-Total</b>	<b>960</b>	<b>(125)</b>	<b>-</b>	<b>84%</b>	<b>71%</b>	<b>38%</b>	<b>7%</b>					
<b>Foreign Exchange</b>	960	(125)	19%	84%	71%	38%	7%					

1-Week 95% VaR to 1-Day 95% VaR Divide by 2.236.

1-Week 95% VaR to 1-Week 99% VaR Multiply by 1.412.

1-Week 95% VaR to 2-Week 99% VaR Multiplied by 1.997.

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## Appendix D: Scenario Analysis Summary Report

Active Filters: Late Edition; As of date: 20050810; Comparison date: 20050809; Entity: ALL; Location: ALL

Bear Stearns Scenario Summary Report						
History-based Stress Scenario as of Date 20050810	One Day Scenario	%Rank	One Week Scenario	%Rank	One Month Scenario	%Rank
September 11, 2001	(332,476)	98%	(577,447)	98%	(152,756)	89%
Russia/LTCM 1998	(175,272)	97%	(421,053)	98%	(808,080)	97%
1987 Stock Market	(827,426)	94%	(807,282)	95%	(691,096)	91%
1994 Peso Deval	23,593	60%	28,739	63%	89,827	15%
1997 Asian Flu	40,948	1%	81,864	1%	136,199	7%
1994 Fed Hike	109,295	26%	(194,527)	97%	(226,080)	94%
Past 2yrs worst loss			(93,481)	70%		
Mid 2003 Rate Spike	8,990	74%	939	82%	85,905	58%
Early 2004 Rate Spike	101,039	26%	105,755	33%	147,701	51%
Hypothetical Stress Scenario as of Date 20050810	25% of Scenario	%Rank	50% of Scenario	%Rank	100% of Scenario	%Rank
<b>Interest Rate</b>						
Rates Rise (25/50/100bp)	763	62%	(16,879)	89%	(48,525)	98%
Rates Fall (25/50/100bp)	10,295	10%	51,886	3%	128,688	11%
Bear Flatten (2yr+100/10yr+25)*	(12,262)	100%	(19,491)	100%	(17,006)	93%
Bull Steepen (2yr-100/10yr-25)*	22,765	1%	57,797	1%	151,448	1%
<b>Equity</b>						
Stocks Drop (6.25/12.5/25%)	(109,476)	19%	(250,860)	28%	(665,159)	49%
<b>FX</b>						
Asia dumps USD						
Asia buys USD						
<b>Corporate Credit</b>						
HG Spreads Widen (25/50/100%)	1,441	47%	2,882	47%	5,764	47%
HY Spreads Widen (20/40/80%)	(86,250)	81%	(172,499)	81%	(344,998)	81%
EM Spreads Widen (20/40/80%)	(2,638)	73%	(5,276)	73%	(11,028)	73%
<b>Consumer Debt</b>						
MBS Underp. (Prepay Risk)						
HG MBS/ABS Underp. (Credit Risk)						
HY MBS/ABS Underp. (Credit Risk)						
<b>OTHER</b>						
Volatility Spike						
FNMA Problems						
FHLMC Problems						

\* 25% and 50% columns are proportionally less than 100% scenario noted.



DAILY RISK HIGHLIGHTS

Start Date: 07/14/2005 (Thu)

End Date: 07/14/2005 (Thu)

*Risk*  
*Management*  
 Bob Neff x6341

## FOCUS ITEMS

- **Leveraged Finance**

*TRANSACTIONAL*

BSC booked net \$5.8mm P/L as co-lead [70%] on the \$455mm LBO financing for Doubleclick by Hellman & Friedman and JMI Equity. The credit facility consisted of a \$50mm revolver, \$290mm 1st lien term [B] and \$115mm 2nd lien term [CCC+]. The net gain was after marking back \$14mm of the remaining revolver to 91 [approved target-hold level is \$20mm]. (Helen Wong x. 5964)

- **Block Trading**

The desk closed long 263m shares/\$14.6mm in Camden Property Trust [CPT] which is largely why the desk is \$1.7mm over its \$15mm Net MV limit; weekly VaR is running at about \$590m. That issue is down 2.3% in midday trading on 189m shares traded; average daily volume is 260m shares. (Safa Rekkali x. 2636)

- **Mortgages**

*AGENCY CMO*

The desk made \$1.2mm pricing a \$200mm GNMA 5.5% PAC deal backed by 30yr collateral [August settlement] selling \$95mm floating-rate bonds from the transaction. (Ewa Jankojc x. 5228)

## OTHER ITEMS

- **Bankruptcy/High Yield**

*DISTRESSED*

This morning Salton 2005 subordinated notes jumped 15pts and the 2008 subordinated notes jumped 8pts after announcements that the 2005 notes will be exchanged for new secured notes, preferred paper and equity. As of this writing, the desk is long \$2.6mm of the '05 at 65 and \$5mm of the '08 at 53 for an estimated gain of \$550m [decreasing the ltd loss to (\$3.2mm)]. (Helen Wong x. 5964)

- **Derivatives**

*MUNI DERIVATIVES*

The desk's July 12 actual P/L was about \$1mm, roughly \$600m over the estimate. This was mainly due to the release/implementation of a new exotika version which better handles non-quarterly resets and non-Libor discounting of swaption underlyings; this increased the value of a subset of the desk's PSA swaption portfolio. (Michael Bellacosa x. 8288)



DAILY RISK HIGHLIGHTS

Start Date: 08/10/2005 (Wed)

End Date: 08/10/2005 (Wed)

Risk Management  
Bob Hef x6341

OTHER ITEMS

• Firmwide

Yesterday, LBO rumors pushed Time Warner's 5yr CDS 8bps wider to 52; spreads recovered slightly this morning. Firmwide we had \$144mm MV/726 pops exposure to Time Warner: \$92mm MV in Bank Debt; \$39mm MV in Credit Trading; and \$14mm MV in equity [mainly in Bear Wagner]. The name has breached our firmwide limit notification level for BBB rated issuers. (Yanming Guo x. 0661)



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# Appendix F: Risk Summary by Trading Desk

## Risk Summary by Trading Desk (a/o August 31, 2005)

Desk/ Risk Measure	Nov '01	Nov '02	Nov '03	Nov '04	Dec '04	Jan '05	Feb '05	Mar '05	Apr '05	May '05	Jun '05	Jul '05	Aug '05	MTD Chg.	% Rank	
															Jun-98	
<b>FIRM WIDE TOTAL(95% Daily VAR)</b>			15	15	15	16	20	13	18	22	25	28	27			
<b>Bankruptcy/High Yield</b>																
High Yield - Net MV (x CBO)	(10)	(118)	(175)	72	110	142	144	115	127	91	72	31	62	32	43%	-
Distressed - Net MV	424	471	600	660	771	709	718	854	918	898	751	735	792	57	97%	B
Bank Debt Funded - Net MV	329	221	596	725	654	507	844	911	1,179	1,068	707	872	1,093	221	99%	B
Bank Debt Commitments - Net MV	1,424	1,595	1,656	1,946	2,026	2,168	2,641	2,562	2,700	3,310	3,372	3,595	3,286	(310)	97%	-
CLO Collateral Accumulation				828	490	650	813	737	1,000	1,703	2,292	2,113	2,037	(76)	85%	-
Cap. Mkts																-
<b>Mortgages</b>																
Pass Throughs - VAR				3,058	1,827	3,577	740	4,980	693	1,354	1,456	7,979	1,956	(6,023)	50%	L
ARMs - Net MV	2,502	3,590	4,247	9,123	9,974	13,181	10,101	9,205	10,212	9,853	10,132	10,941	10,165	(776)	97%	B
CMO Desk - Net MV (x subs)	6,643	8,175	9,296	9,835	10,966	9,955	11,082	12,869	14,106	14,062	15,404	12,910	16,656	3,746	100%	VB
Residential Subs Desk - Net MV	369	487	687	1,231	1,408	1,170	967	1,466	1,736	1,929	1,698	1,553	1,473	(80)	97%	-
Asset Backed - Net MV (x sub/CBO)	387	293	991	212	309	327	590	527	438	269	576	538	394	(144)	44%	B
Asset Backed - Net MV (sub/CBO)	55	48	35	22	54	26	44	19	51	39	31	25	27	2	9%	-
CBO Secondary - Net MV	278	228	177	128	83	133	177	239	233	235	278	232	189	(43)	52%	-
London ABS / MBS / CDO			82	86	55	63	100	76	156	225	204	81	171	90	97%	-
EMC/MVH - Net MV	1,452	1,605	1,755	1,575	1,934	1,782	1,630	2,025	2,098	1,590	1,969	2,216	1,911	(305)	94%	B
Special Situations/Desk Hedge- Net MV	1,998	4,531	2,585	539	522	1,506	444	2,337	2,227	2,497	1,496	1,057	984	(73)	61%	BL
Commercial conduit- Net MV	1,385	1,182	1,634	2,115	2,462	2,360	2,796	2,885	3,612	3,860	4,011	5,046	6,876	1,830	100%	B
Commercial secondary - Net MV	432	452	296	303	708	577	538	943	889	274	484	660	788	128	97%	-
<b>Fixed Income Investments *</b>																
REITS - Net MV	835	759	673	509	476	485	485	442	448	452	443	442	448	6	41%	L
MAX Recovery - Funded MV	358	439	508	502	514	533	546	541	539	537	535	568	589	21	100%	B
<b>Credit Trading</b>																
CD Spread Risk Pops	743	(7,787)	(5,523)	1,842	5,662	(5,331)	(7,249)	(7,594)	(14,917)	(17,802)	(18,574)	1,241	1,079	(162)	62%	B
Corp Trading -- Spread Risk Pops	4,983	(464)	8,225	6,548	6,970	7,186	11,286	9,649	7,841	5,788	8,141				0%	-
Capital Markets																-
<b>Convertibles/GPFM</b>																
Long MV	1,890	1,395	1,930	1,160	1,016	834	637	501	269	107	13	-	-	-	0%	-
Premium	127	69	126	68	63	46	33	23	10	2	33	-	-	-	0%	-
Spread Risk Pops	2,993	1,503	295	(285)	(211)	(106)	(83)	(98)	(97)	(112)	23	-	-	-	0%	-
<b>Emerging Markets - Spread Risk Pops</b>	498	442	578	1,118	1,213	1,163	1,037	189	(263)	657	1,287	1,012	452	(560)	77%	-
Corporate Debt - Gross MV	96	116	253	356	382	436	401	402	395	352	410	336	351	15	93%	-
Sovereign Debt - Gross MV	482	410	589	1,069	1,145	1,175	1,120	861	1,060	1,170	1,373	1,291	1,170	(121)	97%	-
<b>Risk Arbitrage</b>																
Long MV	310	191	327	471	537	648	716	821	893	1,014	1,072	1,037	1,026	(11)	98%	-

% Rank reflects historical size of our position with 100% being the largest and 0% being the smallest. These risk factors cover the period from 6/30/98 - present.

MV = Market Value, PV = Par Value, SR Pops = Spread Risk Pops (estimated price sensitivity of position to spreads widening/narrowing - e.g., 100 SR Pops = +/- \$100m per 10bps spread movement).

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Appendix F: Risk Summary by Trading Desk

Risk Summary by Trading Desk (a/o August 31, 2005)

Desk/ Risk Measure																
	Nov '01	Nov '02	Nov '03	Nov '04	Dec '04	Jan '05	Feb '05	Mar '05	Apr '05	May '05	Jun '05	Jul '05	Aug '05	MTD Chg.	% Rank Jun-98	
<b>DERIVATIVES - TOTAL(XCDS)</b>																
<b>Derivatives - Equity/Electronic Market</b>																
Value at Risk	3,000	8,250	3,815	3,926	5,737	4,581	7,146	5,435	5,090	5,403	5,043	5,372	1,390	(3,982)	0%	VB
Large Market Drop (000)	(4,792)	(3,758)	2,844	21,946	(5,229)	24,652	56,770	45,415	(31,243)	6,087	3,071	80,963	95,758	14,795	100%	
<b>Derivatives - Fixed Income</b>																
Value at Risk	3,294	6,927	4,468	5,509	6,518	5,620	7,493	6,605	7,879	7,826	4,517	3,405	2,804	(601)	8%	B
<b>Derivatives - Mortgages</b>																
Value at Risk	314	542	653	997	1,455	960	1,059	1,093	897	919	749	387	414	27	5%	L
<b>Derivatives - Municipals</b>																
Value at Risk	1,431	3,124	1,935	1,760	1,864	3,202	2,888	3,361	3,093	2,983	2,358	2,380	1,886	(494)	73%	-
<b>Derivatives - Othes Areas</b>																
<b>(Certain Reserves)</b>																

\* Pops prior to Nov '99 do not include Structured Notes

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Appendix F: Risk Summary by Trading Desk

Risk Summary by Trading Desk (a/o August 31, 2005)

Desk/ Risk Measure																
	Nov '01	Nov '02	Nov '03	Nov '04	Dec '04	Jan '05	Feb '05	Mar '05	Apr '05	May '05	Jun '05	Jul '05	Aug '05	MTD Chg.	% Rank	
																Jun-98
<b>Finance Desk</b>																
Value at Risk	1,167	1,663	1,366	1,111	1,354	1,182	641	1,488	921	1,094	1,370	1,514	1,540	26	18%	B
<b>Foreign Exchange</b>																
\$ Delta	59	(49)	(74)	(210)	(189)	(215)	(17)	(67)	(76)	(185)	(137)	(227)	(96)	131	86%	B
Value at Risk			2,982	5,173	3,211	6,080	1,694	1,234	3,680	1,362	839	954	116	11%		
<b>Governments</b>																
Gross Pops - NY	87,755	105,363	117,700	86,521	125,239	131,823	75,093	91,704	95,836	61,450	93,676	88,165	78,383	(9,782)	68%	-
Long PV - LDN	1,075	813	952	1,149	1,234	1,480	1,165	1,329	1,121	4,874	6,668	4,134	5,508	1,374	91%	L
Value at Risk			4,042	4,136	3,892	2,598	3,989	4,894	2,990	3,636	2,934	2,557	(377)	0%		
<b>Municipals</b>																
Long MV (x floaters)	178	71	256	246	383	960	590	855	975	637	753	684	500	(184)	93%	B
Value at Risk			1,329	2,016	2,235	1,940	3,225	2,851	3,575	2,292	2,407	1,936	(471)	11%		
<b>Intnl Equity/EM Equity</b>																
MM/Prop. - Long MV	21	18	29	37	56	66	60	40	49	39	64	56	59	3	81%	B
Arbitrage - Long MV	158	176	135	210	161	158	141	180	135	150	194	192	239	47	58%	
<b>Block, OTC, Invest. Acct.</b>																
Block - Long MV	24		6	-	-	2	1	5	6	1	19	5	18	13	67%	-
OTC - Long MV	2	1		108	27	4	7	7	3	3	5	4	3	(1)	23%	-
Investment - Long MV	17	13	36	10	21	27	27	26	24	27	26	27	34	7	79%	-
<b>Strategic Structured</b>																
Long MV	57	199	239	230	288	310	234	250	246	175	194	541	185	(356)	61%	L
Avg. Daily P/L (000)	209	35	127	798	679	696	886	589	852	1,269	744	634	610	(24)	75%	
<b>Illiquid Investments</b>																
Tax Related - BV	124	70	39	82	82	83	85	86	87	95	76	90	90	-	34%	
Other - BV	775	1,042	982	1,250	1,285	1,298	1,332	1,464	1,462	1,549	1,616	1,581	1,635	54	100%	

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**Appendix G: Credit Group Risk Monitoring**

Within the Credit Group, market risk management responsibilities are headed up by Marc Galligan, Senior Managing Director - Credit Group, and Helen Wong, Managing Director - Credit Group. Mr. Galligan reports to the Global Head of Risk Management, Robert Neff, for the following five trading desks:

- High Yield – Includes bonds and other credit related instruments that carry a Standard & Poor’s credit rating of BBB- or below.
- Distressed – Includes both public and private debt as well as some public equity received through restructuring.
- Bank Debt – Primarily revolvers and term loans.
- Emerging Markets – Includes both sovereign and corporate instruments.
- Credit Trading Desk – Credit Group risk managers cover credit issuer risk only. Other types of risk are covered by risk managers in the Credit Trading Group.

**Key Risk Measures and Associated Limits**

*Key Risk Measures* utilized by the Credit Group include: (1) Market value; (2) Spread pops; (3) Interest rate pops; (4) Credit spreads; (5) Value-at-Risk (VaR); and (6) Aged inventory. For much of the daily monitoring, the Credit Group relies heavily on market value and P&L.

<b>Trading Desk</b>	<b>Key Risk Measure Usage by Trading Desk</b>					
	<b>Market Value</b>	<b>Spread Pops</b>	<b>Interest Rate Pops</b>	<b>Credit Spreads</b>	<b>VaR</b>	<b>Aged Inventory</b>
<b>High Yield</b>	X	X		X	X	X
<b>Distressed</b>	X				X	
<b>Bank Debt</b>	X	X		X	X	X
<b>Emerging Markets</b>	X	X	X	X	X	X
<b>Credit Trading*</b>	X	X	X	X	X	X

\*Credit Group covers credit issuer risk only. Other risks are monitored by Credit Trading RMs.

*Market Values* are used to track exposure by net and gross market value as well as exposure by issuer, region, country and credit rating. Spread pops are available and monitored for High Yield, Bank Debt, Emerging Markets, and Credit Trading. Additionally, all desks, with the exception of Distressed, monitor Option Adjusted Spreads (“OAS”). Since distressed debt trades more in price space than yield or spread space, risk managers do not find spread related metrics useful when monitoring distressed instruments.

Risk managers also do not use aged inventory as a primary risk measure for the Distressed desk. However, aged inventory is tracked informally each quarter and risk managers maintain a regular dialog with the desk and analysts over investment strategies and progress of restructuring (e.g., how close the position is to coming out of restructuring). For High Yield and the Bank Debt trading desks, inventory is considered aged if the position has been held for over 90 days based on a first in first out (FIFO) basis. For the loan origination group, risk managers use an aging metric that considers a position aged if it is not below its approved target hold level after 90 day following the close of the deal.

With respect to VaR, OPSRA notes that the VaR metric is available across all desks in the Credit Group, but does not appear to be a primary metric for day-to-day risk management.

*Monitoring trading limit usage* is another crucial part of the Credit Group market risk managers' job. Risk managers monitor, and report on, limits and usage for:

- Market value by desk – net (long minus short) and gross (long plus short)
- Market value by issuer – primarily for the High Yield and Distressed desks
- Market value by region – net for the Global Emerging Markets trading desk
- Market value by credit rating – for the Emerging Markets trading desk
- Net spread risk POPs - for the Emerging Markets trading desk
- Interest rate risk POPs - for the Emerging Markets trading desk
- VaR by desk

For the High Yield, Distressed, Bank Debt and Emerging Markets desks, Helen Wong, Managing Director-Credit Group, has primary responsibility for monitoring and reporting of risk limits and violations. Risk managers monitor net and gross *Market Values* for the High Yield and Distressed debt and net market value for Bank Debt. Net Market Value Issuer limits are utilized for High Yield and Distressed positions where BS currently has one issuer limit on the High Yield desk and four on the Distressed desk. Value-at-Risk limits are monitored and reported for all Credit Group desks.

For Emerging Markets, risk managers are concerned with desk level limits on net and gross market value, net spread risk pops, interest rate risk pops, and VaR. Additionally, net market value is monitored by region, country, and issuer rating while spread risk pops are monitored by region and by country. Each of the Emerging Market limits are further segregated into Global Trader Limits and Global Manager limits. Any global trading limits exceptions must be approved by Adam Groothuis, head of the Emerging Markets desk, or Kelley Millet, co-head of credit trading, while exceptions to global manager limits require a higher level of approval—Jeff Mayer or Craig Overlander, co-heads of the Fixed Income Division.

On a daily basis, limit reports are generated by either Credit Group risk managers or business unit controllers (depending on the desk) and sent to the appropriate trading managers, heads of the trading desk, and to some traders.<sup>1</sup> Daily limit usage information also goes to certain Executive Committee members and the Global Head of Risk Management. Any limit violations are included in a limit violation email that is distributed to key senior managers by the Limit Monitoring Group within BUCs.

### Daily Monitoring and Analysis of Portfolio

*Portfolio Monitoring and Analysis* for Credit Group market risk managers includes monitoring daily market and trading activity, analysis of risk reports, P&L review (including analysis and explanation), and detailed analysis of significant transactions and new business activity. A key component of market risk management for the Credit Group, and BS in general, is to stay apprised of market and trading desk activity; then, supplement that knowledge with risk report and risk metric analysis. In contrast to the other product-line risk monitoring groups, the Credit Group focuses on issuer-specific

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<sup>1</sup> Please see *Limit Monitoring and Price Verification Responsibility* document for a complete division of these responsibilities between risk managers and BUCs.

fundamental credit analysis.<sup>2</sup> Because of the high level of name specific risk in the desks covered by the Credit Group, it is especially important for the risk managers to stay abreast of issuer specific market news.

Credit Group market risk managers typically begin the day with a review of market news and reports, and a close look at any new trading activity.<sup>3</sup> Monitoring of daily trading activity entails:

- 1) Reviewing market values
- 2) Monitoring daily P&L
- 3) Reviewing differences between trader marks and outside marks.
- 4) Reviewing the credit watch list and other notable positions. For positions to make the credit watch list, they need to be both large and have a negative outlook.

For monitoring trading activity, two widely used measures by Credit Group risk managers are *market value and P&L*. Risk managers review market value and P&L by top ten positions, by trader, by trading desk, by industry, and by region. Additionally, risk managers review positions where significant differences between trader marks and outside marks exist; and review positions that are on the credit watch list. For differences in marks, a position is flagged if the difference in market value is greater than \$100 thousand.

For the High Yield desk, risk managers receive daily external pricing; thus, are able to verify these marks on a daily basis. Price verification for other desks occurs throughout the month on an as needed basis, or as part of the monthly XPOS Mark-to-Market (“MTM”) Price Verification process.<sup>4</sup> Credit Group risk managers retain primary responsibility for price verification for all High Yield, Distressed, and Bank Debt positions. Business Unit Controllers are responsible for MTM verification on Emerging Market positions while Credit Trading risk managers monitor Credit Trading marks.

*Systems* that the Credit Group risk managers rely on to accomplish day-to-day monitoring and reporting activities include three primary trading systems—Prism, Wall Street Office, and High Yield Trading System (“HYTS”)—and RIO (the market risk management system). The three trading systems are used by risk managers for the following desks:

- Prism – is used primarily for the High Yield and Emerging Markets desks.
- Wall Street Office – is used for the Distressed, Bank Debt, and Emerging Markets desks.
- HYTS – is used primarily for the Distressed desk.

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<sup>2</sup> As previously discussed, this fundamental credit analysis performed by RMD’s Credit Group is used in creating the Firm’s Credit Watch list which highlights the market risk associated with issuer-specific as well as industry concentrations, particularly those with a negative fundamental outlook.

<sup>3</sup> While the reports reviewed tend to focus on previous day activities, risk managers monitor market events as they currently unfold with real-time review, research, and highlights to senior management where deemed necessary.

<sup>4</sup> See Section IV.E.(2) “Price Verification” for a detailed explanation of the Monthly XPOS MTM Verification process.

These trading systems provide risk managers with the information necessary to achieve their goals of understanding the market risk profile of each trading group, of articulating large market risks to senior management, and ensuring accurate mark-to-market pricing. Risk managers primarily use Prism to monitor OAS and yields on bond positions for the Emerging Markets desk and, to a lesser extent, for the High Yield desk. Wall Street Office, which is used just for loans, provides risk managers with position level data such as coupon, margin, and maturity date. High Yield Trading System contains a handful of legacy distressed loan positions, but is not particularly useful for tracking distressed positions because it was originally designed as a front-office bond system. Additionally, none of these front-office systems provide computation of VaR or any stress test analysis. VaR and stress test calculations are accomplished in RIO (which is a key system for the aggregation and reporting of Credit Group risk on a firmwide level).

#### Daily Production of Reports and Commentary

In addition to monitoring and analyzing the portfolio, risk managers routinely communicate their findings to various levels of the firm. Trading managers and heads of trading desks receive three primary reports from Credit Group risk managers on a daily basis:

- Daily Trading Review – for High Yield, Distressed, and Emerging Markets
- Trading Limit and Usage – for High Yield, Distressed, Bank Debt, and Emerging Markets.<sup>5</sup>
- RIO Reports – for all desks; including a drilldown into High Yield positions

The *Daily Trading Review* highlights the top ten long positions, short positions, and P&L gains and losses; worst exposures over \$100,000; long, short and net market value positions by desk; and positions on the “Credit Watch List” (or other notable positions). The “Worst Exposures over \$100,000” section brings to light positions where the difference between internal trader marks and outside marks is large enough to create at least \$100,000 in possible exposure. Essentially, the Daily Trading Review provides a desk-by-desk snapshot of top exposures that deserve special attention, or should at least be on the managers’ and trading heads’ radar. As noted in the bullet point above, Daily Trading Reviews are available for the High Yield, Distressed, and Emerging Markets desks. A Daily Trading Review is not available for Bank Debt because there is a lower level of daily activity and external prices are not sourced daily. Risk managers do, however, review activity, positions, market conditions and provide commentary for the book daily similarly to other desks.

*Trading Limit and Usage reports* are generated daily and sent to Trading Managers and the heads of trading desks. Each report provides a desk-by-desk overview of limit usage and an indication of whether or not exceptions exist. For the Emerging Markets desk, limits are reported at a deeper level of granularity—by desk,

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<sup>5</sup> A summary of Trading Limit and Usage is available in the Key Risk Measures and Associated Limits section.

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region, country, and issuer credit rating. Senior managers are kept abreast of limit violations through a daily "Limit Notification" email that is sent by BUCs.<sup>6</sup>

Credit Group risk managers also provide VaR Summary reports to Trading management which displays VaR, a Historical Risk Comparison, Market Value, and other key risk measures for their respective trading desks. In addition to the VaR overview reports, Credit Group risk managers provide VaR drill downs for desks where managers or trading heads find it useful. For example, High Yield trading managers and desk heads receive a VaR breakdown by Account, Rating, and Issuer.

Similar to other risk managers, Credit Group risk managers also contribute to a "Daily Risk Highlights" report on an as needed basis. The primary purpose of the Risk Highlights report is to spotlight, for senior management, significant market movements, trading activity, P&L events, and risk exposure. Secondly, Risk Highlights serves as a communication tool and historical database for risk managers, enabling them to share and track information. The Risk Management Department views Risk Highlights as one of the most important regular contributions that risk managers can make at BS; thus, there is a great deal of focus around this report.

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<sup>6</sup> The Limit Notification email is sent to Warren Spector (President and Co-Chief Operating Officer); Bob Steinberg (Global Senior Risk Officer/Equity Management); Jeff Mayer and Craig Overlander (Co-Heads of Fixed Income); and Bob Neff (Global Head of Risk Management). Senior Risk Managers are cc'd.

## **Appendix H: Credit Trading Group Risk Monitoring**

Overseeing market risk in Credit Trading is the responsibility of Oliver Jakob, Managing Director of Credit Derivatives and Commodities. Assisting Mr. Jakob is Dan Hojdar and Matt Buchan in London, and Pat O' Kelly and Aditya Bindal in New York. Credit Trading is a combination of two legacy Whitebooks—Corporate Bonds and Credit Derivatives—across six business activities:

- 1) Global Structured business – Collateralized Swap Obligations (“CSOs”) (i.e., synthetic CDOs), Credit Options, and First to Defaults (“FTDs”)
- 2) New York Investment Grade Flow Trading – cash and credit derivatives
- 3) New York High Yield Flow Trading – credit derivatives only
- 4) Latin America Trading
- 5) London Flow Trading – cash and credit derivatives
- 6) Asia Flow Trading

To promote synergy between the two legacy Whitebooks, corporate bond traders typically sit next to a complementing credit derivatives trader. *Global Structured business* traders engage in market making for index tranches (e.g., CDX, Hiboxx, and Itraxx). The business unit also structures customized trades such as bespoke CSOs, CSO<sup>2</sup>, FTD, and credit-linked notes; and maintains a hedging book to macro-hedge spread sensitivities, recovery sensitivity, and recovery rate sensitivities. To alleviate problems that may arise due to geographic location, responsibility for the global CSO book is split 40/40/20 between New York, London, and Asia. However, within the hedging book, responsibility for any mis-hedged items resides with the New York desk.

*Investment Grade Flow* trading (for New York, London, and Asia) focuses on market making in investment grade bonds and single-name credit default swaps, trading of indices<sup>1</sup>, and support for the structured business by making markets in single names for hedging purposes. Traders in investment grade flow are segmented by industry groups (Autos, Telecommunications, Energy, Consumer Products, Health Care, Real Estate, and Financial Institutions).

The *New York High Yield Flow* desk is a major trader on Wall Street for indices such as Hiboxx and Hiboxx sub indices (which carry a BB or B credit rating). The desk also supports the structured business by making markets in single names for hedging; and facilitates Total Return Swap (“TRS”) business by transacting in bonds and swaps requested by counterparties.

*Latin America* business activity is fairly small with an emphasis on sovereign names and, to a much smaller extent, semi-governmental corporates (i.e., TelMex and Pemex). Trading is conducted on a new index—Emiboxx—, and on single name credits, structured Credit-Linked Notes (“CLNs”) and FTD. Latin American exposures are often actively hedged using cash bonds. This differs from other Credit Trading business activities where a lot of the hedging is conducted using index tranches.

### **Key Risk Measures and Associated Limits**

*Key Risk Measures* utilized by Credit Trading risk managers include: (1) Correlation Sensitivity; (2) Market Value (including P&L); (3) VaR; (4) Restructure Risk measure; (5) Basis Risk; (6) OAS; (7) Spread pop; (8) Interest rate pop; and (9) Credit spreads.

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<sup>1</sup> BS is a large player in the trading of indices (e.g., CDX, HIVOL, and Itraxx).

Daily *Correlation Sensitivity* analysis is primarily utilized for Global Structured products where the analysis is conducted at two primary levels—by Index and by Risk Book. At the Index level, daily correlations are compared to the previous day's correlations for each index across various subordination points. Each change in correlation is then multiplied by a correlation sensitivity resulting in a P&L (which is displayed by subordination point, by index sub-total, and by Grand Total).

Correlation sensitivity by risk book breaks out each book's correlation risk across indices where the book of business bears exposure. This allows risk managers to track total risk book exposure and provides information on which indices each book is exposed to. This is especially important for the hedging book where the desk strives to hedge primarily with index tranches.

The importance, and complexity, of correlation sensitivity analysis has made it necessary for Credit Trading risk managers to work closely with model review personnel to validate and enhance credit models. For example, when the credit trading desk began to trade junior equity pieces that were below the lowest standard index attachment point (3%), model review was asked to validate the model's linear extrapolation methodology. An alternative was to use flat extrapolation instead of linear extrapolation for attachment points below 3%. Model review discovered that the impact of incorrectly using one extrapolation methodology over the other could be significant—as high as 5% of notional in some cases. With this evidence, risk managers requested that the desk engage in price discovery that subsequently led to a methodology change from using linear extrapolation to 50/50 flat/linear extrapolation.<sup>2</sup>

Market value, VaR, spread pops, interest rate pops and credit spreads are all monitored at the issuer level and aggregated into risk book totals and, ultimately, into firmwide measures. Credit Trading risk managers monitor *Market Value* at the issuer-level by long position, short position, and net position (including a net change from the previous trading day). Additionally, risk managers closely monitor *Profit and Loss* (“P&L”), breaking it out into eight “P&L Explain” factors—change in spread, carry, basis, interest rate change, funding, new deal P&L, adjustments to P&L, and unexplained P&L. Being able to thoroughly explain profit and loss is the cornerstone of risk reporting to senior management at BS.

For Credit Trading, most of the flow P&L is driven by New York with London being a steady performer. Profit and loss in Asia tends to be flat and relatively small compared to NY and London. OPSRA did note, however, that while Asia P&L might be small, risk management for the Asia desk most likely poses some interesting geographic challenges. This is due to the fact that the Tokyo Risk Manager, Matt Buchan, is headquartered in London. Mr. Buchan admits that there are significant time zone challenges that create the need to frequently work late, but also points out that BS has recently assigned a Tokyo-based risk manager to help Mr. Buchan monitor credit derivatives. Mr. Buchan also points out that the P&L explain for Tokyo is quite robust and that he thoroughly investigates large P&L changes, P&L on new positions, and P&L for large positions.

*Value-at-Risk* measures include Total Weekly VaR, daily Credit VaR, and daily Issuer Specific VaR. Risk managers also monitor historical Spread and Interest Rate VaR. Weekly 95% VaR is reported to senior management at the desk level (currently reported under the Credit Derivatives and Corporate legacy Whitebooks) in the RIO “Daily VaR Summary Report.” Value-at-risk, however, but does not seem to play as

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<sup>2</sup> Credit Trading Risk Managers and Business Unit Controllers have become comfortable with the 50/50 flat/linear extrapolation methodology because of the trading desk's ability to make markets at these levels; therefore, it was determined that no model reserve is necessary at this time.



critical a role in daily risk management as other metrics (e.g., spread risk pops). On a daily basis, risk managers use VaR primarily as a means of verifying or supporting P&L explain findings. Risk managers do, however, closely monitor VaR limits in total, for the interest rate risk portion of VaR, and by issuer ratings.

Risk Managers also use a Credit Risk Metric (“CRM”), which was a predecessor to VaR for Credit Trading. CRM is a metric that combines the spread and recovery volatility sensitivities of an individual position. CRM can not, however, be compared across portfolios; thus, it is not useful for firmwide aggregation like VaR is.

*Spread Risk Pops*<sup>3</sup> for the Credit Trading desk is a critical risk metric that is monitored and reported to senior management. Spread risk pops for Credit Derivatives and for Corporate Trading are reported as two separate line items in the “Risk Summary by Trading Desk” report. Spread risk pops over the past year have been volatile for Credit Derivatives while Corporate Trading spread risk pops fluctuated slightly. Risk Managers typically look for large changes in pops, then drill down to determine where the increase in exposure is and which trades caused the increase. Risk limits exist by net pops and in total for issuers rated below BBB.

Risk managers also monitor metrics such as *Restructuring Risk* which keeps risk managers apprised of the effect that restructuring provisions have on individual positions and on the entire book of business.<sup>4</sup>

Risk limits and usage are monitored and reported by:

- Total Market Value – net (long minus short), for instruments below BBB
- Total Pops – Spread risk pops (net and gross), spread risk pops for instruments below BBB
- Total VaR – Interest rate risk VaR, FX risk VaR
- Total Recovery risk – \$mm recovery
- Issuer Ratings - Market value, Pops, VaR, and Recovery
- Issuer specific exceptions – Market value and Pops
- Country – Market value and Pops

### Daily Monitoring and Analysis of Portfolio

*Risk Processes* include a number of daily processes augmented by other weekly or monthly processes (or as needed). On a daily basis, Credit Trading risk managers monitor and generate RIO reports, Credit Portfolio Web Reports, Sensitivity analysis, Correlation analysis, Limit usage reports, and reports on daily Reserve changes. Risk managers also stay apprised of daily market and trading activity; review front-office risk reports; conduct price verification (at least monthly); and closely analyze significant new deals. A fair amount of a risk manager’s time is spent on sensitivity change analysis that is summarized for senior managers and traders in a daily email. Market Risk Managers also contribute to “Risk Highlights,” which is becoming very important because of a significant increase in Credit Trading transaction volume.

Market risk managers in the credit trading group utilize a number of systems to monitor and analyze portfolios including:

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<sup>3</sup> Spread Risk (“SR”) Pops is the estimated price sensitivity of positions to spreads widening or narrowing. For example, 100 SR Pops = +/- \$100m per 10bps spread movement.

<sup>4</sup> Restructuring risk stems from the fact that credit default swaps on the same issuer may differ as to the set of credit events under which they pay off- in particular, some CDS’s do, and some do not, recognize “corporate restructuring” as a credit event.

- RIO
- Proteus
- Poseidon / ScenarioGen
- Janus
- CDRM
- Calypso – “Being developed”

*RIO* is used by Credit Trading risk managers to monitor firmwide VaR limits, Correlation VaR, and Restructuring VaR. *Proteus* is a booking system that holds all deal characteristics and provides valuations. The system is primarily used as a booking system and used to generate P&Ls on a nightly basis. *Poseidon / ScenarioGen* is an application that allows risk managers to view and manipulate information stored in Proteus. Risk managers utilized this system heavily for scenario analysis.

*Janus* is an online application that provides drill down capability by allowing the risk manager to create ad-hoc reports to augment the 300 plus canned risk reports that are generated daily. Janus also produces VaR files that are called upon by other systems and applications. CDRM is a database that uses the Janus-generated VaR files to monitor limits and produce other miscellaneous reports.

The cornerstone of risk monitoring and reporting is a flat file that is created in Proteus and stored in Janus. This flat file provides the ability for risk managers to aggregate risk metrics into an easy to understand format for senior management. Additionally, through Poseidon, Risk Managers can use the flat file to run “what if” scenarios (e.g., shifting default curves or changing recovery rates). Eventually, the functionality provided by all these systems may be consolidated into one system—Calypso, which is currently in the development phase.

#### Daily Production of Reports and Commentary

On a daily basis, risk managers keep senior managers and heads of trading desks abreast of credit trading risk and activity through a number of standard reports—RIO, Limit report, Daily Trades, Reserve Changes, and Risk Highlights. In addition, risk managers generate reports that are fairly unique to the Credit Trading group—Credit Portfolio Web reports, Market Daily, Sensitivity Changes, and Correlation Change.<sup>5</sup>

Claire Sams and Matt Buchan (from risk management) have primary responsibility for daily limit reporting for the Credit Trading desk. Daily limit reports are generated by risk managers and sent to the appropriate trading managers, heads of the trading desk, and to some traders. Limit usage information also goes to certain Executive Committee members and the Global Head of Risk Management on a daily basis. Any limit violations are included in a limit violation email that is distributed to key senior managers by Risk Management.

*Web Credit Reports* allow users to view various risk metrics on an issuer level (e.g., spread pops, market value, and CRM), and facilitates comparison among issuers given various risk metrics. This report also allows users to view risk metrics by location (New York, London, or Tokyo). The purpose of this report is to provide a visual representation of risk wherever possible; thus, allowing readers to quickly scan through

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<sup>5</sup> See the “Key Risk Metrics” portion of this section for additional detail on what is contained in Sensitivity and Correlation reports.

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large amounts of in a relatively small amount of time. This report is also useful in identifying stale curves that may require update.

*Market Daily* reports provide a timely summarization on BS' credit spread curve changes. This report is usually distributed by 8:00 am New York time, and focuses on daily changes in spread and recovery rates aggregated by Bloomberg market sectors, which allows readers to focus in on select segments (e.g., only those credits on negative watch). The Market Daily report also shows the daily change in ratings of individual legal entities supplemented by commentary that explains the reason for the change.

**Appendix I: Municipal and Foreign Exchange Group Risk Monitoring**

Risk Management for the Municipal and Foreign Exchange (“FX”) trading desks is headed up by Michael Bellacosa, Managing Director Principal, who reports directly to the Global Head of Risk Management, Robert Neff. Risk management responsibilities for Mr. Bellacosa’s risk management group covers five trading desks:

- Municipal bonds desk – is a market making business where it is very rare to have a single position for more than 90 days in aged inventory.
- Muni Derivatives – includes BMA swaps and swaptions and Tender Option Bond (“TOB”) program.
- Foreign exchange desk – trades primarily foreign exchange spot forwards and options in New York and London.
- Governments desk – trades in highly liquid, very active, government and government agency instruments.
- Finance desk – is a repurchase (and reverse repurchase) desk that borrows and lends based on various collateral types.

**Key Risk Measures and Associated Limits**

Key Risk Measures used by the Municipal & FX market risk managers include: (1) Market value; (2) Spread pops; (3) Interest rate pops; (4) Value-at-Risk (“VaR”); (5) Aged inventory; (6) Delta; and (7) Vega.

<u>Trading Desk</u>	<b>Key Risk Measure Usage by Trading Desk</b>					
	<b>Market Value</b>	<b>Spread Pops</b>	<b>Interest Rate Pops</b>	<b>VaR</b>	<b>Aged Inventory</b>	<b>Other</b>
<b>Municipal</b>	X	X	X	X	X	Delta
<b>Muni Derivative</b>		X	X	X		Delta, Vega
<b>Foreign Exchange</b>				X		Delta, Vega
<b>Governments</b>	X	X	X	X	X	Slope Pops, Vega
<b>Finance Desk</b>				X		Delta

For Municipal and FX risk managers, many of the trading desks differ substantially in the risk measures used as well as the level of importance given to each of the metrics. For *Municipal* and *Government* instruments, risk managers focus heavily on Market Value and VaR, while also monitoring spread and interest rate pops, aged inventory, and delta (for munis).

Market values are monitored by long-position, short-position, and net position along with the change in net from the previous trading day. For the municipal desk, risk managers monitor credit VaR, issuer specific VaR, and total weekly VaR. Credit VaR is broken down by account (NY Trading, Branch, Muni Derivative, SWAP, Syndicate, Default, and Variable Rate Auction), by issuer, and by credit rating. Similar to risk managers for other desks, Municipal and Foreign Exchange risk managers use VaR primarily as a means to substantiate other risk measures (such as Spread and Interest Rate Pops), and to support P&L explains. With respect to aged inventory, it would be

very rare for the municipal desk to have a single bond position greater than 90 days in aged inventory. This is due to the market making nature of the business.

On the *Foreign Exchange* desk, risk managers focus primarily on VaR, which is aggregated by total desk, by group (Options, NY, and London), and by trader. At the desk level, risk managers focus on VaR limit usage, while at the group or trader level, they are most interested in large VaR changes. Risk managers also monitor net delta and gross delta by currency, and vega by currency. In addition to monitoring delta and vega by currency, risk managers monitor both metrics by the same three groups that VaR is broken out into—Options, NY, and London.

For *Muni Derivatives*, risk managers focus primarily on Greek metrics (such as delta and vega) and on VaR. They monitor these metrics at the desk level and further separate muni derivatives into prop trading and flow trading to better understand the desks market risk profile. Value-at-risk metrics are available to risk managers in total, and are decomposed into Yield VaR, Spread VaR, Vega VaR, and Basis VaR components. The various VaR metrics provide risk managers with the ability to substantiate Greek metrics and P&L explains.

Similar to the use of risk metrics, the risk limits that risk managers and BUCs monitor and report on vary depending on the trading desk:

- Municipal Bonds – VaR and Position limits
- Foreign Exchange – VaR, net delta, and net vega limits
- Government Trading Desk – VaR and various Pops
- Finance Desk – VaR limit
- Muni Derivatives – VaR limit
- Prop Trading –VaR and various Pops

Municipal bonds have a VaR limit for the desk total while position limits are set at a more granular level—position limits are set on NY Trading, Syndicate, Notes 2-years and less, and on Floaters. Additionally, there are position limits for three branches (Los Angeles, San Francisco, and Chicago). Limits for Foreign Exchange trades include total desk VaR, net delta limits by currency, and net and gross vega limits for emerging market currencies.

The Government trading desk has two levels of limits—Operating limits and Maximum limits. A violation of an operating limit serves as an early warning to trading managers and the heads of trading desks while a maximum limit violation triggers a violation notice that requires the approval of one of the co-heads of Fixed Income, Jeff Mayer or Craig Overlander; or the Global Head of Risk Management, Bob Neff. Operating and Max VaR limits are set for the total Government Trading desk while interest rate pop limits are set by trader and by desk type (flow desk, foreign desk, strip desk, agency desk, and syndicate). Additionally, for the callable book on the agency desk, risk managers track a P&L Scenario limit for a 25 basis-point shock in rates.

Both the Finance desk and Muni Derivatives desk are monitored using various VaR limits. For the Finance desk, VaR limits are set for three collateral types—Governments, Spread, and Mortgage Backed Securities--, for BSIL Mortgage, Corporates, and Emerging Markets, and for Specials. Similar to the Government trading desk, there is an early warning Operating limit and a Maximum limit for each of the VaR measures. The muni derivatives have VaR limits based on total VaR, VaR separated by prop and flow trading, and delta, spread, basis, and vega VaRs for flow trading.

### Daily Monitoring and Analysis of Portfolio

Daily portfolio monitoring and analysis is driven primarily by a “risk management ideal”—the need to understand the portfolio’s risk as well as the traders do. To achieve this, Muni & FX risk managers utilize a daily routine that has four primary focuses—understanding markets, estimating P&L, staying abreast of trade activity, and analyzing risk positions.

The purpose of looking at market changes and movements over time is to provide a basis for estimating what the market impact on P&L might be. Risk managers then look at trading activity to provide additional insight for P&L explains. For desks with relatively few trades (e.g., muni derivatives), risk managers take an in-depth look to see if the trades are booked correctly and to ensure that the P&L changes make sense given the positions. For other desks where there are a large number of trades (e.g., Foreign Exchange), risk managers focus primarily on outliers such as large trades or trades outside the norm.

Following completion of the P&L explains, Muni & FX risk managers do not do a lot of intra day monitoring of positions with the exception of positions that they find significant or for positions where traders are over their limits. Monitoring these positions often requires interaction with traders or desk heads. Mr. Bellacosa points out that maintaining a good relationship with a desk requires credibility; and that means staying informed about the markets and positions.

With respect to limit monitoring, responsibilities are shared between Risk Managers and Business Unit Controllers. Risk managers are responsible for monitoring limits on the municipal bond desk, foreign exchange desk, and the government trading desk. Business Unit Controllers are responsible for monitoring and reporting on limits for muni derivatives, but risk managers take responsibility for monitoring new muni derivative products until the Firm feels the limits are appropriately set, then limit monitoring is turned over to BUCs.

*Systems* utilized by Municipal & FX market risk managers include RIO, RiskLab, Summit, Exotica, Lynx, Prism, FX Trader, and Derivatech. RIO is a Web based system for the calculation and display of VaR and other risk metrics including historical data. RiskLab is comprised of a series of databases that feed a web site for reporting of risk information including greeks, VaR from RIO and other portfolio measures that are consolidated from RIO and other primary trading systems. Some of the more applicable primary trading systems include Summit, Exotica, and GP. Summit and Exotica are used for data entry and hedge reporting on plain vanilla interest rate products including simple European, Bermudan, and Digital Options. Muni & FX risk managers also utilize a Government bond trading system (“GP”) that is used for maintenance of dollar based listed option positions and OTC Treasury bond positions.

Other important systems include Lynx which contains position data and risk data that flows through to RIO and stress test numbers; a front-office management information system called Prism that is used primarily for cash instruments such as municipal bonds; FX Trader which contains spot and forward information for foreign exchange trades; and a system used for derivatives—Derivatech.

### Daily Production of Reports and Commentary

In addition to standard risk management reporting for risk limits, price verification, and Risk Highlights, Municipal and Foreign Exchange market risk managers send a “Daily VaR Summary Report” to trading management. This Daily VaR Summary Report

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is then supplemented with various other reports that are tailored to meet the needs of senior managers and the heads of trading desks, including the following:

#### Municipal Bonds

- Municipal VaR History report– Provides time series data on the metrics displayed in the “Firm-Wide VaR Report.”
- Municipals Account Level VaR report – Displays VaR, Market Value, Spread Pop, Interest Rate Pop, OAS, and number of positions by account type (e.g., NY Trading).
- Municipals Issuer Level VaR report – Displays the same metrics as those mentioned above aggregated by issuer.
- Municipal Rating Level VaR report – Aggregates metrics by issuer rating.

#### Foreign Exchange

- Foreign Exchange Group Level VaR report – Aggregated into three groups (Options, New York, and London), and displays total VaR for each of the groups.
- Foreign Exchange Trader Level VaR report – Shows the current VaR by trader along with the change from the previous trading day.
- Management Position Reports – Display net delta and vega by currency.

#### Governments

- Governments VaR History report – Provides time series data on the metrics displayed in the “Firm-Wide VaR Report.”
- Governments-Interest Rate Risk Account Level VaR reports – Display VaR, market value, interest rate pops, dollar convexity, slope pops, and vega aggregated by product type and by trader.

#### Finance Desk

- Finance Desk VaR History report- Provides time series data on the metrics displayed in the “Firm-Wide VaR Report.”
- Position report – Provides the balance, VaR, and DV01 for Government, Mortgage, and Foreign Exchange repos and reverse repos.

#### Muni Derivatives

- PSA/Prop P/L email – Summarizes the risk in the BMA generic tax exempt index curve, which is the basis for plain vanilla BMA versus LIBOR Swaps.
- Delta Summary report – Displays the delta risk by term and product type.
- Tender Option Bond (“TOB”) Risk Report – (which is distributed monthly) contains six sections that provide information on liquidation value, likelihood of liquidation, remarketing risk, limit exposure, tax benefit, and PV01 for forward bonds and forward bond options.

## **Appendix J: Fixed Income Derivatives Group Risk Monitoring**

The Fixed Income Derivatives (“FID”) risk monitoring group is headed up by Matt Garter, Managing Director, who reports to the Head of Risk Management for Europe and Asia, Kanwardeep Ahluwalia, and the Global Head of Risk Management, Robert Neff. Risk management for FID is separated into three geographic regions:

- 1) New York Fixed Income Derivatives
- 2) London Fixed Income Derivatives
- 3) Tokyo Fixed Income Derivatives

The *New York* FID desk is the most active of the three desks where trading includes swaps, options, mortgage derivatives, structured notes, and exotics (e.g., inflation based swaps, spread options, target rate notes, range accruals, and digital caps and floors). Market risk management responsibilities for muni derivatives, with the exception of VaR (which flows through FID), are the responsibility of the Municipal and Foreign Exchange risk monitoring group, not FID risk managers. *London and Tokyo* FID desks trade swaps, options and exotics.

### **Key Risk Measures and Associated Limits**

*Key Risk Measures* relied upon by FID risk managers fall into one of two primary groups—measures used in VaR analysis and measures used in sensitivity analysis (e.g., Greeks). *Value-at-risk* measures are monitored by desk and by currency; and typically include Total VaR, Yield VaR, Spread VaR, Basis VaR, and Vega VaR. Key risk measures for *Sensitivity Analysis* include delta, gamma, vega, skew vega, basis risk, inflation risk, spread risk, and reset risk.<sup>1</sup>

The importance of each risk metric to the risk management process is dictated by product type and by the region in which that product trades. On the NY desk, risk managers are concerned primarily with duration and convexity risk with inflation and basis risk also receiving a fair amount of attention. Swap and option products are large drivers of risk for this region; thus, risk managers closely monitor delta, gamma, and vega with all three being tracked by desk, currency, and term structure. Mr. Garter points out that while gamma is a risk that needs to be monitored, they tend to view it more as a cost of doing business where they like to be long gamma. With respect to vega, BS deliberately takes positions; thus, monitoring how vega is bucketed is especially important.

For the NY region, inflation risk is much smaller than other risks (such as delta risk), but is still important for certain products (such as zero coupon inflation swaps) where risk managers monitor actual inflation movements by bucket out to 30 years. For mortgage derivative products, risk managers are also concerned with basis risk and prepayment risk—mainly the one month basis and the change in prepayment rates relative to various scenario assumptions.

In addition to monitoring Greek and other sensitivity based risk metrics, market risk managers monitor various measures of VaR. The table below provides some insight into the level of granularity at which FID risk managers monitor VaR and VaR limits. This level of granularity is not surprising given the relative level of complexity in FID products.

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<sup>1</sup> See Appendix K: Equities Group Risk Monitoring for an in-depth explanation of some of the Greek metrics.



VaR Limits by Desk (in millions of dollars)

<b>FID Desk</b>	<b>Total VaR</b>	<b>Yield VaR</b>	<b>Spread VaR</b>	<b>Basis VaR</b>	<b>Vega VaR</b>
<b>Swaps</b>	5.0	1.0	3.0	2.0	
<b>Options</b>	6.0	1.0	1.0	0.5	3.5
<b>Muni Deriv</b>	4.0	1.5	0.8	2.5	0.5
<b>Mortgages</b>	1.0	0.5	0.5	0.5	0.5
<b>All - NY</b>	14.0	2.5	4.0	4.0	3.5
<b>London</b>	1.5	0.3	0.3	0.3	0.3

When monitoring FID trading in the London and Tokyo regions, risk managers are concerned with most of the same risks and risk metrics as in the NY region with the exception of risks related to London exotics. A larger percentage of P&L is generated from exotics in London; thus, these products receive a slightly deeper dive than they do in NY. Market risk managers typically take a close look at the exotic deal structures and how they are booked. The intent is to eliminate, or at least minimize, errors associated with improper modeling of deal structures. Additionally, risk managers are more cognizant of Foreign Exchange volatility risk, which is the result of a larger portion of the cash flows being embedded in cross currency trades.

#### Daily Monitoring, Analysis and Reporting

*Risk Processes* for FID risk managers entail a lot of dialogue with traders, heads of trading desks, and other risk managers supplemented by a great deal of group analysis. A large portion of the dialogue and analysis revolves around P&L analysis and explanation. Market risk managers look at P&L at the start of the day and at the end of the day and provide drill down and explanation on large moves or large (or unusual) positions. As part of the drill down, risk managers look closely at what is happening in the market including upcoming option expirations. Risk managers then generate and analyze VaR reports for all desks to either substantiate the P&L explains or find areas that may require additional analysis.

FID market risk managers also focus on price verification on an ongoing basis. As part of the price verification process, risk managers compare internal trader marks to counterparty marks, and validate interest rate curves and volatility skews (which is extremely important for at-the-money Bermudan swaptions).

Daily risk processes are similar across the three regional locations—New York, London, and Tokyo—with one noteworthy exception being the amount of time spent on verifying and analyzing P&L results on the exotics desk in London. For the London desk, market risk managers are more apt to verify the booking of exotic trades to ensure that an error does not cause erroneous P&L results. Risk managers feel that this extra level of detail is necessary given the complexity and volume of exotics in London.

*Monitoring and Reporting of Trading Limit Usage* falls into one of two categories depending on the type of limit violation (which may be a “major” management limit violation or a “minor” trading limit violation). For major management limit violations, the Head of Risk Management or Senior Trading Management must be notified if: (1) Principal Factor (“PF”) VaR Management Limits (e.g., total VaR, yield VaR, spread VaR, etc.) totaled across all currencies for all interest rate derivatives are violated; (2) PF VaR Management Limits in each currency for all of IRD are violated, or (3) Bermudan Vega Limits are violated.

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Major management limit violations must be reported to RMD by Business Unit Controllers (“BUCs”) if: (1) PF VaR Management Limits totaled across all currencies for a specific desk are violated provided the total PF VaR across all currencies for all desks is not greater than the total Management Limit or (2) PF VaR Management Limits for a specific desk in a specific currency are violated provided the total PF VaR in that currency for all desks is not greater than the total Management Limit for that currency. When reporting these violations to Risk Management, BUCs must include an explanation on what caused the violation and a plan, by the Head of FID Trading, to correct the violation. Limit usage information is also disseminated to certain Executive Committee members and the Global Head of Risk Management on a daily basis. Any limit violations are included in a limit violation email that is distributed to key senior managers by the Limit Monitoring team within BUCs.

For minor trading limit violations, the trading desk must get approval from the head of FID Trading if: (1) the trading desk exceeds its PF VaR trading limit totaled for all currencies, but not its management limit in all currencies combined or (2) the trading desk exceeds its PF VaR trading limit in a specific currency, but not its management limit.

*Systems* used by FID risk managers include systems used to monitor and report risk and risk limits; and primary trading systems. The main systems used to monitor and report risk and risk limits include RIO and Risklab. RiskLab, which is comprised of a series of databases, provides consolidation of risk information (e.g., VaR from RIO and Greek metrics) that is subsequently fed to a reporting website.

Primary trading systems include Summit, Exotica, GP, Lynx, and Mortgage Derivatives System. Summit and Exotica are used for data entry and hedge reporting on plain vanilla interest rate products including simple European, Bermudan, and Digital Options. GP is a government bond trading system used for maintenance of dollar based listed option positions and OTC Treasury bond positions. Lynx is used for data entry and modeling of exotic fixed income trades (e.g., CMS spread options and inflation trades). The Mortgage Derivative System is a Unix based model that combines interest rate derivative models with the mortgage department’s prepayment models. Most common uses of this system include asset swaps on mortgages and CMO deals.

## **Appendix K: Equities Group Risk Monitoring**

Within the Equity Group, market risk monitoring responsibilities are headed up by James Bell, MD Structured and Cash Equity Products who reports to Kanwardeep (Kan) Ahluwalia, Senior Managing Director & Head of Risk Management for Europe and Asia.<sup>1</sup> Reporting to James Bell are 6 other risk managers (3 in London, 2 in NY and 1 in Tokyo). The Equity Group risk managers monitor the following businesses or whitebooks: (1) Structured Equity Products ("SEP"<sup>2</sup>), (2) Risk Arbitrage, (3) Block/OTC/International Equity, (4) Firm Investments and (5) SST.

The Head of the Equity Group stated that the group spends the vast majority of its time on the SEP whitebook, between 80-85%. The more complex positions to risk manage within Equities reside within equity derivatives and this is where their analysis adds the most value to the firm. After SEP, the Equity Group spends much of its remaining efforts on the Risk Arbitrage desk. While not as complex as many of the products within SEP, the risk arbitrage desk does have some concentrated exposures and requires some analysis, specifically around the "break risk" associated with merger deals. The group also covers the other desks within Equities, such as Cash Equities, but the risk in these areas are more easily understood, requiring less resources.<sup>3</sup>

As with all the other product-line risk monitoring groups, the Equities Group is vertically integrated. The following risk managers have the responsibility of covering specific risk portfolios within SEP: (1) William Chan, MD (NY) covers SEP-America, (2) Steve Luxton,<sup>4</sup> AD (LDN) covers SEP-Europe, and (3) Jonathan Heritage, VP (TK) covers SEP- Asia. Each risk portfolio is a collection of risk books and will fall into sub-categories by desk such as, volatility, exotics, structured equity finance, etc. In addition, the Equity Group has other individuals that, while not primarily responsible for monitoring specific books, help the group as a whole regarding day-to-day production of reports and system initiatives.<sup>5</sup> Finally, although the model review function is separate from the risk monitoring functions, there is a close relationship.<sup>6</sup>

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<sup>1</sup> Both Kan and James are based out of London.

<sup>2</sup> SEP refers to BS's Equity Derivatives businesses which include five primary business lines: (1) volatility (options and variance swaps), (2) exotics (index based; basket based; hybrids), (3) arbitrage (ETF trading; index arbitrage and swaps; proprietary trading), (4) convertibles, and (5) structured equity finance.

<sup>3</sup> There are a couple of Equity Whitebooks that the Equity Group within RMD does not review: (1) Bear Wagner and (2) Merchant/Illiquid. As previously discussed, Bear Wagner is BS's majority-owned market maker on the NYSE and as such is purely a customer flow business. The Merchant/Illiquid whitebook includes BS' private equity and other less liquid positions and these positions are longer-term investments and are not eligible for trading book capital treatment.

<sup>4</sup> Steve Luxton is also primarily responsible for the day-to-day risk monitoring of the Risk Arbitrage desk.

<sup>5</sup> David Goulding, VP (LDN) is a clear example of this. He is the group's technology expert and has led the group's systems initiatives such as creating the daily productionalized Heatmap reports. He is also an available resource for deeper investigation of risk within products when needed.

<sup>6</sup> Ashley Everington (Model Review), who is responsible for reviewing equity derivative pricing models, works very closely with Steve Luxton and the other SEP risk managers. In addition to the reviewing of models, Ashley is crucial in creating practical solutions for monitoring of more complex portfolios from both a risk measurement and price verification standpoint.

## Key Risk Measures and Associated Limits

Similar to the other product-line risk monitoring groups, the Equity Group monitors and reports on risk at the whitebook level (e.g., SEP). Below we detail the risk metrics and associated limits for the *SEP business* or whitebook that the Equity Group spends the vast majority of its time monitoring.

Within *Structured Equity Products*, the risk metrics used by the Equities Group to monitor risk within the equity derivative desks are similar to industry norms. First, understanding the risk of these positions starts with understanding the risk sensitivities (i.e., the Greeks). For the more plain vanilla equity derivatives, this means understanding the Delta, Gamma, Vega, and Theta. The risk managers must understand if the portfolio has a directional market risk (i.e., Delta), has positive or negative optionality from buying or selling options (i.e., Gamma), and where the portfolio stands with regards to exposure to volatility (i.e., Vega). In addition, from a business perspective, while positive gamma is a great tool for reducing measured risk of a portfolio, especially if you have substantial directional risk, it comes at a cost. If the underlying equity(s) do not move, the value of the options you purchased for protection decrease over time. This process is known as time decay or "Theta bleed." In addition to the primary Greek sensitivities, the risk managers will also look at more second-order risk factors, such as forward volatility skew and correlation risk. These risk factors are primarily used for the more exotic equity derivatives, primary in the London or Asian risk books, where the pay-off structures of the trade are much more path dependent and the underlying may be on a basket of stocks.

As previously stated, positive gamma provides protection to a portfolio. However, understanding only the current gamma of a portfolio or of derivatives linked to a specific underlier (e.g., S&P 500 Index), is not sufficient. The risk managers and business alike must understand the complete gamma profile. There are two important moving parts to this analysis. First, the gamma of an option is sensitive to where the spot price of the underlier is in reference to the strike price. For example, gamma is quite low for a deep out of the money put option. However, the gamma will spike as the spot price approaches the strike price. Thus, it is quite useful for the business area and risk manager to understand how the gamma related to various underlying securities will move if the current spot price moves. This can provide insight into potential pockets of exposure. Secondly, the protection provided from purchasing gamma of course is for a limited time. The current gamma of a portfolio, for example, may be positive, but if the options providing that protection expire tomorrow, the protection expires as well. As such, the business area and risk managers must understand the gamma profile over time for the SEP business.

In order to spot "gamma holes" and have a better understanding of the gamma profiles to the various underlying positions, BS developed a powerful analytic tool called "Heatmaps." The Heatmaps provide a graphical (in color) representation of how gamma on a particular underlying security may change given the change both in spot price and over time and provide the user a view of what the book might look like at different points in time. The current calibration is to shock the spot price up and down by 10% assuming the portfolio is perfectly delta hedged before the shock. The portfolio is then recalculated at 1000's of strike and maturity points. The result is a graph of the P&L impact from Gamma across time and across different spot price levels. The graph gets its name in that the gains and losses are shown along a continuum of colors (e.g., red/yellow representing losses and blue representing gains). These Heatmaps are calculated on a stock-by-stock basis and are used primarily for single asset vanilla

derivative positions such as vanilla options, Digitals, Variance swaps and barrier options. These Heatmap reports are available on a daily basis in RIO.<sup>7</sup>

Secondly, in addition to monitoring the Greeks, the risk managers will use VaR extensively. For the SEP businesses, VaR is used to confirm the risk they see from having an in-depth knowledge of the underlying risk sensitivities and the associated market moves.<sup>8</sup> For equity derivatives desks, the risk managers have the capability of viewing VaR at a variety of aggregation levels. For example, they can view VaR at Total SEP, within SEP by geographic region (e.g., SEP-America), by SEP product (e.g., all, Volatility, Exotics, etc.), and by individual issuer (i.e., underlying security, such as, S&P 500 Index). This is quite helpful for the risk managers, as this provides the individual risk managers with the ability to look at VaR for the geographic and product type(s) they cover. In addition to the Total VaR metric, Component VaR metrics are available. This allows the risk manager to see what is driving the VaR, whether it is market moves, volatility moves, etc. The *SEP RIO Summary VaR* report provides a good example of Component VaR cut in numerous ways including Total VaR, Market<sup>9</sup> VaR, Vega VaR, IR (interest rate) VaR, and Credit VaR.

While VaR provides a sense of the risk to the portfolio during normal market conditions, the risk managers are also concerned with the potential losses that may occur from less-likely but more extreme market moves (tail risk). To capture and monitor the portfolio's exposure to "tail risk," the risk managers subject the portfolio to both a stress event, "Large Down Limit"<sup>10</sup> and to various firmwide scenarios such as the 1987 Stock Market scenario, September 11<sup>th</sup>, and 25% market drop.

While the risk managers will look at all the above mentioned risk metrics in monitoring the SEP businesses, limits are only set for some of these metrics. First, with respect to the global or firmwide limits which are reported up through the Limit Monitoring Group to senior management of the Firm, the SEP businesses are limited on both VaR (Total and individual Component VaR) and on the Large Down Limit. There are limits on these metrics for each geographical region (America, Europe, and Asia) as well as a global limit. In addition, the SEP exotics business operating out of BSIL, the U.K. broker-dealer, has separate limits for both Net Forward skew and Net Correlation risk which are reported up to BSIL management as well as to RMD personnel including the Global Head of Risk Management and to the Head of the Limit Monitoring Group, Susan Flynn.

### Daily Monitoring and Analysis of Portfolio

For SEP, the risk manager's first priority each morning is to understand the positions and risk of the desks he is covering as well as how the desk made or lost

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<sup>7</sup> The Head of SEP has on-line access to RIO reports including Heatmaps.

<sup>8</sup> For the cash equity businesses, excluding Risk Arbitrage, VaR can be a leading indicator for the risk managers as they do not focus on the underlying details of these positions to the extent they do for SEP.

<sup>9</sup> Market VaR includes the VaR from both Delta and Gamma.

<sup>10</sup> The large down limit is similar to the 1987 crash but is strictly a stress test, not based on an actual historical scenario. Basically, the large gap down is calculated by shifting single stocks up/down 20% and broad indices/ETFs up/down 10%. Special consideration was given to Index arbitrage (i.e., cash/carry) style portfolios where the indices are decomposed into its stock components and both sides are then shifted up/down by 20% in order to have more meaningful numbers.

money the previous day. The risk manager uses multiple tools and reports in this process. Most of the data and reports used come from the following systems: (1) ATLAS- the equity derivatives front office system, (2) Lynx-an external calculator with a spreadsheet interface that pulls in data from Atlas (allows the risk manager to do a lot of “what if analysis”),<sup>11</sup> or RIO (see defined earlier). First, the risk manager will want to view the positions within the various risk books<sup>12</sup> he monitors. The risk manager will be able to see this position detail including related risk sensitivity information from the Atlas Position Blotter. The risk manager may view this information for the entire portfolio he covers (e.g., SEP-Americas) or for more granular sub-sets (e.g., Exotics within SEP-Americas). While this information is available on-line, typically the risk manager will download the information into excel, where it can be sorted or categorized to the specifications of the risk manager.

Once the risk manager has reviewed the positions details, he typically will want to begin the profit and loss explanation process. For most of the non-exotic equity derivatives, the risk manager can use the automated Atlas P&L explain report. This report will give the daily P&L, projected P&L, unexplained P&L, the P&L by Greek sensitivity (delta, gamma, theta, etc) as well as trading P&L. If there is a large unexplained P&L from this process, the risk manager will investigate further. An unexplained P&L may be caused by (1) trader miss-marking a parameter used by the pricing model, (2) a problem with the booking of the trade in the system, (3) model deficiency, etc. Even if a book shows a small unexplained P&L, there could be a mis-marking issue that could fly below the radar screen due to the immateriality of it initially. However, the risk managers watch for situations where this could result in a larger issue by the prices moving slightly each day. One of their stated goals is to catch issues before they turn into major problems. Therefore, while the Atlas automated attribution report is a good tool for the P&L explain process, the risk managers will often look deeper into the detail of the positions to search for any problems. In addition to the Atlas position blotter and P&L explain report; the risk manager will review the Atlas trade blotter on a daily basis to keep abreast of new trading activity. The trader will look at this to see if there are any unusual or material trades as well as to maintain a sense of the structure of the book in general.

For many of the exotic equity derivatives, the Atlas P&L explain report will generally not provide a complete enough attribution of the P&L and consequently not provide enough information to ascertain whether or not there may be a problem with a particular sensitivity or mark on the position. The positions within the exotic books are exposed to both forward skew and correlation risk. These sensitivities are not captured in the Atlas P&L explain report. The risk managers will use Lynx to get the forward skew and correlation risk sensitivities. The forward skew sensitivity is calculated by shocking

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<sup>11</sup> The risk managers use Lynx Trade Cache to run queries and filter on what the risk manager is interested in for a particular desk. Lynx also supports the ability to do scenario analysis regarding the structure of the forward skew. In addition, in the next six months or so, the risk managers hope to have the ability to run the alternative stochastic volatility model within Lynx. Currently, it is run on a spreadsheet developed by Ashley Everington (Model Review).

<sup>12</sup> There are over 600 risk books within SEP; however, a much smaller subset are actually actively monitored on a daily basis by the risk managers. They focus on where the largest exposures are. However, there are daily reports that show P&L and risk sensitivities by risk book that would alert a risk manager to material risks or changes in books he does not generally review based on materiality. Traders put trades with like strategies within the same risk book. In addition, they tend to have the same hedging strategies within the same risk books. For example, cliquet equity derivatives would be in the same risk books.

the underlier by 10% and pivoting around the at-the-money option (i.e., calculating a relative shift for a 10% move). The correlation risk sensitivity is calculated by increasing correlation 1%.

#### Daily price verification activities

Within SEP, the breakdown of responsibilities for price verification is based on the complexity of the product. Generally speaking, risk books that require more interpretation are done by the risk managers. Products where verification can be more easily performed by checking against an available external quote are performed by the business unit controller (BUC) assigned to the desk. While BUCs are used for some price verification, the risk managers view the overall responsibility for the price verification process as owned by them.

The price verification process for the more complex products generally entails the risk managers checking the reasonableness of the trader's various assumptions for parameters that are used in the pricing model. These parameters will not only affect the mark of a position if the product is marked to model, but will also affect the risk sensitivities that come out of the model, which are inputs for the VaR engine. One of the primary parameters that the risk managers will be verifying within the complex or exotic equity derivatives space is the volatility curve or surface. The risk managers obtain quotes from an external service, such as "Totem exotic," which provides them with volatility quotes for 11 indices and a number of single stocks. They can use these external quotes to build their own volatility surfaces to compare to the trader marks. For certain generic contracts, these quotes may be accurate, but in other cases, staleness of the quote may be an issue.

Certain exotic trades show significant sensitivity to the volatility of the volatility parameter. The products which produced the highest level of sensitivity to the volatility of the volatility parameter were Napoleon cliquets<sup>13</sup> followed by reverse cliquets. The market for the Napoleon and reverse cliquets is still relatively a one-way market, where BS is providing hedges to other banks to hedge their retail exposures (i.e., from selling the product to retail clients) and thus any market observations of volatility are suspect.<sup>14</sup> This sensitivity is even more pronounced in the current low volatility environment. However, the pricing model in Atlas used to book all equity derivatives does not shock the volatility parameter; rather it uses a "static" volatility parameter. To more accurately capture the effects of this sensitivity to volatility of volatility, Ashley Everington produced a spreadsheet to revalue the Napoleon book using a Stochastic Volatility model. Mr. Everington worked with the product-line risk managers to extend this approach to all Cliquet products (over 300 trades) in a more automated way. Currently, the stochastic volatility model is used as a benchmarking model and has not replaced the local volatility model that remains the booking model. Therefore, the risk sensitivities that are fed into VaR will be based on the static volatility vs. the sensitivities from the stochastic volatility model.<sup>15</sup> However, now the risk manager can compare automatically the differences in

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<sup>13</sup> Napoleon Cliquet – had 30 trades (100 legs) net notional short \$200 million, market value \$20 mm.

<sup>14</sup> In contrast, there is a more complete two-way market for regular cliquets which allow for better price discovery. Thus, risk managers would feel more comfortable using a market quote of volatility (from Totem service) for these products than for the Napoleon or reverse Cliquets.

<sup>15</sup> The risk manager stated that the effect on VaR at the Firm level would be quite minimal based on the small amount of positions, only 30 Napoleon trades (i.e., the most sensitive product to volatility of

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marks from using either model. He can then use this information to make valuation adjustments to the mark if necessary.<sup>16</sup>

As part of our on-going supervisory responsibilities, we intend to monitor any future developments in this area, including but not limited to changes in the risk profile of SEP, model developments and implementations, and new product developments.<sup>17</sup>

### Production of Risk Reports and Analysis

The Equity Group produces a wide range of reports from data sourced from RIO and Atlas. In addition to providing comments for Daily Risk Highlights, the Equity Group provides a variety of reports for the business unit, senior management, and for their own internal use. The following is a sample of the key reports and analysis provided by the Equity Group for the SEP whitebook:

- (1). *SEP RIO Summary Report* - provides the Total VaR (as well as by issuer) by business within SEP and by geographic location for the Total VaR and for each component VaR (e.g., Market VaR or Vega VaR).
- (2). *SEP VaR report* - provides the risk sensitivities and the results of shocks to spreads ("SR Pops"), interest rates ("IR Pops"), and up/down 10 and 20% scenarios, as well as the total and component VaR in Total and by issuer.
- (3). *Daily Note* - a custom report which combined profit and loss information, reserves held against positions, notable trades not yet included in risk systems, booked, or modeled on spreadsheets with the risk sensitivity, stress scenario, and VaR numbers.
- (4). *SEP Forward Skew and Correlation risk report* - provides the risk in total, by underlying, and for top 10 risk positions and the risk limits and usage thereof.
- (5). *Heatmaps* - contour maps demonstrating the effect on gamma of a large market movement on a portfolio of trades at different strikes and maturities (on a specific underlier or issuer).

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volatility) and the likely magnitude of volatility changes within a week time-frame. With the current risk profile, this does not appear to be a material issue. However, we intend to monitor the composition of the exotics portfolio going forward and will periodically reassess this determination.

<sup>16</sup> These would be in addition to the normal model reserves booked against these trades.

<sup>17</sup> During our review, the Equity Group risk managers discussed relatively new exotic products for BS (e.g., Digicallables) and potentially new variations of those products currently traded. We will follow up on any developments regarding these and other new exotic equity derivative products traded at BS.



## **Appendix L: Mortgages Group Risk Monitoring**

Within the Mortgage Group, market risk management responsibilities are headed up by Phil Lombardo, Senior Managing Director-Mortgage Group (23 years at BS) and John Schrader, MDP-Mortgage Group (8 years at BS) who reports to Phil. The Mortgage Group also includes 9 other professional staff (8 in NY and 1 in London) mostly at the VP level. The Mortgage Group risk managers monitor the following businesses: (1) Passthroughs (2) Agency CMOs (3) Non-Agency CMOs (4) ARMs (5) ABS/CDO (6) CMBS and (7) Whole loan operations (i.e., EMC). Generally speaking, the largest businesses, from both the revenue and risk exposure perspectives, that the Mortgage Group covers are the various securitization businesses including ARMs, Non-Agency CMO, and the Commercial Conduit businesses.<sup>1</sup>

Similar to the other product-line risk manager groups, the Mortgage Group is vertically integrated. Individual risk managers are assigned to specific desks and then follow all activities with respect to that area. While the knowledge of the specific product area is known best by the risk manager in charge of monitoring that product area on a daily basis, the Head of the Mortgage Group strives to have his risk managers cross-trained in the various mortgage products. While the group is generally organized by product area, certain functional tasks that span across the entire Mortgage Group are typically assigned to specific risk managers as well. For example, the daily processes around VaR for the Mortgage Group, including reconciliation of positions, production of summary VaR reports, and VaR explain, is performed by a sub-set of specific risk managers.

### **Key Risk Measures and Associated Limits**

Historically, the Mortgage Group relied exclusively on a set of simple metrics, such as Market Value ("MV"), IR POPs, and Spread POPs,<sup>2</sup> in monitoring and limiting the risk within the mortgage businesses it covers. The risk managers track these metrics and set limits at many different levels of granularity. The rationale is to use "simple measures which will provide clear conversations with the business." The risk managers will then manage the risk in greater detail by setting lots of limits on these metrics. For example, there are a plethora of sub-limits that are set based on MV within the various mortgage desks.

While the Mortgage Group still relies heavily on these simple risk metrics in its daily risk monitoring activities (especially with respect to its various securitization activities), with the more recent development of VaR and scenario analysis/stress testing capabilities at BS, they now have additional, more sophisticated risk metrics to use in their risk monitoring activities. In fact, VaR has been integrated to a certain degree in the daily risk monitoring activities within the Mortgage group. With regards to the large securitization businesses, where the goal is to buy, securitize, sell and earn a spread (i.e., "we are in the moving not storage business"), the risk managers typically use VaR more as a confirmation tool. In these businesses, the risk managers look more to the

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<sup>1</sup> For example, the 95% 1-week VaR for all the MBS desks as of 08/10/05 was approximately \$38 million (after taken into account diversification benefits). The VaR for the ARMS, Non-Agency CMO, and Commercial Conduit desks were the largest contributors and were as follows: (1) \$30 million, (2) \$27 million, and (3) \$12 million. For more details see BS' Firmwide VaR Report at Appendix C.

<sup>2</sup> Spread POPs are generated by RIO and analyzed by risk managers for certain mortgage products. However, there are no limits on mortgage desks based on Spread POPs.

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underlying risk sensitivities (e.g., IR POP or Spread POP). If they understand the risk sensitivities and the market moves, VaR should be confirming a risk they already understand. However, there are circumstances where VaR is used more prospectively by the risk managers in understanding the risk inherent in the desks they cover. First, the risk managers utilize VaR in alerting them to material “basis risks” that desks may have. These basis risks may appear as a result of relative value trades put on by the flow or other secondary trading desks (e.g., long FNMA 6% 30 yr TBAs and short FNMA 5.5% 30 yr TBAs) either to support customer requests or proprietary views or as a result of the normal hedging activities of the desk (e.g., imperfect hedges that result in basis risk). In addition to highlighting material basis risks, VaR provides the risk managers with a perspective of the historical behavior of the interest and spread curves that affect the value of their positions. The risk managers do not get a sense of the historical volatility of these risk factors by just looking at the sensitivities to the risk factors.

The following is a list of the key risk metrics used by the Mortgage Group risk managers in monitoring the various MBS desks:

<b>Key Risk Measures Used by Mortgage Group (RMD)</b>						
<b>Trading Desk</b>	<b>Market Value</b>	<b>Interest Rate Pops</b>	<b>Spread Pops (no limits)</b>	<b>VaR</b>	<b>Aged Inventory (no limits)</b>	<b>Other (no limits)</b>
<b>ABS</b>	x	x	x	x	x	
<b>ARMS</b>	x	x		x	x	Trader vs. Model Pops
<b>CBO</b>	x	x	x	x	x	
<b>CMBS Secondary</b>	x	x	x	x	x	
<b>Commercial Conduit</b>	x	x	x	x	x	
<b>EMC</b>	x			x	x	
<b>Agency CMO</b>	x	x		x	x	Trader vs. Model Pops
<b>Flow Desk</b>	x	x		x	x	Trader vs. Model Pops
<b>Non-Agency CMO</b>	x	x		x	x	Trader vs. Model Pops

VaR Summary reports for the mortgage desks are produced daily and distributed within RMD and to the business area (e.g., daily distribution of summary VaR package for all MBS desks to the Head of Mortgages). In addition, Mortgage VaR limits are set at the desk level and are included in those limits tracked by the Limit Monitoring Group. Violations of these limits are emailed daily to those in senior management with the authority to approve limit excessions or grant new limits.

While the VaR metric has been integrated into the daily risk monitoring of Mortgages and communicated within the Mortgage Group of RMD and to the trading management, scenario analysis and stress testing results have primarily been used as a monitoring tool to alert senior management to particular concentrations in risk factors. While the historical scenarios and hypothetical stress tests are run on a daily basis for the mortgage desks, these metrics are much more of a support tool for the risk managers and do not appear to drive their daily risk monitoring activities. Unlike VaR,

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daily scenario and stress results are not distributed<sup>3</sup> (in hard copy) to trading management or within the Mortgage Group and limits are not set on these metrics. However, both VaR and particular Scenario Results (e.g., 1998 Russia/LTCM scenario) for the MBS desks are included in the Daily VaR and Stress Package provided to those in senior management with the authority to approve limit excessions or grant new limits. In addition, senior level risk managers within the Mortgage Group will, if warranted, discuss the results of these scenarios during their weekly meetings with the Co-Heads of Fixed Income.

#### Daily Monitoring and Analysis of Portfolio

Similar to the other product-line risk monitoring groups, the Mortgage Group needs to have a good understanding of the risks (positions and sensitivities) of the desks they monitor as well as an understanding of how each desk made or lost money the previous day. These are the primary goals of the morning risk monitoring activities.<sup>4</sup> This analysis culminates in the communication to senior management of the Daily Risk Highlights by the late morning/early afternoon.

In order to accomplish these goals, there are various daily activities that the Mortgage Group must perform including: (1) monitoring of the market, (2) review of positions and trades, (3) P&L explain process, and (4) VaR production and analysis. While these morning activities are similar for all the risk monitoring groups, within the Mortgage Group, there are some particular morning tasks performed by the Mortgage Group risk managers worth further mentioning.

#### *PRISM-Analysis and Support*

As mentioned in the risk metrics section, in order to understand and limit risk for the mortgage desks they monitor, the Mortgage Group risk managers rely heavily on monitoring simple risk metrics, particularly MV and IR POPs. The Firm has set a multitude of limits on these simple risk metrics. The limits are set at many different levels of aggregation and/or categorization, so as to “box in” the traders. For example, there are MV limits set at the desk level, for particularly sensitive positions<sup>5</sup> within a desk, and for the hedges<sup>6</sup> used to mitigate risk.

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<sup>3</sup> Daily VaR and Scenario/Stress test results are available on-line in RIO. However, currently outside of RMD, RIO is not typically used in this fashion. Rather, trading and senior management rely primarily on distributed copy of reports by RMD.

<sup>4</sup> For further discussion of the morning duties of the Mortgage Group risk managers, see *Mortgage day-in-the-life Risk Monitoring* (OPSRA Supplemental Notes).

<sup>5</sup> For certain desks such as the Residential Subordinate desk, positions are categorized by rating and limits are set at each of these rating buckets. Particular focus is placed on the MV for the non-rated and residual security tranches.

<sup>6</sup> For example, on the Agency CMO desk, there is an IR POP limit associated with the use of U.S. Treasuries as hedging vehicles. The purpose of this is to control exposure to basis risk and to encourage traders to hedge their interest rate risk with instruments that are more correlated with the products they are trading, in this case to use more MBS as hedges.

The Mortgage Group relies on PRISM,<sup>7</sup> to provide risk managers with the ability to see the market risk profile of the desks they cover and to monitor, limit, and report on mortgage position data (i.e., MV) at various levels of granularity, particularly where limits are set. All of the position reports used for managing risk and limit monitoring come from the PRISM system and thus, as the Head of the Mortgage Group states, “This place runs on PRISM information.”

The effectiveness of the day-to-day risk monitoring within the Mortgage Group is contingent on the accuracy of the data within PRISM. As such, the Mortgage Group spends a significant amount of time inputting and verifying the integrity of PRISM data. Although, many risk managers may touch this process, the Mortgage Group has dedicated a VP-level risk manager with the primary responsibility of supporting data quality within PRISM. This job has three primary aspects. First, new mortgage positions (whole loans and securities) must be assigned a set of attributes<sup>8</sup> in PRISM by the product-line risk managers. Many of these attributes are used to filter and/or aggregate positions within PRISM. As such, these attributes may determine where the position winds up on various risk reports (e.g., correct rating bucket, correct position type, etc). For newly purchased whole loans, the risk managers will typically call the front office to get information necessary to assign attributes to the position. For securities, generally the risk manager will use Bloomberg structuring tools to determine the correct attributes to input into PRISM. The responsible risk manager(s) will then input these attributes into PRISM. Secondly, any existing positions with missing attributes must be corrected. If any attributes are missing, PRISM will generate a line-item called “NULL” for that position for the missing fields. This appears to be an adequate control around ensuring completeness of data. Finally, PRISM has a separate report “MBS un-priced” which shows the risk managers all the un-priced positions. For any positions without prices, the risk manager will need to find prices. After the “nulls” and “MBS un-priced” have been addressed, the risk manager primarily responsible for the data integrity of PRISM, as well as the Head of the Mortgage Group, both spend a fair amount of time spot-checking attributes and prices. For example, the Head of the Mortgage Group may look at the prices of all the new IO positions and if someone gave an IO attribute to a PO position, he would be able to see this quite easily through this type of ad-hoc review, as an IO would be priced at a fraction of where a PO strip would be priced.

The data quality of the PRISM system also impacts other areas. First, various attributes entered by product-line risk managers into the PRISM system are used in determining which VaR methodology, risk sensitivity, or time series to apply to the specific position. Thus, the accuracy of these attributes may affect the measurement of risk, as given by VaR. There are two main areas where these attributes may impact the

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<sup>7</sup> PRISM is a front-office management information system that produces on-line, real-time position data for mortgage products and other cash instruments. PRISM was developed by FAST, with RMD input, to facilitate the monitoring and reporting of positions in a useful manner for risk management.

<sup>8</sup> The only identification type fields that are fed into PRISM from the front-office trading system (“MORT”) are CUSIP and SIC fields. The remaining list of attributes for the new mortgage positions (loan or security) must be input by the risk managers in the Mortgage Group. These attributes are in a hierarchy format. The highest level attribute, product type, must be input for all new positions. The following are the required attributes for all positions: (1) product type (e.g., IO, PO, Inverse, whole loan, passthrough); (2) product sub-type- depends on the product type (e.g., for pass-through, 15-year, 30-year, 5-yr balloon); (3) Desk rated- for all securities (AAA down to un-rated); (4) Collateral Group (e.g., mortgages, corporate, asset-backed, etc.); and (5) Collateral type (e.g., for Mortgages, agency-residential, agency-commercial, non-agency-residential, and non-agency commercial). For Non-Agency Collateral, collateral sub-type is also required (e.g., for residential, Alt-A, subprime, performing, non-performing, etc.).

measurement of VaR for mortgage products. First, certain attribute fields from PRISM are used in the calculation of general market risk in VaR if the position must be proxied. Generally, the FAST RIO team automatically pulls the necessary position information from the front-office FAST database to calculate the general market risk for each position. However, if there is a fail, generally because the position is for a new deal or new product not yet in the FAST database, there is an automated process to proxy a position on a similar position if it is missing data needed to run the model. As stated above, the VaR system will look to the attributes within PRISM to run the proxy. This is a continuous process each day and thus when the data is finally available the fail will no longer occur and the proxy will no longer be used. Secondly, certain attributes in PRISM (e.g., collateral sub-type) will be used by the FAST code to determine which VaR methodology for specific risk to apply to the position. For example, if the collateral sub-type is Alt-A for a Non-Agency CMO position, it will be treated differently than if it had a collateral sub-type of Subprime.

There appears to be a fair amount of attention placed on manually reviewing the accuracy of PRISM data by certain risk managers within the Mortgage Group. In addition, another indirect quality control around the data is that the distribution and use of PRISM information is vast<sup>9</sup> and as such “there are lots of eyes on this data.” While it appears that there are adequate semi-automated controls around the completeness of attribution data (“Nulls process”), the controls around the accuracy of the hand entered attributes appear to be more manual and ad-hoc in nature.

#### *VaR-Analysis and Support*

With the recent integration of VaR into the Mortgage Group’s risk monitoring function, there was a need to build up the “proof and control” capacity around this metric. Towards this end, the Mortgage Group hired three additional personnel (at the VP and Associate level) in the past two years mainly to support VaR. Among other duties, these individuals perform the following tasks: (1) reconciliation of VaR and (2) production of VaR summary reports, including analysis.

The daily VaR process within the MBS/ABS desks differs slightly depending on the VaR methodology employed. The majority of MBS desks, such as Agency CMO, Non-Agency CMO, and ARMS, use the “multi-factor approach.” For the vast majority of positions on these desks, VaR runs overnight automatically (i.e., without manual intervention) and is included in the initial firmwide VaR numbers (i.e., early morning T+1). For desks that use the “Credit VaR approach,” such as CMBS, ABS, CBO, and CDO, the various Mortgage Group risk managers have to create input files (i.e., manual spreadsheets) of the positions to be uploaded into RIO. The risk managers perform this task on a T+1 day basis. Therefore, the VaR on these desks is not available until the late afternoon versions of VaR (T+1).

After the VaR files are generated, the timing of which will depend on the VaR methodology used by the desk, John Sun, VP (Mortgage Group) performs various VaR reconciliation procedures. First, he will reconcile the data flow. In addition to testing the data flow, he will test the integrity of the data in RIO. To ensure that the feeds are correct and the positions are right, he will reconcile MV and Trader POPs<sup>10</sup> between RIO

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<sup>9</sup> PRISM information and reports are used by the business area (traders and trading management), Mortgage Group risk managers, and other control functions, such as Treasury.

<sup>10</sup> The Trader POPs go into RIO and thus can be reconciled to the Trader POPs in PRISM. However, as previously stated it is the Model POPs that are used by RIO in calculating VaR for the mortgage desks.

and PRISM. If there is a material discrepancy at the desk level, he will go down to the account level and then to the position level to discover the cause of any discrepancy. If there are any material issues with either completeness or accuracy of the data in RIO, he will alert IT to re-run VaR for the mortgage desks.

Once Mr. Sun is comfortable with the position and interest rate sensitivity data input into RIO for the VaR calculations, he will start the process of compiling a set of RIO Summary VaR reports for each of the mortgage desks and for the Total Mortgage whitebook VaR. Once the summary reports are produced, he will begin the VaR explain process. The VaR explain process has two main objectives. First, the risk managers use this process to understand what is driving the desks' measured risk as stated in VaR. Within most of the securitization desks, the VaR is rather static, with the exception of large trades, and will grow or decline with the growth or decline in the underlying businesses. Secondly, the VaR explanation process should serve as a control function in validating the VaR output. If the VaR for a desk does not confirm what the risk manager believes to be the risk of the desk, it should be investigated. Differences could occur due to Trader vs. Model POP differences,<sup>11</sup> proxying issues, data issues, etc. If there are large changes in VaR, the risk manager will look at sensitivities and trades to explain the changes in VaR. If necessary, he will seek input from the risk manager primarily responsible for the particular desk in question. All risk managers will get these summary VaR reports with commentary and will review the desks that they cover. If there are no further issues, the reports are then distributed to the various mortgage desks and the Head of Mortgages in the afternoon on a T+1 day basis.

As discussed earlier, the desks that run the "Credit VaR approach" do not run overnight. The process to calculate VaR on these desks does not begin until the risk managers have uploaded the input files, which occurs in the morning T+1. As a consequence, the earlier versions of VaR on these desks may not include the most recent activity, and as such are not final. In order to provide timely information to the business area, the Mortgage Group typically sends out preliminary VaR summary reports in the afternoon T+1.<sup>12</sup> The final run of VaR occurs around 4:00 PM and, unless there is an issue, all the mortgage positions should be included in this final VaR run. While the VaR summary reports sent to the business area is an estimated number, particularly related to the desks using the Credit VaR methodology, the VaR in the final run of RIO should be complete.

If there is a material difference between the amounts on the VaR summary report sent to the business area and the final VaR amount per RIO, the risk managers will communicate this to the trader(s) and/or the Head of Mortgages. If there is an immaterial difference between the two reports, the risk managers will simply restate the prior day's number on the VaR Summary reports sent to the business area the next day. Finally, if the VaR is incorrect in the final run of RIO, then John will alert IT to restate VaR in RIO to make sure they have the correct VaR saved in the VaR time series.

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John is also responsible for producing the Trader vs. Model POP reports and therefore can see any large discrepancies when looking at VaR and flag these for the other risk managers.

<sup>11</sup> See discussion of "POP Policing" below for more details.

<sup>12</sup> The Head of the Mortgage Group (RMD) stated that the VaR Summary report that he receives and reviews is the final version. He receives this report in the early morning, T+2.

*Significant afternoon activities*

After the Mortgage Group risk managers have completed their typical morning duties, the afternoons are usually spent performing more in-depth analysis of positions or trades. This investigative-type work typically includes, among others, the following duties: (1) Price verification, (2) Aged inventory analysis, and (3) Pop policing.

*Price Verification:* Within the mortgage desks, RMD is responsible for all price verification duties. Mortgage Group risk managers spend a substantial portion of their time searching for mis-marked positions.<sup>13</sup> They perform both daily price verification duties which are more risk-based (i.e., to spot problems early on before they snow ball) as well as the formal month-end XPOS<sup>14</sup> process used to make sure positions marks are accurate for the closing of the books.

The amount and extent of the daily price verification duties will be determined based on what issues, if any, the risk managers uncover. If there are no particular issues of concern, the risk manager will typically perform the following tasks: (1) monitor the prices of new trades against marks on existing positions to see if there are any material discrepancies and (2) review exception reports which highlight trades that may be interesting from a price verification perspective.<sup>15</sup> If the risk manager has particular concerns, he or she may perform the formal XPOS process of price verifying a trader's positions against external sources, such as broker screens, on a daily basis. In addition, the risk manager can monitor the trader's offering sheets<sup>16</sup> to see if the price a trader is offering a position at is below their current mark.

The frequency and amount of external and internal information available to be used in the daily price verification process will vary based on the liquidity of the product being traded. Less liquid items, such as an ARM IO tranches, will not have external trade information available as often as an agency pass-through security. In the case of the IO tranche, which is highly sensitive to prepayment speeds, the risk manager will typically wait until new prepayments speeds come in to assess the accuracy of the trader's mark. In the interim, they will monitor reports that track the trader's mark changes by position. However, when an external trade occurs, the risk manager would then have information to either back up the traders mark or refute it.

The formal monthly XPOS process starts immediately after month-end and takes approximately three weeks for the risk managers to complete. Typically, this work will be done during the afternoon after the risk managers have completed their morning duties. This process is much more comprehensive than the daily price verification duties since this process is a major control function for closing the books and reporting accurate financial statements. In any case, this process is a large demand on the risk managers. However, as stated before, the risk managers believe that robust price verification is key to risk management and "is Job #1."

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<sup>13</sup> On average, risk managers within the Mortgage Group spend roughly one-fourth to one-third of their time on price verification duties.

<sup>14</sup> Please see *Price Verification* section of this report for more details of the monthly XPOS process.

<sup>15</sup> For example, one exception report shows the largest (absolute) % difference of trade price vs. mark.

<sup>16</sup> The risk managers have access to the traders Bloomberg offering sheets.

*Aged Inventory:* Another focus of this group is on Aged Inventory. The MBS desks, as discussed previously, contain the majority of the Firm's large securitization or conduit businesses, including ARMs, Non-Agency CMOs, and the Commercial Conduit businesses. BS' general business strategy for these desks is to earn a spread on the securitization of the underlying collateral. The often quoted line of "we are in the moving not storage business" goes to the heart of their strategy.

In addition to monitoring the usage of the various MV position limits within the mortgage businesses, the aged inventory analysis is one of the key tools in monitoring how well the business is adhering to senior management's strategy of "moving not storage." The risk managers prepare both actual and projected aged inventory reports at various aggregation levels both for internal use and for discussion with the business and senior management.<sup>17</sup> For example, the projected aged report gives the aged inventory for the past month, the current week, and the projection for the end of the current month as well as breaking out the aged inventory into various time buckets.

Aged inventory reports are useful in two respects. First, the reports can give the risk manager and management a general understanding of whether or not the growth or decrease in the total amount of aged inventory corresponds to the growth or decrease in the businesses overall. If there is a disconnect, that would be cause for investigation. In addition, risk managers and senior management are particularly concerned with increases in the aged inventory of positions which are highly sensitive to either credit (e.g., a non-rated tranche of a securitization) or interest rate (e.g., an IO tranche) risk factors. These aged inventory reports are granular enough to highlight these riskier exposures to both risk managers and management<sup>18</sup> and are very important in managing the risk for lower rated or highly prepayment sensitive tranches that may remain with BS for some time.

The risk managers also use these reports internally to focus their attention on particular positions to investigate further. Aged positions may indicate: (1) the lack of attention by traders on marketing the rather immaterial remains of a past securitization, (2) the trader holding on to position based on his belief that the market is not fully reflecting the value of the position, or (3) that the position is potentially mismarked, as a mismarked position will be difficult to sell at the current mark. The risk managers will need to determine why the positions remain on the books and if there are any related pricing issues. As stated in the Bear Stearns Risk Management Policies and Principles, "Risk managers should view aged positions as leading candidates for potential mismarks and give them extra scrutiny in their MTM verification work."

Typically, the risk managers will start a dialogue with the relevant traders regarding their aged inventory positions. RMD will then track trading activity against the anticipated exit strategy. If positions remain on the books for extended periods of time, the risk manager will check whether the trader is actively marketing the position (e.g., check offering sheets) and will perform additional price verification procedures to determine if the position is inaccurately marked. If warranted, the dialogue will be escalated within RMD and the business.

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<sup>17</sup> These reports are distributed separately and as part of the *Mortgage Department Weekly Report* that is distributed to the Head of Mortgages and senior management. Both the risk managers and the Head of the Business stated that they rely heavily on this report for moving product.

<sup>18</sup> During our review, OPSRA personnel reviewed with Mortgage Group risk managers the aged inventory reports for the residential sub-debt desk, which includes all security tranches rated below AAA from both ARM and Fixed rate Non-Agency collateral.



*POP Policing:* As discussed before, one of the key risk metrics used by the mortgage group is IR POPs (i.e., IR DV01/100). IR DV01 represents the sensitivity of a position's price to a 1 basis point parallel shift in interest rates. POP Policing refers to the Mortgage Group's unique task of assessing the reasonableness of the trader's marking of a position's interest rate sensitivity (i.e., Trader IR Pop).

Traders will publish their Trader POPs<sup>19</sup> in the front office system and these will flow into PRISM. These Trader POPs are then the basis for the traders hedging decisions and it is on these Trader POPs that the Firm sets limits to manage the amount of interest rate risk various desks, such as ARMs, can take on. While Trader POPs are used for both hedging purposes and used to measure interest rate sensitivities on which limits are set, the interest rate sensitivities that are used in calculating VaR and the various scenario analyses/stress tests for these mortgage products are based on the front-office PORC pricing model.

The main goal of "POP Policing" is to find out if a trader is mis-hedged and as a result could be putting the Firm at risk for a material loss. Ultimately, the risk managers will check prices, but hedging or closing out of a position at that point may be quite costly if the markets have moved. Additionally, this process can highlight the need for additional reserves or future mark adjustments; especially for less traded products where there is much more room for different opinions on price and sensitivities. Finally, this process might point out potential weaknesses in the VaR results for the interest rate sensitive mortgage desks (i.e., if the Trader POPs are materially different than the PORC POPs and the Trader POPs are eventually supported by external market prices).

To compare the two POPs, a risk manager in the Mortgage Group will compile daily the POPs Comparison Report, which provides a comparison of the Prism IR POPs,<sup>20</sup> Trader IR POPs, and Model-based POPs. The report provides these comparisons at the desk level, account level, as well as a comparison by position level for the greatest absolute differences between Trader and Model Net POPs. This report is compiled for every desk to facilitate "POP Policing." In addition, the risk manager may discover differences in Trader and Model POPs by reviewing the VaR for the desk.<sup>21</sup>

Generally speaking, the firm believes the interest rate sensitivities coming from the pricing models are largely accurate, especially for products where there is a large amount of historical data and prepayment activity is fairly well-understood (e.g., 30 yr fixed rate mortgages). For these products, while traders might tend to parameterize factors outside of the PORC model (e.g., short-term technical factors) in determining their view of a position's interest rate sensitivity, there should not be a large discrepancy between a Trader POP and the Model POP. If there is a material difference, Risk Managers (and the Head of Mortgages) will ask traders to explain the rationale for their

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<sup>19</sup> Trader POPs only refer to IR POPs. Traders do not mark Spread POPs. All Spread POPs are derived from the front-office PORC pricing model.

<sup>20</sup> The IR POPs in PRISM are the Trader approved POPs. The trader may use the POPs generated by the PORC Model or they may override the Model generated POP if they believe they have market information that suggests a different POP is warranted.

<sup>21</sup> The risk managers discussed a particular situation in which a pass-through trader took down a large trade in Agency securities to facilitate a customer request. The trader hedged the trade with Treasuries and some other Agency coupons. In PRISM, the Trader POPs were flat, however, the model POPs used in generating the VaR were short 2000 POPs. This created a spike in VaR, the risk managers immediately investigated and the position was flattened out in a few days based on management request.

POP. For the newer products, with relatively less historical data regarding the prepayment behavior of borrowers (e.g., Option-Arms), the sensitivity to interest rate moves is less well-understood and thus there is more uncertainty associated with the pricing models. In addition, the fact that the embedded options that exist within mortgage products are not always exercised economically, also results in some inaccuracy in the modeling of prepayment assumptions and may require a great deal of qualitative judgment. While the risk managers and the Head of Mortgages feel that the pricing models are fairly accurate for these products, there may not be enough conviction in the model's results to dispute a Trader's POP. This issue is particularly important when discussing the risk sensitivities of securities derived from these newer products which have highly concentrated sensitivities to prepayment risks, such as IO tranches. For these positions, an in-depth analysis of any material differences between the Trader and Model POP is a must. If the Trader POP is less conservative, but there is not much external evidence to contradict the Trader's POP, the risk manager may recommend an increase in reserve until more external data is available at which time an adjustment to the mark will occur if necessary.<sup>22</sup>

#### Production of Risk Reports and Analysis

The Mortgage Group produces, on a periodic basis, a variety of risk reports and analysis for traders, trading management, senior management, as well as for internal use within RMD. The following is a sample of the key reports and analysis provided by the Mortgage Group:<sup>23</sup>

##### Daily:

- (1). *Mortgage Desk Summary VaR Report* - includes weekly VaR, change, percentage of limit utilized, percentage of last period average, historical rank, as well as other risk metrics for every desk and MBS in total.
- (2). *Limit Report* - shows current limits (both max and operating limits<sup>24</sup>) as well as the percentage utilized and current exposures at each desk (and sub-desk level) where limits are tracked. The report also shows daily history of exposures for the past week and the low, high, and average exposures for the prior quarter and year. This is a separate report from the daily limit violation email distributed by the LMG.

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<sup>22</sup> During both our normal monthly risk meetings with BS and the CSE market risk fieldwork, we discussed this exact issue relative to a particular IO position based on SAMI (ARMS reset monthly based on spread to LIBOR) collateral. There was a large difference between the Trader and Model POP for this highly interest rate sensitive position, with the Model POP showing roughly \$20 million more in exposure. The risk managers continued to have discussions on the reasonableness of the Trader POP, but the product hadn't been traded in the past 3-4 months and they lacked enough conviction in the model to push for a write down at that time. Finally, an external trade on a similar position came in close to where the prepayment model had the position marked and the position was written down.

<sup>23</sup> See *Mortgage day-in-the-life Risk Monitoring* (OPSRA Supplemental Notes) for more details of reports produced by the Mortgage Group risk managers, including complete distribution lists.

<sup>24</sup> See *Limit Setting and Monitoring* section of the report for details on max and operating limits.

- (3) *POPs Comparison Report* - This report provides a comparison of the Prism IR Pops,<sup>25</sup> Trader IR Pops, and Model-based IR Pops. It provides these comparisons at the desk level and account level. In addition, it provides a comparison by position level for the greatest absolute differences between Trader and Model Net POPs. This report is compiled for every desk and is used by the risk managers in "Pop Policing."
- (4). *Daily Risk Highlights* - Similar to the risk highlights produced by other groups within RMD, the focus of this report is to provide a brief summary of items deemed to be of interest to senior management. This will typically include analysis/explanation of large P&L moves, as well as discussions of any large trades, market moves, limit breaches, etc.

Weekly:

- (1). *Non-Agency Residential and Other Structured Credit Report and the Commercial Report* - this report gives the current MVs for the various mortgage desks which have some sort of credit sensitivity to them.<sup>26</sup> For example, prime or near prime residential (e.g., Alt-A) non-agency ARM and fixed rate mortgage loans and securities, in addition to the subprime loans, are included in this report although credit spread is not a risk factor separately captured per se for these products in VaR. The positions in each desk are broken out by rating buckets and/or by other categories. The Commercial Report is broken out by CMBS Secondary, Agency Multifamily, and Commercial Conduit. As with the residential mortgage products, the current and historical levels of MV for the commercial products are given as well as the Max MV limits and current usage of the Max MV limits. The construction of this report was requested by Warren Spector as a way to see all the credit sensitive mortgage products on one report.
- (2). *Mortgage Department Weekly Report* - this is a comprehensive report including weekly highlights (trades of week, deals of the week, brief commentary on positions, aged inventory, P&L by desk, etc), aged inventory reports, limit reports,<sup>27</sup> current and historical position summaries for desks (and sub-categories within desks) including % of Operating and Max Limit usage, and daily analysis of mortgage department activity for each day during the past week. The senior risk managers of the Mortgage Group review this report with the Head of Mortgages during their Tuesday meeting. The Head of Mortgages also uses the report in his meetings with the Co-Heads of Fixed Income and for the weekly Risk Committee Meeting.

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<sup>25</sup> The IR POPs in PRISM are the Trader approved POPs. The trader may use the POPs generated by the PORC Model or they may override the Model generated POP if they believe they have market information that suggests a different POP is warranted.

<sup>26</sup> The report includes Non-Agency ARMs, Non-Agency fixed loans and CMOs (including AAA securities, A-Quality loans, Alt-A Quality loans, and Sub-prime loans), Residential Subs (all security tranches below AAA), EMC (securities, performing loans, and non performing loans), ABS/CDO, and Auto loans.

<sup>27</sup> The limit reports included in the weekly report are mostly MV limits. There are some IR POP limits included but VaR limits are not part of this package.

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- (3). *Aged inventory report*- This report is updated daily regarding trading activity, but is updated weekly with respect to marks and paydowns. The report gives the projected aged for the past month, the current week, and the end of the current month. It also breaks out the aged inventory (MV) in various time buckets (e.g., 90-149 days). Finally, this report breaks out the aged inventory at many different levels and includes analysis down to the CUSIP level. Both the risk managers and the Head of the Business stated that they rely heavily on this report for moving product.

In addition to the daily or weekly distribution of risk reports and analysis, risk managers within the Mortgage Group have constant contact with management. For example, senior risk managers within the Mortgage Group meet with the Head of Mortgages on a bi-weekly basis (every Tuesday and Thursday). During the Tuesday meeting, they will go over the Mortgage Department Weekly Package and will discuss position changes, aged inventory, and any other current issues or concerns. The main benefit to the risk managers is to have a constant forum to discuss issues with the Head of Mortgages. In addition, senior risk managers from the Mortgage Group meet weekly with the Co-Heads of Fixed Income. Again, this is a constant forum to provide analysis and raise issues to senior management's attention. Finally, once a week, risk managers from all the product-line groups within RMD meet with the Heads of businesses and other senior management at the Firm Risk Committee meeting.

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**Bear Stearns**  
**Consolidated Supervised Entity Credit Risk Review**

CONFIDENTIAL (October 27, 2005)

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SECURITIES AND EXCHANGE COMMISSION  
Division of Market Regulation  
Office of Prudential Supervision and Risk Analysis  
100 F Street NE  
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## Scope and Methodology of Review

Pursuant to Bear Stearn's (Bear) application to become a Consolidated Supervised Entity (CSE), staff of the Office of Prudential Supervision and Risk Analysis (OPSRA) reviewed the credit risk management function at Bear.<sup>1</sup> We interfaced primarily with the Global Credit Department (GCD), as our review focused on Bear's independent credit risk management function. However, we also had on-site discussions with business unit personnel, including the risk management groups established within the Global Clearing Services (GCS) Prime Brokerage and Corporate Lending businesses, the operational and legal department staff (e.g., the Derivatives Operations Group), and others.<sup>2</sup> The bulk of the field work and analysis was done during August and September of 2005.

The review consisted of on-site interactions with Bear staff and off-site review and analysis of reports, documents and presentations submitted pursuant to this review.<sup>3</sup> The on-site interactions generally focused on GCD's current and developing processes and infrastructure for credit risk management, the risk management of counterparties that are material or pose particular challenges (e.g., hedge funds), areas of material credit risk that are managed primarily by the business units (e.g., GCS Prime Brokerage), and risk metrics and modeling (e.g., Bear's simulation based Potential Exposure (PE) methodology). In total, we spent 11 days on-site meeting with Bear staff; during the intervening periods we analyzed the information and document requests received.

The goals of the review were several: (1) to assess, in general terms and by CSE standards, the adequacy of the credit risk management functions at Bear, including the modeling and assignment of key risk metrics, (2) to gain a firm understanding of the material credit risks at Bear and the firm's various credit risk management approaches and processes, and (3) to establish a supervisory framework by which to monitor and gauge credit risk management developments in the future.

Our review did not focus on operational control issues, such as credit risk data and data systems integrity, nor did we conduct any testing or validation of risk numbers or the firm's capital ratios. Rather, we directed our efforts to gain a meaningful understanding of Bear's credit risk management infrastructure, in order to enable us to effectively carry out prudential supervision on an ongoing basis.

Overall, we find that the credit risk management function at Bear is robust and that credit risk appears to be adequately measured, monitored and managed given the firm's current credit risk profile. The communication of the firm's risk appetite appears to be effectively conveyed to the business areas through the credit risk limits framework, as well as through the on-going dialogue between the respective credit risk officers and the business areas. Likewise, the measurement of credit risk exposures against these limits appears to be effectively reported back to senior management. Finally, the processes around upfront credit permissioning, as well as post-transaction monitoring of risks, appear to be robust and comprehensive.

## I. Credit Risk Profile

Bear is exposed to various credit risks through its many business activities. It is counterparty to a large volume of various types of financial transactions (e.g., OTC derivatives,

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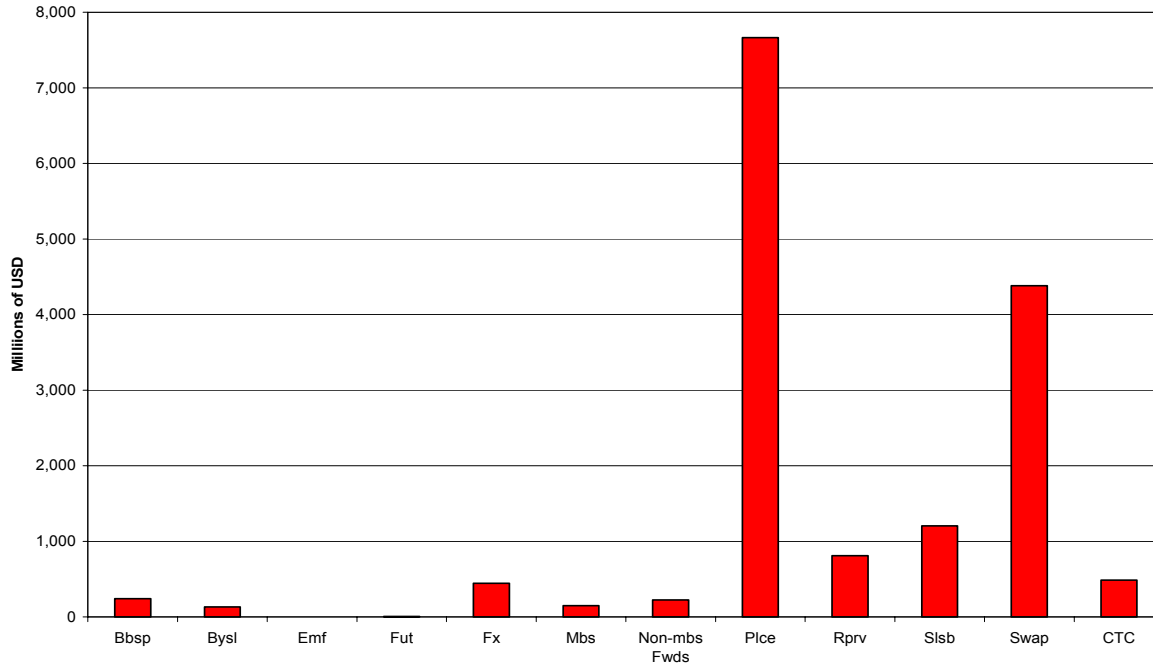
<sup>1</sup> The credit risk review team consisted of Steve Spurry, Mike Hsu, and Lori Bettinger.

<sup>2</sup> Our primary contact at Bear was Mike Alix, Head of the GCD. For a list of Bear staff contacted as part of this review process, see Appendix A.

<sup>3</sup> See Appendix B for a catalogue of the Bear documents relied upon for this review.

financing transactions, etc.) with an assortment of counterparty types, extends margin loans against marketable securities, and originates sizeable corporate loans. The functions responsible for identifying, assessing, measuring, monitoring, and reporting these various risks are housed in a number of departments. Primary responsibility lies within GCD, which manages counterparty credit risk and loans extended against restricted or illiquid securities. The following three charts reflect Bear's current net credit exposure across the activities monitored by GCD as of August 2005.

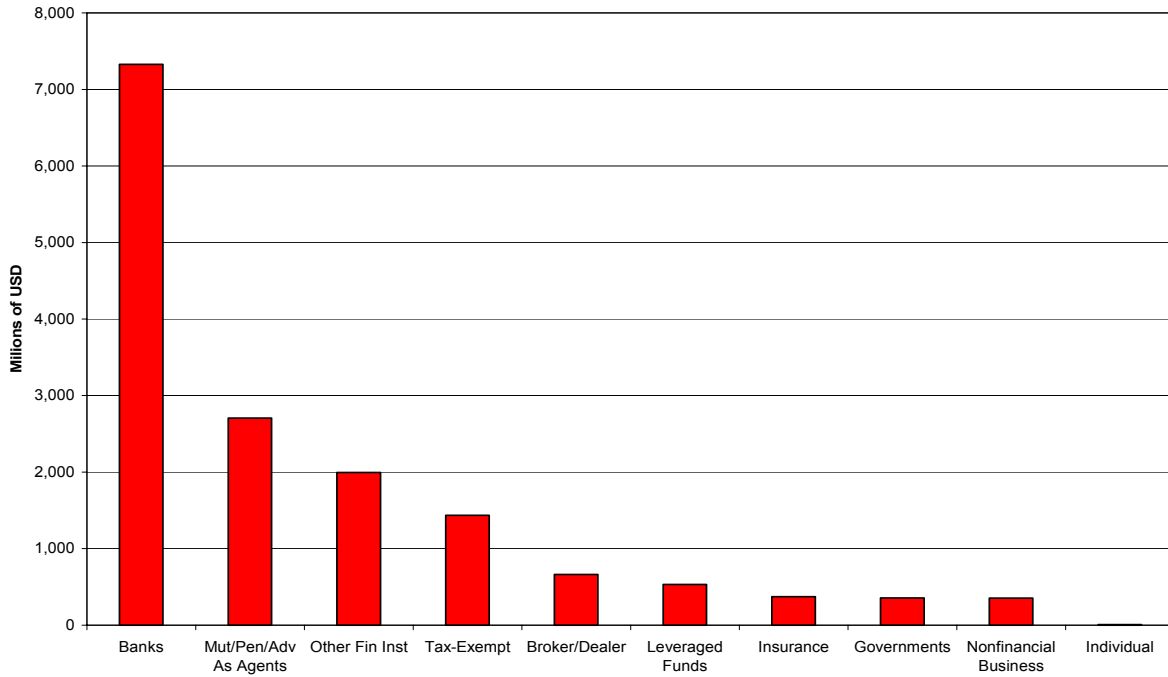
**Bear Stearns Net Exposure by Product as of 8/31/05**



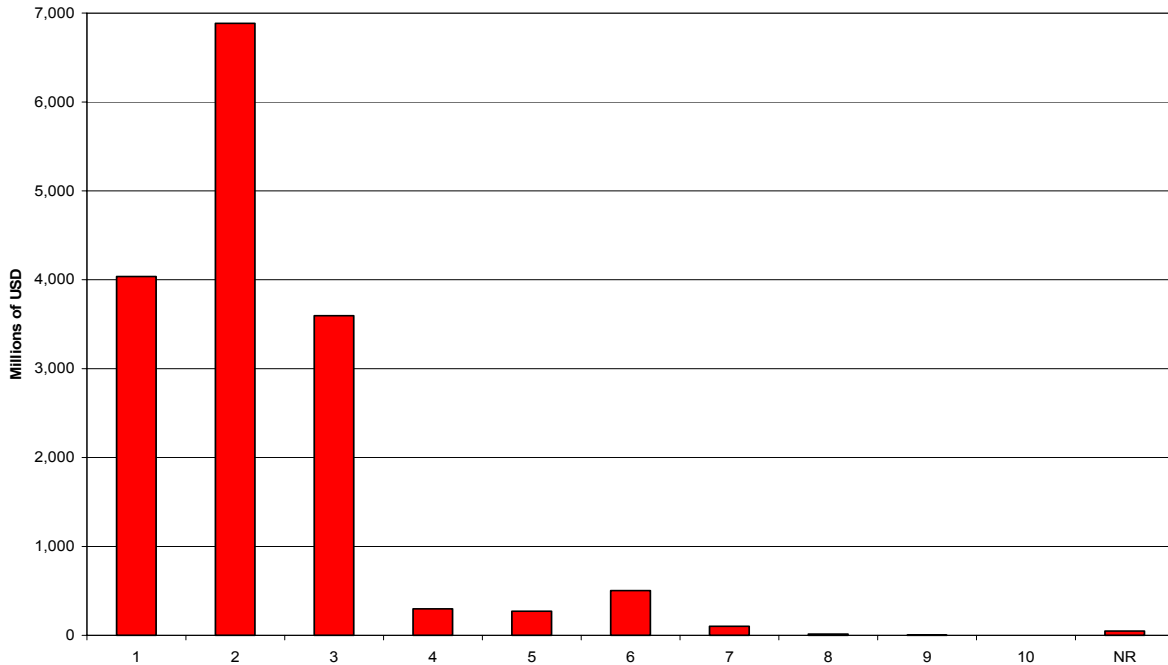
**Bbsp** = Bonds Borrow/Securities Pledge    **Bysl** = Buy/Sell    **EMF** = Emerging Markets Financing  
**Fut** = Futures    **Fx** = Foreign Exchange    **Mbs** = Mortgage Forwards    **Non-mbs Fwrds** = Non-mortgage forwards (e.g., Governments)    **Plce** = Placements, Cash Deposits, Money Market Funds    **Rprv** = Repo Resale  
**Slsb** = Stock Loan/Stock Borrow    **Swap** = OTC Derivatives    **CTC** = Loans Against Illiquid Securities



**Bear Stearns Net Exposure by Counterparty Industry as of 8/31/05**



**Bear Stearns Net Exposure By Counterparty Rating as of 8/31/05**



Note: 1 represents the highest credit quality/lowest probability of default. 4 and above correspond to agency investment grade ratings. For a mapping of Bear internal obligor ratings to Moody's and S&P ratings see page 58 of the *GCD Policies and Procedures Manual*.

In addition to current (net) exposure, Bear assumes potential credit exposure arising from possible future market movements. While Bear's individual counterparty product level PE estimates cannot be aggregated in a meaningful way, it should be noted that many counterparty activities are collateralized to a zero net exposure on a daily basis, and thus fall under the radar when tracking only net exposures over time. Definitions of net and potential exposure metrics are provided in Section II.C below.

Bear also extends leverage to hedge fund and other counterparties via margin lending through its GCS Prime Brokerage business. As of August 2005, the gross market value of prime brokerage counterparty positions was \$238 billion (\$162 billion long and \$76 billion short), and the total loan amount was \$50 billion. On a fully netted basis, Bear asserts the PE generated by the prime brokerage business is de minimis.<sup>4</sup>

Bear also extends somewhat large corporate loans, including non-investment grade event driven loans, albeit at lower volumes than many of its competitors. The size of these commitments sizes has in recent history ranged from less than \$2 million to nearly \$900 million in a few instances. As of May 2005, Bear's closed lending commitments totaled \$4.28 billion, of which \$1.1 billion was funded.<sup>5</sup> This total includes all finalized event driven (including bridge loans), relationship, and asset backed relationship loans, but not pending or likely future commitments. The total potential commitment including pending and likely commitments was approximately \$20 billion as of May.<sup>6</sup>

## **II. Credit Risk Management**

### **A. Credit Risk Infrastructure**

In this section we describe the structure of GCD and senior level governance (risk committees, etc.), as well as the overall infrastructure in place for communicating risk appetite and monitoring risk appetite usage. Credit exposures managed primarily outside of GCD are discussed in subsequent sections (III.A.i and IV) below.

#### **i. Risk Governance Structure and the Global Credit Department**

The formal credit risk decision-making body at Bear is the Credit Policy Committee (CPC). The CPC was established by the Executive Committee<sup>7</sup> and has final responsibility and authority for counterparty credit risk management. It establishes guidelines for the Global Credit Committee (GCC) and GCD. CPC is comprised of senior officers of GCD as well as senior members of market risk, legal, and businesses, and is chaired by the Head of GCD. The CPC meets regularly (usually weekly). It approves exposure measurement standards, reviews credit risk concentrations, sets documentation policies, and considers any other issues referred to it.

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<sup>4</sup> In instances where loans and securities are booked in different Bear entities, Bear does not award cross-entity netting for capital purposes, and thus some PE is generated by this activity. However, from a risk management perspective Bear has confidence in its legal rights.

<sup>5</sup> By way of comparison, the total closed committed amounts at several peer CSE firms have exceeded \$30 billion.

<sup>6</sup> As of August, the total closed commitment excluding asset backed loans was \$4.36 billion, thus activity in this space has not changed materially since our May meeting. Asset backed loans are fully collateralized and represent a de minimis portion of funded commitments (\$29.3 million as of May), and thus are not a focus of this review.

<sup>7</sup> The Executive Committee and the Management and Compensation Committee are the two key senior management committees at Bear. For a full description of Bear's corporate governance structure above the level of the CPC, see the Bear, Stearns & Co. CSE Application.

CPC decisions may be made in-between meetings by at least three members, one of whom must be the Head of GCD or a senior GCD risk officer.

The GCC is responsible for implementing policies established by the CPC at the individual counterparty level. It reviews and approves counterparty limits and collateral requirements. GCC membership comprises credit risk officers appointed by the Head of GCD. It meets several times a week to discuss specific requests of credit approvals or renewals.

The responsibilities of assessing counterparty credit worthiness, including due diligence and the assignment of counterparty credit ratings, establishing credit lines and approving certain transactions (under delegated authority, discussed in the next section), determining/approving credit and collateral terms, measuring counterparty credit risk exposures, and the day-to-day monitoring and reporting of exposures (against limits) are delegated to GCD. In short, GCD's mandate is to ensure that counterparty credit risks are understood and appropriately managed, and that the firm's credit risk profile is consistent with the firm's appetite.

GCD has approximately 80 employees, located in New York, San Francisco, London, Dublin, Hong Kong, and Tokyo. GCD is an independent function; the Head of GCD reports to a senior member of the Management and Compensation Committee. Responsibilities are divided among the offices according to counterparty location. Within the US, coverage is subdivided by counterparty industry. GCD also has a quantitative group, which is responsible for credit risk methodologies. Underneath the Head of GCD, the group is broken up into seven departments, with a senior managing director or managing director heading each one. They include Hedge Funds/International, Mortgage Finance and Financial Institutions, Tax Exempts and Corporates, Special Credit Services<sup>8</sup>, Credit Risk Measurement, Policy and Administration, and Credit Risk Europe and Asia. For the purpose of this review, OPSRA spent the majority of its time meeting with the staff in the following areas: Hedge Funds, Mortgage Finance, Tax Exempt counterparties, and the measurement of potential credit exposures.

## **ii. Limits and Permissioning**

The ability to set limits and approve transactions is delegated by CPC to GCD. GCD is, however, bound by a sliding scale that expresses the maximum limit permitted for a given obligor credit rating and a given level of delegated credit authority (discussed below). In practice, credit officers often establish limits well beneath their approved maximums, based on their expert judgment and the actual needs of the businesses. Especially large, unusual or sensitive transactions/requests are referred to the Executive Committee at CPC's discretion.

Limits are set at three levels: family, client, and product/facility. Client limits apply to individual counterparties and family limits apply to all entities within a related group of counterparties. In other words, a family limit applies to all sub-counterparties or clients that ultimately consolidate to a single organization. Both family and client limits are referred to at Bear as global limits. The sum of client limits is bound by the family limit. In addition, GCD takes responsibility for allocating limits to the product/facility level. Unlike with global limits, this does not require delegated authority or committee approval for authorization. An analyst can allocate this as long as the sum of the facility limits fits within the approved client limit. The primary metric used for expressing limits is PE.<sup>9</sup> There are also separate sub-limits for tenors

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<sup>8</sup> Special Credit Services controls margin loans extended against illiquid, concentrated or restricted securities. For example, the financing of equity shares by a director of the underlying company, which are subject to selling restrictions, may require special consideration. The group evaluates regulations and the fundamental credit and assesses the risk and liquidity of the underlying collateral. Clients include brokers for whom Bear clears, Private Client Service clients, and clients referred through investment banking relationships.

<sup>9</sup> The repo business currently uses notional limits that are converted to PE equivalents, using a back of the envelope calculation, for purposes of aggregating PEs to the Client level. An effort is underway to convert repos to PE limits,

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greater than 1 year, called potential exposure long term (PELT) limits. PELT limits tend to be significantly smaller – often only 1/5 of the overall PE limit. In addition, there are daily settlement limits (DSL), expressed in dollar amounts. The maximum DSL that can be approved by the head of GCD is \$1 billion, in the case of a AAA counterparty. Finally, term limits, which refer to the longest maturity transaction permitted for a facility, are also used.

Within GCD, credit officers are granted delegated authority based on their level of expertise, and each officer is provided with a memo outlining the specifics of their approval authority. If a proposed limit exceeds an officer’s authority, he or she can consult with their team leader or regional manager. Limit requests will be approved or passed to a more senior officer as necessary. The following table is an abbreviated version of the GCD limit approval authorities.<sup>10</sup> PE is expressed in millions of USD. Term is expressed in number of months. A dash indicates that there is no delegated credit authority and transactions must be approved directly by GCC or the CPC.

Rating	Global Head		SMD		Regional Manager		Team Leader		Officer		
	Bear	S&P	PE	Term	PE	Term	PE	Term	PE	Term	
1	AAA	500	180	300	126	200	126	150	126	50	126
2	AA	400	180	210	126	140	126	105	126	35	96
3	A	200	126	120	126	80	84	60	84	20	66
4	BBB	75	126	45	72	30	48	22.5	48	7.5	24
5	BB	42.5	48	25.5	42	17	13	13.1	13	4.5	13
6	B	25	18	15	18	10	13	7.5	13	-	-
7	CCC	8	13	6	13	4	13	2.1	13	-	-
8	CC	-	-	-	-	-	-	-	-	-	-

In addition to GCD credit officers, sales and trading managers may have delegated credit authority. Certain transactions conforming in terms of size, term, and collateral do not require specific approval from GCD.

Currently, GCD does not use country-specific limits. GCD does have a sovereign rating process for assessing countries using economic and political analysis. GCD expresses a view of exposure to a given country in the credit risk management system, and may set limits that reflect this view through the actual counterparty limit. In reality, the majority of Bear’s business is in US and Europe, and to a lesser extent Asia, Japan, and Australia. Therefore, there is minimal exposure to emerging market counterparties.

GCD has a surveillance process intended to capture trades without limits or trades in excess of limits. Frequently, when limits are exceeded, it is an allocation issue or a misunderstanding, rather than an intentional breach. The process is also intended to catch stale prices and large daily changes. Passive violations of a limit, resulting from large market movements, are generally dealt with by adjusting the limit upward but imposing a “line full” indicator. For such full lines, no new trades may be put on, even if market conditions subside and PE begins to fall. In other words, since this type of limit adjustment does not reflect a change in risk appetite, GCD avoids creating excess capacity for unwanted trades in the future.

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which should be accomplished in the upcoming months. There has been some resistance from the sales force, who “owns” the limits as far as the traders are concerned. As the business is conducted almost entirely on notional terms, GCD and sales must be able to make a PE limit tangible for a trader.

<sup>10</sup> This ratings based authority grid is coded into the credit risk management system. Limits can only be entered by someone with the appropriate level of authority.

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In addition to establishing these limits, when collateral support or “mark-to-market” agreements are negotiated, GCD must decide the acceptable threshold amounts. The threshold amount represents the size that a counterparty exposure must reach before additional collateral is called. Typically, thresholds are established as a function of public credit ratings, i.e., if a counterparty is downgraded its threshold will be lowered. Bear has established a standard ratings ladder, which serves as a guideline or starting point for negotiation with counterparties. The standard ladder is:

AAA/Aaa	\$25 million
AA /Aa	\$15 million
A/A	\$5 million
BBB/Baa	\$1 million
Below BBB/Baa	\$0

In addition, hedge funds, which are usually not rated, typically receive \$0 thresholds.

**iii. Credit Systems**

GCD staff uses a credit risk management system dubbed the Global Risk Management System (“GRMS”) for storing, viewing, and analyzing credit related data. GRMS stores and displays various counterparty information, such as family information, financials, external and internal ratings and associated rationales, current and historical position and exposure data as well as transaction details, credit limit information, the status of the documentation for a particular transaction or facility, and so on. GRMS is a global on-line interface, so that all users view the same data, which is stored in the central GRMS database or accessed from external systems. Credit personnel use GRMS to monitor exposure levels (relative to current limits), create new credit lines, approve trades and modify existing credit lines, and update counterparty information. GRMS is linked with other systems to both obtain and provide information. For instance, Operations groups calculate daily net exposures for each counterparty netting group and pass those results on to GRMS daily. Similarly, certain information is shared between GRMS and RACS, the GCS Prime Brokerage risk system.

Many of the reports and screen shots used in monitoring and managing credit exposures throughout the firm are created in GRMS and viewable on-line. GRMS provides access to standardized views and reports, but also provides flexibility for sorting, filtering, and ad hoc querying.<sup>11</sup> Also, GRMS is used by credit risk managers to examine counterparty level information as well as cross-counterparty data. One can view position and exposure information for a particular counterparty (contract notional amounts, mark-to-market values, net exposures, and potential exposures), as well as certain aggregate information across product or counterparty types. Having viewed a higher level report, such as a “Product Summary” exposure report, which reflects limits, positions, and net exposures for a particular product, one can efficiently drill down into specific trade details or perform filters. For instance, only those clients with limit violations in a particular product area can quickly be isolated. In addition, virtually all of the information stored in GRMS can be viewed historically.

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<sup>11</sup> OPSRA staff received several demonstrations of GRMS’s capabilities throughout the CSE review. In addition to spending an afternoon reviewing GRMS with GCD IT and other personnel, we had “day in the life of” a credit analyst presentations/discussions, during which we walked through the functionality and reports used most frequently by the individuals responsible for covering mortgage banks/REITS and hedge funds.

The total quantity of information reported and available through GRMS is vast.<sup>12</sup> For example, a “Clients to be Reviewed” report is automatically created. This report identifies counterparties needing current attention, for instance if a limit has been violated, a limit request has been submitted, or a periodic credit review is due. In addition, a “Surveillance Summary” report captures all potential limit violations in one place and allows an analyst to categorize violations and add their comments regarding the circumstance of the violation. Similarly, trades requiring attention are flagged. For instance, if a trade requires approval or a PE calculation failed, these transactions automatically appear on a screen for analyst review.

Certain core risk information used by GCD is calculated in external systems and transmitted to GRMS. Namely, PE calculations are performed in CreditLab.<sup>13</sup> This ancillary GCD platform takes various inputs from the front office quant group (FAST) and performs Monte Carlo simulations to estimate PE distributions (the details of the PE modeling are discussed in Section II.C below). Certain PE results are then fed into and used by GRMS. In terms of analyzing the PEs of potential new trades on a standalone basis as well as in terms of the impact to an existing portfolio, such calculations are performed directly in CreditLab. Since CreditLab is maintained and operated by the Credit Risk Measurement group, PE calculations (what-if analyses) are generally not performed by credit analysts or sales staff. In addition to PE risk metrics, GCD staff has access to the results of a standard set of stress tests for certain fixed income portfolios. These stress tests, which are produced by FAST, quantify the valuation impacts (to instruments and portfolios) of a series of predetermined shocks to certain risk factors. For instance, shocks are applied to the level and shape of the yield curve, credit spread levels, and implied volatility levels. While these stresses are currently used primarily in monitoring the hedge fund counterparties of the Fixed Income Customer Clearing business (discussed further in Section III.A.ii below), GCD and FAST are working to expand coverage to all fixed income portfolios. This additional risk information will be particularly useful for the monitoring of other (non-clearing) hedge fund counterparties.

The large number of counterparties at Bear and the number of internal groups involved with the oversight and management of collateral terms and other credit mitigants presents challenges. GCD is responsible for making decisions regarding credit and collateral terms with counterparties, while Legal actually negotiates documentation with counterparties and Operations oversees compliance with collateral support annexes and computes margin requirements. GCD is in the process of implementing a Credit Terms Database, which will capture all credit terms contained within master agreements and automatically transmit credit term information to the other functions throughout the firm. In addition to improving coordination between GCD and other groups, GCD feels this database will be a powerful credit risk management tool. GCD personnel will be able to query this database and observe trends over time. For instance, one could examine patterns in the NAV termination trigger provisions established for hedge funds of a certain rating over time. Similarly, the Credit Terms database will assist in the completion of Portfolio Reviews, an important credit risk review process discussed in Section II.D below.

## **B. Internal Credit Ratings**

Similar to peer firms, internal credit ratings at Bear play an important role in communicating credit risk appetite down from senior management and in reporting credit risk

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<sup>12</sup> A more thorough discussion of information available through GRMS and its querying capabilities is discussed in the “GRMS User Guide”.

<sup>13</sup> In addition to GRMS, OPSRA staff also received a demonstration of CreditLab’s capabilities.

exposure up from the business units. Bear utilizes two types of credit ratings: obligor ratings and facility ratings.

Obligor ratings reflect the firm's estimation of a counterparty's probability of default (PD). Credit analysts assign a number for each counterparty ranging from 1 to 10, relying on criteria similar to those used by external ratings agencies such as S&P and Moody's. The numerical assignments correspond roughly to external ratings – e.g., 1 = AAA/Aaa, 2 = AA/Aa2, etc. In the last year, Bear has adopted the use of scorecards to assist in the assignment of these obligor ratings, as described in detail below.

Facility ratings reflect the firm's estimation of credit risk, taking into account factors which affect the loss given default (LGD). In contrast to obligor ratings, which assume a fixed recovery rate reflecting the risk of a senior unsecured creditor, facility ratings deviate from obligor ratings depending on Bear's position in the capital structure and/or whether credit risk mitigants are in place.<sup>14</sup> Obligor ratings are used as a starting point and "notched" to take into account the LGD profile of a given facility. Thus, the resulting rating reflects both the PD and the LGD to which Bear has exposure. At an aggregate portfolio level, exposures by both obligor and facility rating can be monitored, however, as of now there are few facility ratings in place.

Approximately six months ago, Bear formally adopted a scorecard methodology to assist in the assignment of obligor ratings. The purpose of the scorecard is to ensure that Bear's internal ratings are consistent with external ratings, so that the default probability statistics compiled by the external ratings agencies can be used by Bear for internal credit risk management and capital calculation purposes. Unlike large commercial banks but similar to peer CSE firms, Bear cannot generate statistically significant default probabilities internally due to the paucity of first-hand default experience, hence the reliance upon external statistics. The scorecard methodology also provides greater consistency of analysis by credit analysts, and better documented rationales for ratings decisions.

Currently, Bear utilizes fifteen different scorecards, each corresponding to a different type of counterparty, e.g., industrials,<sup>15</sup> life insurance, specialty finance (e.g., REITS/mortgage banks), municipal general obligation, not-for-profit healthcare, hedge funds, etc. Within each scorecard, final obligor ratings are arrived at through a bottoms-up approach, where analysts assign category ratings according to a set of factors, and those category ratings are aggregated into a composite obligor rating, taking the weighted average of the category ratings. The schematic below illustrates the relationship between the categories, weights and factors that make up a scorecard.

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<sup>14</sup> Note, for tax-exempt entities, such as municipalities, industry practice has been to rate obligor risk from the perspective of secured creditors. Bear's facility ratings in these cases are calibrated accordingly.

<sup>15</sup> Unlike its peers, Bear does not have sector groupings for corporate/industrial clients. This reflects the fact that Bear's customers are primarily financial institutions (including hedge funds and insurance companies), mortgage-related firms, and municipalities.

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Schematic of sample scorecards, categories, weights and factors

<b>Industrials</b>	<b>Muni (gen.oblg)</b>	<b>Insurance</b>	<b>Hedge funds</b>
<b>10</b> Size	<b>10</b> Size	<b>10</b> Size	<b>2</b> Size
Sales Total Assets Stockholders equity	Tax revenue Total revenue Revenue diversity	Total revenue Adjusted capital & surplus Total general account assets	Assets at mgmt co. NAV of fund
<b>20</b> Profitability	<b>10</b> Performance	<b>10</b> Profitability	<b>10</b> Profitability
Operating margin Net margin Return on equity	Unreserved fund balance/exp. Reliance on one-time measures Stability of expenditures	ROC Expense ratio Return on assets Pretax operating margin	Rate of return Volatility of performance
<b>15</b> Leverage	<b>20</b> Leverage	<b>20</b> Capitalization	<b>15</b> Leverage
Debt/EBITDA Debt/Capital	Debt/property MV Debt/capita Debt service/(oper.+debt fund exp)	NAIC RBC ratio S&P capital adequacy ratio Moody's risk adj/ cap ratio AM Best BCAR ratio	Leverage
<b>15</b> Liquidity		<b>20</b> Liquidity	<b>15</b> Liquidity
Working capital Cash & cash equivalents		Moody's liquidity ratio S&P liquidity ratio Quick liquidity ratio Current liquidity	Liquidity of assets Redemption period Diversity of investors
<b>20</b> Cash flow			
FOCF/debt EBITDA/interest			
		<b>20</b> Asset quality	<b>18</b> Asset quality
		Bond as % of invested assets Inv. Grade bond/total bonds Mtgs & R/E to capital NIG bonds to capital Total NPA to capital	Hedging Concentration
<b>10</b> Industry		<b>10</b> Industry	
Tier position Industry risk		Distribution Competitive position Product diversification Geographic diversification	
<b>10</b> Management	<b>5</b> Management	<b>10</b> Management	<b>10</b> Management
Management reputation Management strategy Financial reporting	Management team Financial reporting Property tax collection (%) Funded ratio - pub emp pension Risk/Liquidity of ind. Portfolio	Management team Financial reporting	Reputation Financial reporting Strategy
	<b>8</b> Demographics		<b>12</b> Op risk
	Local household median income Household income vs. nat. avg. [etc.]		Back office Systems Administrator Pricing/valuation
	<b>45</b> Tax base		<b>18</b> Risk Mgmt.
	Size (MV of property in 500s) Size (MV of property/population) Concentration Structure of tax base		Measurement Controls/compliance Independence

Scorecard types by column. Categories in orange; weights in boxes. Factors in grey denote "financial risks"; factors in white denote "business risks".

Each column corresponds to a scorecard type. The bold headings denote categories relevant to the final obligor rating. Each category has a corresponding percent weight next to it. Underneath each category is a list of factors which credit analysts take into account in assigning the category ratings. Financial risks are shaded in grey; business risks in white.<sup>16</sup>

Overall, the scorecard methodology appears to err on the side of consistency over discretion. Though credit analysts have flexibility at several points in the analysis to apply their expert judgment, this framework imposes relatively strict objective criteria in the assignment of ratings. This gain in consistency comes at a cost, however. Some flexibility is lost in being able to adapt to changing industry and market conditions. More importantly, perhaps, is the challenge of calibrating the category weights. The category weights effectively restrict analyst

<sup>16</sup> For a description of how the scorecards are completed, see OPSRA fieldwork notes.



judgment. Given that the final analyst ratings are guided by the scorecard ratings, proper calibration of the weights is important.

During the scorecard development process, GCD sought to calibrate the category weights to achieve a best fit with external ratings. GCD first conducted credit analyses using the categories and factors. The category weights were then adjusted to make a best fit between the scorecard ratings and external ratings, once certain niche factors were taken into account. This process was not conducted on a comprehensive basis. Rather, select counterparties and scorecards were tested as indicative samples. Currently, there is no envisioned process for updating the scorecards on a periodic basis – i.e., re-calibrating the category weights and reassessing the factors in a systematic way. The main priority appears to be to roll out additional, more granular scorecards, e.g., by corporate sector, and/or to develop “dynamic scorecards” for different hedge fund strategies. We will follow developments in this ratings area going forward.

### **C. Potential Exposure Modeling and Aggregation**

#### Net and Potential Exposure Overview

As a result of its derivatives trading, financing transactions (repos), securities lending and borrowing, and margin lending activities, Bear assumes credit risk arising from the possibility that a counterparty will default at a time when the termination value of outstanding trades is in Bear’s favor, or when the collateral held by Bear is worth less than the amount lent against that collateral. Net Exposure (NE) represents Bear’s loss were such a counterparty to default today, assuming zero recovery of unsecured exposure.<sup>17</sup> NEs may change substantially over time, not only from new transactions, but purely as a function of movements in markets. Thus in managing counterparty credit risk, securities firms must concern themselves not only with NE, but with future potential NE as well. PE models provide probabilistic estimates of how NE may evolve over time as a function of market movements. At Bear PE is a primary tool by which counterparty credit risk is managed.

Assuming a particular counterparty has only one portfolio or product “facility” with Bear, the NE with respect to that counterparty is simply the mark-to-market (MTM) value of the portfolio, or portfolio replacement cost, taking into account netting and collateral. If netting is allowed, positive and negative transaction level MTM values can simply be added to calculate counterparty level NE. In the absence of netting, the NE comprises the sum of only positive marks. Thus without netting the fear is that, in the event of default, Bear might have to make the defaulting counterparty whole for its positively valued trades while separately seeking compensation for the trades that have positive value from Bear’s perspective.<sup>18</sup> In addition, if collateral has been posted to Bear against a particular trade or portfolio of trades, the value of that collateral is subtracted from the replacement cost (at the appropriate level of aggregation) to derive the ultimate NE.

To model a portfolio’s PE is to model the forecast distributions of its NE. For internal risk management purposes, Bear uses the 97.7<sup>th</sup> percentile (corresponding to a two standard

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<sup>17</sup> Note that often market participants use the term Current Exposure (CE) in reference to what Bear dubs Net Exposure.

<sup>18</sup> Assuming no collateral, with netting:  $NE = \max(V_1 + V_2 + \dots + V_n, 0)$   
Without netting:  $NE = \max(V_1, 0) + \max(V_2, 0) + \dots + \max(V_n, 0)$

deviation move for a normal distribution) of the NE forecast distribution as its PE statistic. PE is a curve over time – i.e., there is a two week PE, a three month PE, and so on.<sup>19</sup>

Very broadly, designing a PE framework involves four central steps. First a process is needed for mapping counterparty positions to risk factors. Examples of risk factors include equity prices, interest rates, and corporate credit spreads. The mapping relates changes in instrument and portfolio values to movements in these factors and must be sufficiently granular to capture material risks. The second step is to design a statistical approach for modeling/generating the distributions of future risk factor movements. This process must generate simultaneous movements in multiple risk factors so as to preserve the correlation structure across factors – i.e., joint risk factor distributions must be modeled. Often, large banks and securities firms, including Bear, accomplish this statistical modeling through the use of Monte Carlo simulation.<sup>20</sup> The third step in the PE modeling process involves taking the risk factor distributions generated and applying a revaluation technique to quantify the price impacts from each joint risk factor realization. Finally, these forecasted instrument level values must be aggregated applying the appropriate netting logic discussed above.

While the above processes are relatively straightforward conceptually, the implementation can be quite complicated. First, PEs often must be modeled over relatively long time horizons, measuring risk at various points along the way. Consequently, PE models must somehow capture the aging of portfolios. For instance, positions may expire or be exercised and relationships between instrument values and risk factor movements may change over time as risk factors move and positions come closer to maturity. In addition, if a mark-to-market agreement is in place collateral flows must be taken into account. Finally, PEs must be aggregated across various legal entities and netting agreements, as well as across different product types.

In the remainder of this section we describe and assess Bear's approach to PE modeling. Given that the methodology is broadly consistent across most of the product areas, we first provide a general description, including a discussion of the treatment for trades that are not explicitly simulated. We then briefly discuss some specific product areas due to notable differences in the modeling approaches taken.

### Pricing Grids

The PE framework is built around pricing grids (and lattices) generated by the front office quantitative research group, FAST. Thus before discussing the GCD PE simulation (performed in CreditLab) and risk factor mapping, a description of these grids, which are the primary input into the simulation, may be helpful. The grids represent series of market scenarios, reporting the transactions values that would result from various standard deviation shocks in the underlying risk factors. For these discrete shocks, full revaluations of the instruments considered are performed. To illustrate, consider an equity put option on stock XYZ currently valued at \$4.00. The following grid, constructed using hypothetical numbers, illustrates the approach over a time period of two weeks. Since PE models require exposures to be modeled over relatively long time horizons, the actual grids must cover a longer range of dates than the illustrative example below. The granularity in the pricing grid time spacing (i.e., one grid every day, week, month, etc.) varies by product and transaction.

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<sup>19</sup> Note for each point in time - e.g., two weeks or three months from today - there is an entire distribution of possible NE outcomes. For instance, there is a three month expected/mean outcome, a 5<sup>th</sup> percentile outcome, a 95<sup>th</sup> percentile outcome, and so on.

<sup>20</sup> This type of framework involves the modeler using market price and/or historical risk factor data, along with certain statistical assumption, to specify the stochastic processes that describe the evolution of risk factor movements over time and then using random number generation technology to generate hypothetical future states of the world.

XYZ Perturbation - # of Standard Deviations	Confidence Level	Put Value		
		1-Day	1-Week	2-Week
-3	99.87%	\$25.00	\$62.50	\$156.25
-2	97.72%	\$19.25	\$42.35	\$93.17
-1.67	95.25%	\$15.50	\$27.90	\$50.22
-1.33	90.82%	\$12.25	\$18.38	\$27.56
-1	84.13%	\$9.50	\$11.40	\$13.68
-0.67	74.86%	\$7.25	\$7.50	\$7.25
-0.33	62.93%	\$5.25	\$5.25	\$5.00
0	50.00%	\$3.75	\$2.75	\$1.00
0.33	62.93%	\$2.50	\$2.38	\$2.26
0.67	74.86%	\$1.50	\$1.35	\$1.22
1	84.13%	\$0.75	\$0.60	\$0.48
1.33	90.82%	\$0.25	\$0.16	\$0.11
1.67	95.25%	\$0.10	\$0.05	\$0.03
2	97.72%	\$0.03	\$0.01	\$0.01
3	99.87%	\$0.01	\$0.01	\$0.01

This grid reflects that if stock XYZ were to exhibit a negative 0.33 standard deviation return tomorrow, the position’s new value would be \$5.25 tomorrow. Note, the table not only quantifies the impact of discrete market/risk factor moves, but also reflects an associated probability, assuming a particular stochastic process derived from a series of normal random variables. This process is simulated using the CreditLab tool discussed below to create a large number of possible value paths over time.

The pricing grids that are at the heart of the PE estimation process are generated using the same pricing models that are used to value the firms’ positions and compute daily P/L. While credit risk management groups at some firms develop their own re-pricing calculators for PE purposes (or use some combination of front office models and their own models), Credit Risk Measurement has decided to only use front office pricing models. The benefits to such an approach are clear. In instances where there is discussion between a business unit and GCD regarding the reasonableness of the PE a particular transaction is generating, it is helpful for the two sides to be starting with the same mark. In addition, front office pricing models are scrutinized by multiple sets of eyes. Such models are vetted by the Risk Management Department as part of the Model Review effort, and the marks produced by those models are reviewed regularly by the Risk Management Department as well as the product controllers. Also, due to the computational demands of PE modeling, independent risk control groups are often forced to utilize various approximations/short cuts in developing their own calculators, resulting in approximation error and possibly capturing fewer non-linear risks.

There are clearly some drawbacks to this approach as well. For instance, the approach is not appropriate for path dependent instruments, like barrier options, where the current change in value of an instrument given a movement of an underlying risk factor depends on the history of past movements.<sup>21</sup> The grids are also all one dimensional in terms of risk factors. For instance, a put option’s value will be determined not only as a function of the value of the

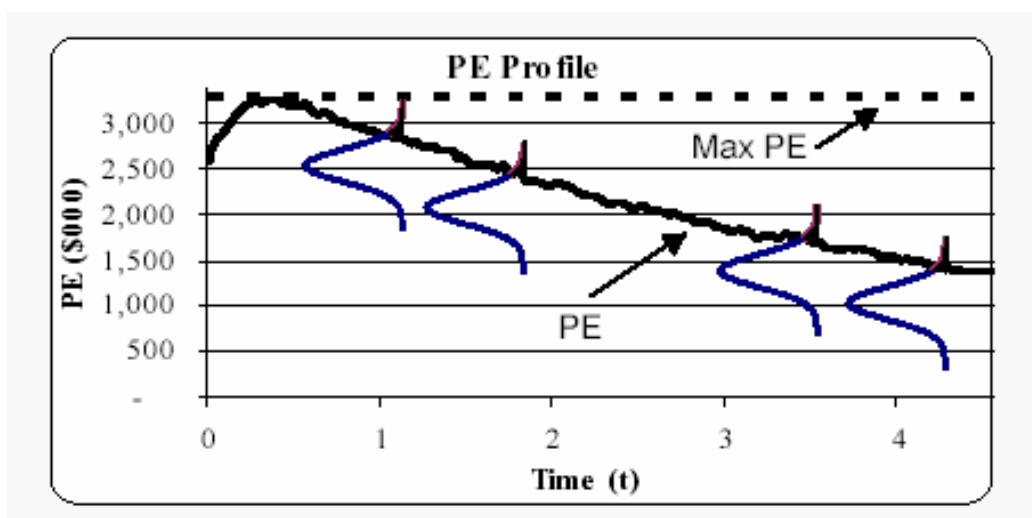
<sup>21</sup> Consequently, the majority of path dependent instruments receive “Fallback Calculation” treatment, discussed in more detail below.

underlying equity price, but also by that equity's volatility level. Currently, implied volatilities are not modeled as a risk factor for any option contracts for PE purposes. The head of the Credit Risk Measurement group asserted that these omitted factors tend to be second order risk in counterparty portfolios.<sup>22</sup> For instance, in performing some ad-hoc analyses, he found that including volatility as a risk factor for the equity derivatives counterparties increased their aggregate one-day measured exposure by around 8%. These drawbacks highlight the need for validating the robustness of the PE models in predicting material risks.

### CreditLab Simulation

The Credit Risk Measurement group does not directly forecast hypothetical future states of the world in terms of risk factors. Rather, the simulation is a fairly simple summing of draws from a random standard normal distribution, with each draw representing a movement between time periods and the sum of these draws representing the entire history. The heavy lifting, here the specification of the stochastic process that drives the valuation of a particular instrument, is done in the pricing grid. In the equity example above, a standard Geometric Brownian Motion model for the behavior of equity prices is assumed. For each series of draws, a path can be traced across the pricing grid generated by FAST. Intuitively, the Bear modelers describe this process as "simulating paths through time against pricing grids".

At any point along each risk factor path, an instrument's value can be determined via an interpolation on the pricing grids. This interpolation occurs between risk factor perturbation points (the predefined standard deviation shock in the underlying risk factors discussed for the table above) as well as between points in time, given the pricing grids are not produced in one week time intervals. Repeatedly creating new risk factor paths and looking up instrument values at various points along those paths, the entire forecast NE distribution and a potential exposure profile over time is obtained. For instance, a trade might yield the following PE profile:



Note: Graph provided by Bear. Max PE is simply the largest PE over the modeled time horizon.

<sup>22</sup> In addition to modeling the risk associated with movements in contract underliers, FX risk is modeled for all transactions denominated in currencies other than US dollars.

The number of risk factor paths simulated in CreditLab to derive the exposure distributions, as well as the number of PE time buckets used along the paths, varies by product. For equity, interest rate and FX derivatives, 1,000 risk factor paths are simulated. For credit derivatives and repos 10,000 paths are used. Credit Risk Measurement is in the process of enhancing the methodology to use 10,000 paths for all products.

In modeling interest rate movements, richer models are required than in the above equity example given that an entire yield curves must be modeled and mean reversion should be imposed (i.e., while an equity price can continually grow over time interest rates do not tend to do so), etc. The process described above is extended to deal with these additional constraints by using a richer grid but the fundamental approach remains unchanged. Additional complication comes from the use of three distinct front office systems, each which each utilize a different rate model for pricing. Consequently, the same instrument booked in different front office systems will generate different PE profiles given the application of different pricing grids. Credit Risk Measurement stated that it monitors and assesses the magnitudes of such differences.

Bear takes a “risk neutral” approach to the parameterization of the risk factor distributions used in its PE simulation model. In short, this involves applying risk free rates of drift (or expected values) to the risk factor distributions, rather than calibrating distributions to historical drifts. Such an approach, which is required if front office pricing models are used, can result in substantially lower exposure estimates, especially for longer maturity transactions in non-margined portfolios, as compared to alternative “econometric” or “real world” modeling approaches that attempt to estimate drifts empirically. Often risk neutral risk model frameworks involve calibrating additional distributional parameters (namely volatilities) to price curves, such as implied volatilities, rather than from historical risk factor data.

As there is clearly no consensus amongst practitioners and regulators as to what is the best approach, OPSRA staff remain somewhat agnostic regarding this real world versus risk neutral PE debate. Each approach has its pros as well as cons. For instance, an argument in favor of the risk neutral approach is that it is more of a forward looking calibration, using the market’s view on distributional parameters rather than simply assuming history will repeat itself. Further, it can be argued that calibrating to market prices is less subjective than other approaches. Alternatively, empirical evidence suggests certain risk factors, such as equity returns, exhibit expected values above that of the risk free rate of return, particularly over longer horizons.<sup>23</sup> Again, this highlights the need for PE validation techniques.

In addition to modeling marginal risk factor distributions (i.e., one risk factor at a time), the correlation structure between risk factors must be taken into account in order to capture portfolio effects, for example the correlation between a single name equity and an equity index instrument in a single portfolio. GCD accounts for the portfolio effect by correlating the random normals that determine the path through the pricing grid via a Cholesky decomposition of risk factor variance-covariance matrices. Currently Bear, like many of its peers, models joint distributions and captures portfolio effects within product groups, but not across product groups. In other words, if a counterparty is trading equity and interest rate derivatives, all equity positions can be modeled as one portfolio, capturing the correlation structure between different equity assets, while rates positions can be modeled as a separate portfolio, but the two resulting PE metrics are aggregated without allowing for any diversification benefit. As a longer term goal, GCD has conveyed a desire to enhance its PE framework to produce more meaningful PE

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<sup>23</sup> The Credit Risk Measurement head also noted using risk free versus empirical drifts has a large PE impact for long-term cross currency swaps. At the same time, he did not see a great benefit in performing additional simulations with larger drifts.

metrics at higher levels of aggregation.<sup>24</sup> This is challenging given netting and collateral considerations, as well as the fact that the PE framework was originally constructed in a manner that placed products into relatively narrow silos. OPSRA staff will continue to discuss with GCD progress towards this initiative.<sup>25</sup>

### Risk Factor Mapping

As mentioned previously, the mapping of positions to risk factors must be sufficiently granular to capture material risks. Given that a pricing grid is produced for every transaction, in some sense the mapping of trades to simulated risk factors is quite granular. However, as discussed above, these grids are all one dimensional in terms of risk factors. In addition, the granularity in terms of the parameterization of risk factors for simulation varies. For example, for equities, single name implied volatilities are used in constructing the grids. On the other hand, for credit derivatives, a single spread volatility is used for all underlying names.<sup>26</sup>

In addition, while distributional parameters such as volatilities and drifts are calibrated from market prices, the Credit Risk Measurement Group must empirically measure correlations in order to capture portfolio effects, given that market implied correlation parameters are not available. The approach to measuring correlations (in terms of the data used, frequency of parameter updates, etc.) varies by product, but in general can be described as quite blunt. For equity and credit derivatives, correlations are not estimated but assumed. With equities, for example, a correlation coefficient of 0.25, 0.50, or 0.75 is assigned depending on whether the companies are in the same industry, in the same country, or in both or neither the same industry and country. Given the difficulties associated with obtaining robust correlation estimates, such as the lack of quality data and asynchronicity issues, and the non-stationary characteristics of financial time series, the Credit Risk Measurement head does not feel empirically estimating and maintaining large correlation structures is particularly worthwhile. OPSRA staff have, however, inquired as to whether any sensitivity analyses have been performed to assess the potential impacts of varying correlation assumptions. We are told Credit Risk Measurement has just begun thinking about performing sensitivity analyses for correlations, and we will continue to follow up along these lines.

### Collateral

In addition to reflecting netting opinions/rules, a robust PE framework should capture the mitigating impacts of margin agreements. If initial margin has been posted to an account, the collateral values must be appropriately subtracted from current and forecasted net exposures.<sup>27</sup> With variation margining or mark-to-market agreements, counterparties are required to post additional collateral if, following market movements, the portfolio replacement cost exceeds a specified unsecured threshold. Thus mark-to-market agreements require the modeler to

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<sup>24</sup> The primary goal is to produce aggregate counterparty and family level PE metrics across product facilities. In addition, GCD feels the ability to produce higher level cross counterparty/family risk measures would also be useful, for instance in analyzing exposures by industry.

<sup>25</sup> We note that Bear is currently in line with its peers in terms of producing cross-product PE metrics.

<sup>26</sup> We recognize that the use of a single volatility applied to different initial spread levels (depending on the particular name being modeled) implies more dispersed spread paths for riskier names, ceteris paribus.

<sup>27</sup> While Bear does not model the value of collateral over time as a function of market movements, it does apply haircuts to non-cash collateral to make them cash-like.

consider the fact that the forecasted NEs will be continually pulled back towards the threshold.<sup>28</sup> The Bear PE framework takes such collateral affects into account. For the majority of Bear counterparties, margin calls can occur daily and delivery is the next business day. However, a longer risk horizon is considered to reflect that collateral may not be sent on time, possibly due to administrative delays or a dispute with the counterparty. The length of this period varies by product and counterparty, but is often two weeks (ten trading days). Thus the total risk horizon modeled for counterparties with threshold amounts is typically two weeks. In addition, Bear captures the possibility that counterparties may be late in sending back collateral that Bear has posted against a trade. This can result in somewhat large spikes in PE, which are interesting from a risk management perspective because these are in a sense real risks. That is, a trade could expire that was positively valued from the counterparty's perspective and the counterparty could fail to send back the collateral. While there has seemingly been some internal discussion regarding how to approach these PE spikes, the Head of GCD asserts he has chosen not to adjust the metrics, rather to have the credit analysts understand the risks and set limits accordingly.

### Non-modelled Trades (G-Calcs)

For various reasons, not every trade is explicitly modeled in the PE simulation. For instance, in the case of new products, the front office needs to dedicate the resources to developing and producing the pricing grids, and trading volumes may need to reach material levels before this investment is warranted. In addition, these one dimensional (one risk factor) pricing grids are not conducive to revaluing some more complex products such as tranching credit (e.g., synthetic CDOs), variance swaps (which are volatility-sensitive instruments) and path dependent options. For such trades that cannot be handled in the CreditLab system, alternative techniques referred to as fallback calculations, or "G-Calcs", are used. These fallback calculations ensure that every trade receives some sort of PE treatment.

There are several broad approaches to performing G-calcs. For some transactions, generic trades are simulated to create tables that allow for the lookup of a PE factor based on certain trade characteristics. These factors reflect the percentage of notional amount that should be used to represent the trades' PE, and the tables yield only one PE metric. In other words, exposure profiles over time are not created. Another G-calc approach is to model proxy trades. This involves taking a trade that cannot be modeled explicitly in the system, and entering it into CreditLab as a different trade with similar risk characteristics that can be modeled. In addition, sometimes for equity derivatives a static approach of using instrument greeks multiplied by the appropriate (probabilistically) risk factor shocks is used. This obviously does not capture the aging of instruments over time. Similarly, an offline spreadsheet model is used to represent the risk of tranching credit products.

Given that proxy trades are actually modeled in CreditLab, no additional steps are required in order to aggregate the PEs from these trades with other transactions to derive product/portfolio level PE metrics. All other G-calc values, which are constant over time, are simply added directly to the aggregate PE from the simulation at every time bucket. Thus, the addition of these G-calcs to a modeled PE curve represents a parallel shift in that risk profile. G-calcs do not give credit for diversification within a portfolio of trades, nor do they take into account netting between trades. Consequently, while GCD feels these fallbacks do a reasonable job of estimating the risk for a particular trade, it feels fallbacks calculations tend to

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<sup>28</sup> In other words, if a NE exceeds the unsecured threshold, the risk horizon for which the NE could continue to grow past that excession is limited, since the portfolio would eventually either be re-collateralized or closed-out. Typically a minimum transfer amount is specified, which requires some minimum change in value for collateral to be called (which avoids "nuisance" calls).

considerably overstate risk at the portfolio level. This is reflected in the fact that while G-calcs are used for only about 5% of trades, they currently generate approximately 40% of total PE.

#### Repurchase Agreements (Repos)

Currently repos are risk managed off of notional exposures. However, as previously discussed, GCD anticipates migrating to a simulated repo PE, which has been developed but not fully implemented. Some distinct characteristics of the repo PE simulation are worth noting. In particular, a multi risk factor approach is taken. In addition to simply modeling one short rate (and thus essentially modeling only parallel shifts in the yield curve), changes in the yield curve shape, such as flatteners, steepeners, and twists are modeled. Changes in credit spreads and implied volatilities are modeled as well. Also, rather than using the repricing grids discussed above, the FAST group perturbs the underlying risk factors to compute risk factor sensitivities. Correlated standard deviation movements in these various factors are then modeled in CreditLab and applied to the risk factor sensitivities to obtain portfolio value forecasts. This approach, which is richer than using one-dimensional repricing grids, begs the question of why it is not used more broadly. Although, given that hedge fund prime brokerage clients (Fixed Income Customer Clearing) pursuing mortgage and ABS strategies finance their positions via repos, it can be reasonably argued that such additional granularity is more needed as these are somewhat credit sensitive counterparties taking complex risks. Further, since repos tend to be relatively short-dated in nature and this methodology is just now being developed, modeling a richer set of factors is likely more feasible as compared to longer dated products managed under a framework initially developed years ago.

#### GCS Prime Brokerage, Retail Margin and Stock Loan/Borrow

For the prime brokerage, retail margin, and stock loan/borrow businesses, a VaR-based calculation is performed outside of CreditLab in order to measure PE. Bear uses RiskMetrics, an outside vendor, to compute 10-day portfolio VaRs for each counterparty. The RiskMetrics methodology involves a 1,000 path Monte Carlo simulation with full revaluation. The time series used to calibrate the simulation specification as well as the methods for pricing instruments in the face of risk factor movements are maintained/developed by RiskMetrics. For counterparty positions that cannot be modeled in the RiskMetrics simulation, haircuts are applied. Intuitively, the final PE for an account equals the 99<sup>th</sup> percentile 10-day VaR, plus any applicable haircuts, less the liquidating equity in an account. An obvious shortcoming of using VaR to measure PE is that it does not capture the aging of portfolios. At the same time, given the daily margining process and the tendency of many hedge funds to adjust their risk profiles on a frequent basis, this does not seem particularly worrisome.

As a longer term goal, Credit Risk Measurement has expressed a desire to develop a consistent approach to measure economically similar PE between equity derivatives and prime brokerage. For instance, leveraged exposures that can ultimately be created via the financing of cash positions in a prime brokerage account can also be created via equity total return swaps. Thus the equal measurement of the two exposures is clearly desirable from a risk management perspective.

#### **D. Risk Monitoring and Reporting**

Credit monitoring occurs at the individual counterparty level and at multiple levels of aggregation up to the firm-wide level.

At the counterparty level, GCD credit analysts are responsible for a number of day-to-day credit risk management tasks, namely monitoring credit risk exposures (NE, PE, etc.)



resulting from trading activity and market movements, and handling requests for new credit limits and credit limit increases from the trading desks. On a less frequent basis, credit analysts are also responsible for assigning and updating internal credit ratings, including conducting due diligence, as well as providing senior management with industry- and portfolio-wide analysis of market/industry trends. These broader analyses sometimes play an important role in providing qualitative context for the more regular, quantitatively-focused reports generated by the credit systems.<sup>29</sup>

As part of the CSE field work, we met with, among others, a credit analyst who covers prime/Alt-A mortgage banks and Real Estate Investment Trusts (REITs) to discuss his typical day. Before the market opens, he looks over market news and client specific developments in the financial/industry press and reviews Bear's counterparty credit exposures from the day before, including checking on limit violations. With limit excesses, the goal is to identify the drivers of the exposure and explain the violation. Usually, these are technical in nature, e.g., a trade was booked into the wrong Bear legal entity, there is a modeling issue, legal documentation did not get recognized in the system, etc. In addition to reviewing news and exposures, information may be received from counterparties periodically for analyst review – e.g., some REITs provide GCD with detailed portfolio breakdowns.

During market hours, the analyst handles live trade requests and requests for new credit limits and/or credit limit increases.<sup>30</sup> For these tasks, he relies significantly upon the reports generated by GRMS and discussions with the desk and Credit Risk Measurement. When we reviewed a request for a limit increase for a mortgage bank engaged in reverse repo warehouse financing of mortgage product, the analyst demonstrated how he uses the client profile and activity reports in GRMS to inform his discussions with the traders/salespeople and to ascertain how the proposed activity fits within Bear's risk appetite and the credit risk of the counterparty. For instance, he used the client profile functionality to drill down into the counterparty's mortgage underwriting criteria, hedging philosophy and performance, servicing history, etc. In cases where the counterparty limit is constraining, he talks to the various account executives (sales personnel), each of whom has his or her own limit, to determine whether current risk capacity can be reallocated within existing lines. Where trade approval exceeds his credit authority, he presents the trade to the appropriate level for consideration. Following up on credit documentation to ensure the appropriateness and accuracy of credit and collateral terms is also a part of his duties with trade approvals. On a periodic basis, usually weekly, credit analysts must also prepare summary reports for the Global Credit Committee and the Credit Policy Committee. These highlight notable transaction requests, limit violations, etc., and are discussed below.

Distinct from the day-to-day activities described above, credit analysts also engage in a host of other tasks, notably due diligence of individual counterparties and so-called "portfolio reviews". The credit analyst we met with described a recent and broadly representative due diligence trip to a mortgage REIT in another state. He went on-site with several people from Bear's trading unit. They met with a range of senior officers to get a broad sense of the strengths and weaknesses of the REIT, trading needs and strategies, financial and operation profile, etc. During these meetings, they "layered" their inquiries (i.e., asked questions from multiple perspectives, multiple times) in order to ascertain the integrity of what they were being told. In addition, they toured the firm's operations, including the trading floor and back office. For Bear's material and/or significant new counterparties, the analyst explained that this type of review is typical. For other counterparties, the due diligence is conducted with a lighter touch,

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<sup>29</sup> For instance, during the CSE field work, we were informed that senior management was requesting market and industry-wide assessments of mortgage related counterparty credit exposures, in light of high profile press reports of a housing bubble.

<sup>30</sup> The analyst indicated that he reviews approximately five to seven such requests per day.

often through written inquiries and submissions. For instance, a highly regulated and controlled large commercial bank may not require as much attention as an unregulated mortgage bank. These due diligence processes appear to be a vital tool for GCD. It relies upon the expertise and judgment of the GCD personnel, requiring not only quantitative analyses, but rigorous qualitative analysis and interaction to gauge competency and veracity.

The portfolio reviews encompass analysis of peer groups, e.g., homebuilder mortgage subsidiaries or bank-owned mortgage companies, in order to identify industry trends and to see the proverbial forest from the trees. The credit analyst we met with walked us through a portfolio review of residential mortgage REITs. The review contained a large amount of quantitative information, e.g., comparison statistics between counterparties in the peer group (ROA, percent of portfolio in AAA securities, borrowing costs, portfolio duration, financials, etc.), as well as a comprehensive qualitative discussion of changes in Bear's exposures in light of industry and market developments. In addition, the review provided a summary of credit-related requests worthy of discussion, such as the entrance of leveraged buyout firms into the REIT space, like KKR and Redwood.

At the firm-wide level, credit monitoring takes place primarily through a set of high level reports and periodic meetings. At the highest level, the CPC reviews a weekly package which regularly features a summary of credit approvals, a report on market spreads, a summary of limit violations, internal ratings changes, and a slew of exposure reports (by ratings, by entity, by group, by change, etc.). Given the difficulties associated with producing meaningful aggregate PE metrics, higher level reports are NE focused. The CPC reviews large PEs by counterparty. These reports get supplemented with one-off discussions of unusual credit requests, follow-up discussions and the like. As part of the CSE field work, we reviewed the CPC materials for July 28, 2005.

Beneath the CPC, a number of more granular reports gets generated and distributed to the appropriate personnel. Some of these reports are generated by GCD, as discussed in section II.A.iii, while others are produced by other departments throughout the firm, such as Operations or the business units, and used by GCD for the management and monitoring of counterparty exposures. For instance, a daily email with a link to the Derivative Margin Call Report gets distributed to GCD and the applicable derivatives desk heads. This report contains open margin calls, including aging, and delinquent margin calls, each of which includes a description of the status or nature of the delinquency. In a similar vein, GCD receives from the Corporate Lending business's Loan Portfolio Management Group a report detailing the bank and bridge loan commitments. The credit system distributes a weekly Derivatives Exposure Report, which shows top five counterparty exposures by obligor rating. In addition, GRMS sends out a daily limits exception and usage report to salespersons with the applicable credits in their portfolio. Of course, within GRMS, credit analysts and credit managers can view limits, utilization, and exposures by product/business line by using Product Summary Reports.<sup>31</sup> A set of more specialized reports – e.g., on derivatives VaR margin, prime brokerage cross margin, warehousing reverse repos margin calls, etc. – are also generated and either emailed to the appropriate staff or available for review on a daily or weekly basis.<sup>32</sup> Overall, Bear appears to have developed an effective infrastructure and processes for ensuring that credit risk information is available and appropriately conveyed to personnel throughout the firm.

## **E. Counterparty Hedge Book**

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<sup>31</sup> During the CSE field work, we reviewed a GRMS Limits/Activity Report (dated August 17, 2005), a DerivWeb Margin Call Notification (dated August 18, 2005), and a Derivatives Exposure Report/Desk (dated August 1, 2005).

<sup>32</sup> For a partial list of reports, see "List of reports used in the management and monitoring of credit risk exposures, collateral management and surveillance" (August 23, 2005).

OPSRA staff met with the head of Bear's rates trading business to discuss his views on counterparty credit risk management and interaction with GCD. In the event that a counterparty were to fail to meet its obligations on a particular transaction with Bear, the trading desk, as owner of the P/L, would directly incur the credit loss. Moreover, GCD must work with business personnel to establish acceptable credit terms while remaining competitive.

While the rates manager notes that there have been instances in which he has simply decided to not do business with a potential customer because he could not establish comfort with them as a credit (could not get sufficient credit terms, etc.), for the most part it seems his credit decisions revolve around the credit reserves generated by trading activity. Bear, like its competitors, uses a market based model to quantify and reserve against credit risks on a counterparty by counterparty and trade by trade basis. The concept of the credit reserve, or credit valuation adjustment (CVA), is intuitive. In short, the same interest rate swap transacted with B and BBB rated counterparties should (in theory) be priced differently to reflect the varying counterparty credit risk born on the two transactions. Furthermore, once the positions have been established, deteriorations or improvement in the credit quality of those counterparties should be reflected in the mark-to-market valuations of those positions. Bear's CVA accomplishes these objectives. The CVA, which estimates expected credit losses, is based on trade Expected Exposure (EE) profiles<sup>33</sup> and counterparty probabilities of default. Consequently, counterparty credit quality, via the CVA, is a determinant of P/L.

In the rates space, business unit personnel work with GCD on a daily basis to determine whether Bear has sufficient credit risk appetite to accommodate transactions and in assessing day one credit reserves. For counterparties with thresholds, the rates manager notes that it is difficult to price credit reserves into transactions without losing business to competitors. Thus the approach taken is for the business to incur the day one P/L hit from the CVA, which will hopefully be (at least partially) recouped at the end of the trade. He notes for counterparties without thresholds, this dilemma is more problematic as the magnitudes of the reserves are larger due to larger EEs. For rates trading, Bear has thresholds in place for the majority (approximately 80%) of counterparty trading volume. Thresholds lower expected losses and thus result in lower credit reserves. Trading and sales personnel often work with GCD in establishing thresholds that adhere to Bear's risk standards, while preventing the loss of business to competitors.

Intuitively, it makes sense for a rates trader to be focused on trading rates and not be overly preoccupied with the impact of credit spread movements on his or her bottom line. In order to accomplish this, the rates manager has established a separate trader role solely responsible for managing the impact of spread and other market moves on the CVA. In short, under this framework the CVA for a particular trade only affects a rates trader's P/L on two days: the day the trade is established and the day it expires or is unwound (the day in which the trader hopefully gets some of that day one P/L back). On day one the rates trader effectively writes a check to the CVA trader for the amount of the credit reserve. The CVA trader, in turn, is responsible for minimizing CVA volatility by hedging against changes in spreads and rates, as well as other market risk factors such as implied volatilities and FX rates. To accomplish this mandate, Bear developed the technology to compute risk sensitivities with respect to the CVA – e.g., the impact on the CVA of a one unit change in rates, etc.<sup>34</sup> Although Bear only adjusts the CVA on a monthly basis, the hedging of the CVA is a daily exercise. The rates manager asserts that in the long run (month over month), his presumption/intention is for the CVA trader to have

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<sup>33</sup> EEs are estimated from the PE methodology discussed in Section II.C., and are obtained simply by using the means (50<sup>th</sup> percentiles) of the forecasted NE distributions as opposed to the 97.7<sup>th</sup> percentiles.

<sup>34</sup> The rates manager noted the CVA is actually more sensitive to changes in rates than in changes to counterparty credit spreads.

approximately zero P/L. As with any other trader, the rates CVA trader has established risk limits.

The duties performed by this trader serve as a potential risk mitigant, just as thresholds and termination events do, and thus represent another credit risk management tool. However, the existence of such a function poses some interesting questions. The hedging of the CVA blends market and credit risk management. While the CVA trader strives to minimize the volatility of expected credit losses, she does so by hedging against local spread and market moves, rather than against tail events. Furthermore, although no systemic or macro hedges (e.g., credit index hedges) are currently being used, one must be aware of any basis risks that are created if such additional strategies are employed. Currently, CVA trading is done at a relatively small scale at Bear and only for the rates business. Hedging of counterparty exposures is not centralized in any other business area.

### **III. Counterparty Groups of Focus**

#### **A. Hedge Funds**

Bear assumes credit risk to hedge funds through two broad channels. The first is through prime brokerage relationships (currently over 2,000 fund clearance accounts) and the second is through derivatives trading and financing transactions (currently over 1,300 counterparties). The management of credit risks differs across these activities.

In GCS Prime Brokerage, the extension of leverage is determined primarily as a function of the collateral posted to Bear, a type of asset backed lending. Thus the daily risk management focus is on assessing the prime brokerage portfolios, requiring a battery of analytics and a skill set for understanding the risks inherent in the fund trading strategies. For derivatives activities, risk appetite is based on the credit assessment of the funds – e.g., based on internal credit ratings. In this space PE is the primary metric by which usage of that credit risk appetite is gauged. While both prime brokerage and counterparty credit exposures are generally collateralized to zero NE on a daily basis, broadly speaking prime brokerage accounts are collateralized to sustain a wider range of possible market moves than are derivatives transactions (i.e., there is little PE in the clearance accounts). Further, prime brokerage margin terms typically may be altered at the discretion of the prime broker whereas margin terms are explicitly locked-up as part of the terms of a derivatives contract. Having noted these differences, Bear personnel explain that over time there has been (and continues to be) some convergence of the prime brokerage and counterparty credit models. For instance, some funds have been successful in locking up prime brokerage margin terms; meanwhile there is a push to develop ancillary risk analytics such as stress tests to further understand the risks in derivatives counterparty portfolios.

GCS Prime Brokerage has developed its own infrastructure and control processes for making leverage decisions and monitoring the activity in counterparty portfolios. Separately, GCD has an industry group dedicated to the management of hedge fund counterparty credit risk outside of GCS. In addition, however, a distinct fixed income prime brokerage business resides within the Fixed Income Finance (Repo) desk. GCD has established a smaller, more quantitative and portfolio-focused group to manage credit risks stemming from these fixed income prime brokerage activities.

##### **i. Global Clearing Services (Prime Brokerage)**

GCS provides custody, clearing, financing, securities lending, execution, and other operational and technology services to investment advisers, broker dealers, and hedge funds.

GCS has approximately 2,200 prime brokerage clients, the vast majority of which are hedge funds.<sup>35</sup> A variety of investment strategies – e.g., options arbitrage, merger arbitrage, statistical arbitrage, global macro, etc. are represented. Bear assumes credit risk with respect to these counterparties as a result of secured financing provided in the forms of margin and securities lending.

Within GCS and separate from GCD, there is a Risk Control Department (RCD) responsible for protecting Bear from counterparty losses. RCD establishes guidelines for the extension of leverage,<sup>36</sup> reviews new business for suitability and appropriate leverage levels, and monitors the appropriateness of and adjusts leverage limits over time in order to ensure clearing accounts are capitalized sufficiently to survive a wide range of possible market conditions. RCD is led by a Senior Managing Director who reports directly to the head of GCS and has a dedicated staff of risk managers and risk analysts.<sup>37</sup> The staff is located in New York, San Francisco, and London.

Potential new accounts are reviewed by RCD for approval and the determination of the appropriate leverage to be extended. Leverage decisions are risk based and involve the analysis of potential client portfolios along with the expert judgment of the risk managers. Potential clients submit sample portfolios which a risk analyst examines using RCD's standard "RACS" analysis, discussed further below. RCD uses these risk analysis results to inform discussions with potential clients. RCD also performs on site due diligence of funds, often in conjunction with GCD personnel,<sup>38</sup> however, RCD's focus is on assessing the counterparty portfolios and agreeing upon acceptable margin terms.

As of June 2005, 1,760 of GCS's 2,200 prime broker clearance accounts were margined at least to Reg T requirements. 440 clients obtained leverage beyond Reg T, referred to as "enhanced leverage". In order for a strategy to be considered for enhanced leverage, it must first be a hedged/relative value strategy. Again, a sample portfolio (or existing portfolio if it is a current client seeking additional leverage) is subjected to the standard RACS risk analysis. Further, the portfolio must meet certain risk parameters, related to factors such as concentration and liquidity. Once the leverage level has been decided by RCD and accepted by the client, there is an official approval and notice process that takes place via an "Increased Leverage Request Form". Enhanced leverage clients have individually set leverage limits based on a number of factors, such as strategy, size, and concentrations.

For the vast majority of clients, RCD reserves the right to change margin terms at any point in time. This means that RCD may decide to reduce the amount lent to counterparties and thus account leverage ratios by requiring additional collateral. It also essentially means that RCD reserves the right to liquidate or hedge counterparty positions in order to reduce what it deems to be excessive risk. Currently, however, for 16 accounts, GCS has "Lock-up" Agreements. For these "highly capitalized and important" clients, GCS enters into a legal agreement not to alter the client's margin terms for a given period. These agreements typically lock in terms for 90 days. Of these 16 accounts, RCD explains only six are "true" lock ups. That is, the conditions of the remaining ten agreements essentially allow for the termination of the agreement in the event of a material change in the portfolio, based on GCS's sole

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<sup>35</sup> GCS has approximately 2,600 accounts in total. Thus prime brokerage represents 85% of GCS clients. Also, the 2,200 prime brokerage clients represent approximately 850 to 900 hedge fund families.

<sup>36</sup> See chapter 6 of the GCS Policies and Procedures Manual for a brief description of the leverage guidelines by trading strategy.

<sup>37</sup> RCD consists of 17 individuals with varied backgrounds in trading, financial engineering, credit analysis, economics, and systems development and maintenance.

<sup>38</sup> Pure prime brokerage counterparties, meaning funds that do not trade with Bear outside of GCS, need not receive credit ratings from GCD.

discretion. The true lock-ups, on the other hand, are conditional upon the portfolio adhering to a number of more specific (and objective) predetermined risk parameters, such as concentration, liquidity, and directionality constraints. Lock-ups also include termination events related to NAV moves, cross product defaults (e.g., missed collateral call to the derivatives desk), etc.

Two major tenets of the RCD philosophy are to be predictive of potential portfolio problems as opposed to having to be reactive to large losses, and to be very proactive in discussing those concerns with clients as soon as possible. RCD measures and monitors the risk in clients' portfolios using its Risk Analysis and Control System (RACS).<sup>39</sup> RACS is designed for monitoring risk on an inter- and intra-day basis. A main function of RACS is to apply each of the positions in each of the client portfolios to a host of stress tests/market scenarios and assess the resulting P/L impacts on a position as well as portfolio basis relative to the equity in the accounts. The risk factors shocked in the RACS system include equity price levels, equity implied volatility levels and skews, and interest rate and credit spread levels. RACS also performs tests in which it first ages positions and then performs the shocks, which is useful for analyzing options portfolios that may suffer considerable theta bleed or exhibit large swings in gamma as positions near expiry. Also, one dimensional stresses as well as multidimensional scenarios are utilized. For instance, there is a "Flight to Quality Scenario" that involves credit spreads doubling and Treasury bonds rallying. Similarly, RACS performs scenarios that involve simultaneous movements in equity levels, volatility levels and skews, interest rates, credit spreads, and time. In addition, these shocks are applied in varying magnitudes. For instance, equities are shocked up and down 20%, up and down one standard deviation, and up and down two standard deviations. In total, across all risk factor types (and combinations), RACS applies 245 "test-points". Positions are fully revalued in the face of the risk factor shocks, using a combination of internally developed pricing models and vendor supplied models.

At the end of each trading day, the RACS system computes each of these stress/scenario P/L outcomes for each account and compares those results to the liquidating equity in the account. These comparisons yield risk ratios, each defined as the stress P/L outcome divided by the liquidating equity. Predefined risk ratio thresholds are established and any client exceeding a threshold is flagged as a "risky client" for further analysis. These ratios are established based on the liquidity of the underlying positions. For instance, an equity position representing 25% of one day's average trading volume (i.e., a liquid position) could be assigned a 0.80 risk ratio threshold, while a position representing 14 days average trading volume (i.e., a less liquid position) could be assigned a 0.60 risk ratio threshold. Thus more risk relative to equity is permitted in more liquid positions. The RACS system is designed not only to identify overall portfolio problems so to speak, but also to identify concentrated positions that could pose problems. Thus different types of risk threshold violations are flagged – i.e., symbol level violations, regional level violations, excess interest rate risk, etc. It is worth noting that the RACS system evaluates all positions that GCS clients have with Bear Stearns. For instance, positions held with the equity or credit derivatives desk are seen in RACS and applied to the standard analyses. However, RCD separately tracks the equity in the clearance accounts and only compares the P/L impacts of the scenarios to that equity, even though those counterparties may have margin posted at other desks or positions that are positively valued. Also worth noting, while RACS automatically subjects each portfolio to every stress test on nightly basis, risk ratio thresholds are only in place for about 80 (of the 245) stress points.

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<sup>39</sup> OPSRA staff reviewed the RACS functionality discussed herein via a live demonstration and the review of hard copy risk reports with RCD personnel.

Every night the RACS system automatically generates a report, dubbed the “I” report, identifying all risky accounts. When RCD personnel arrive in the morning, their first task is to review the “I” report independently. Every morning from roughly 8:30 to 10:00, the RCD team has a call/meeting to discuss the “I”, and individuals are randomly selected to lead the discussion of the various report sections. Clearly it would be impossible to closely examine each of the 2,200 prime brokerage account portfolios on a daily basis. The RCD philosophy is that, given how it must rely upon the RACS infrastructure, all exceptions must be scrupulously investigated and understood. Thus in a sense, the daily review of the “I” and subsequent portfolio “drill downs” serves to validate the overall risk management framework.

There are three categories of risky portfolios: “Early Warning”, “Initial Violation”, and “Repeat Violation”. Early Warning violations, which comprise the majority of risky portfolios, involve small threshold excessions and bring the portfolio to the attention of the RCD risk analyst or manager, but are not severe enough to require position adjustment or increased collateral. However, dialogue with counterparties may result from early warnings. The RCD head emphasizes the importance of identifying these portfolios quickly to initiate conversations with the fund portfolio managers regarding the activity in the accounts. Following Early Warnings are Initial Violations, which involve more severe threshold violations and may require adjustment to the margin requirements for an individual position or portfolio. The risk analyst or manager will communicate the extent of the adjustment, and the rationale behind it, to the relationship manager or to the client directly. A Repeat Violation occurs when a counterparty does not satisfactorily reduce risk after an Initial Violation. At this point, the risk manager reserves the right to make trades on the client’s behalf to reduce positions or add hedges. In practice, the need for such action is extremely rare.

RACS also gives RCD real-time access to client portfolios and market data, and allows access to historical reports. Users have the ability to run ad-hoc queries, which allows risk managers to assess the risk resulting from recent market events. For instance, RACS has a symbol-level risk report, which is used to identify symbol level risk across the entire spectrum of counterparties. If a major earnings or merger announcement is released, this report is used to identify clients with exposure to that particular name. Each day a risk analyst checks Bloomberg to identify the largest equity price moves and compares those names and movements to the symbol level report to assess what counterparties had exposure to those large movers.

The maximum potential exposure (MPE) for prime brokerage clients is calculated as the equity in a counterparty’s account minus the 10-day 99<sup>th</sup> percentile VaR (and any haircuts for non-modelled trades if applicable). As discussed in the PE section, the RiskMetrics VaR package is used. Unlike the RACS scenarios, the VaR model does not cover positions held by the same counterparty outside the clearance account. At the same time, while RCD personnel view the clearance account VaRs in RACS, these are not used as a primary risk management tool. RCD personnel explain they are generally concerned with risks further out into the tails of the portfolio loss distributions than are identified via VaR.<sup>40</sup>

Based on the information reviewed, OPSRA staff believe GCS has built a robust framework for assessing the riskiness of counterparty portfolios. RCD, through its RACS infrastructure, vigorously interrogates counterparty portfolios on a daily basis. Furthermore, the magnitudes of the market moves used to trigger discussion of accounts are quite large. Also, as RCD personnel point out, RACS has performed well during a number of high volatility periods, such as during the 1998 flight to quality and 2000 bursting of the equity bubble. However, it is also worth noting that the reliance upon RACS to identify risky accounts (where the number of accounts is so large) requires the continual validation and enhancement of the

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<sup>40</sup> The risk manager also noted that risk ratio excessions almost never, if ever, occur as a result of VaR.

risk system. This is especially true given the tendency of hedge funds to continually evolve into new and complex trading strategies. For instance, as GCS clients seek to pursue more complex credit spread and interest rate sensitive strategies, or additional cross-asset class strategies, enhancements are needed. That said, RCD personnel also explain they are not bound by the current RACS outputs in assessing new accounts.<sup>41</sup> The risk manager discussed a recent instance in which he could not get comfortable with a potential new account (and thus turned down the account), despite the fact that the fund’s relative value credit strategy produced little risk when subjected to various standard stress tests.

**ii. Counterparty Credit Risk and Fixed Income Customer Clearing**

In this section, we discuss GCD’s approach to rating hedge fund counterparties, setting exposure limits and hedge fund credit terms, and monitoring risk in Fixed Income Customer Clearing (FICC) accounts.

Hedge fund ratings, limits and credit terms

The hedge fund credit group is broadly responsible for assigning internal credit ratings to all hedge fund derivatives and FICC counterparties, as well as monitoring and managing Bear’s credit risk exposure to them.

As with all of Bear’s counterparties, hedge funds undergo a scorecard-based ratings process. The table below shows the categories, weights, and factors utilized for hedge funds.

Hedge funds	
<b>2</b> Size	<b>10</b> Management
Assets at mgmt co. NAV of fund	Reputation Financial reporting Strategy
<b>10</b> Profitability	<b>12</b> Op risk
Rate of return Volatility of performance	Back office Systems Administrator Pricing/valuation
<b>15</b> Leverage	<b>18</b> Risk Mgmt.
Leverage	Measurement Controls/compliance Independence
<b>15</b> Liquidity	
Liquidity of assets Redemption period Diversity of investors	
<b>18</b> Asset quality	
Hedging Concentration	

The category weights show that Bear places a premium on asset quality and risk management, and de-emphasizes fund size and profitability (in contrast to many peer firms). On the asset quality side, particular attention is paid to hedging practice relative to the stated strategy (e.g., arbitrage versus directional) and oversized positions/diversification. On the risk management side, Bear assesses the in-house risk systems, stop loss controls, and the independence of risk management, if any, bearing in mind the strategy and portfolio profile of the fund. The broader assessment of management depth and transparency compliments this analysis. Bear noted that assets under management and NAVs can be volatile and reflect investor flows, neither of which has proven to be a good indicator of a fund’s credit risk profile, hence the low category weight.

Liquidity of the assets in the fund’s portfolio and of fund shares, and leverage both also play important roles in determining a hedge fund’s rating. In terms of leverage, the hedge fund scorecard guidance table provides a fairly granular set of numerical leverage benchmarks. For

<sup>41</sup> It is also worth noting that if a non-standard position (from GCS’s perspective), such as a mortgage security is placed into the clearance account, it receives a value of zero and thus does not get counted as equity.



instance, a hedge fund trading distressed converts with a leverage ratio (defined as long market value + short market value)/equity) of between 1.2x and 1.25x, should be rated “6” (B). Notably, a fund with zero leverage gets a “4” rating (BBB), and a fund with leverage at all can at best be rated “5” (BB). To the extent possible, off-balance sheet leverage from derivatives is taken into account as well.

For many funds, based on materiality, a team may do an on-site due diligence visit to assess the fund’s operational risk and management capabilities in person. Bear emphasizes the importance of operational controls and performance in the category weight, and this is reflected in the due diligence process. For instance, the credit analyst may ask the fund to process a trade through the fund’s systems and explain/show the system flows. The credit analysts also focus considerable attention on the valuation processes at the funds, including policies and procedures (especially for trader overrides), marking conventions, pricing models, independent validation, etc. While some benefit is given to the use of reputable administrators and audit firms, Bear recognizes that these are only complements to and not substitutes for strong valuation controls internally.

Initially, within the scorecard there was only one benchmark standard for each ratings factor, regardless of fund strategy. For example, there was a single “rate of return” benchmark. Funds which did better than that received higher guidance ratings for that factor and funds which did not received lower guidance ratings.<sup>42</sup> The result, of course, was that risk-neutral funds (e.g., long/short equity) consistently rated worse than directional funds (e.g., macro) on the rate of return factor, for instance. To mitigate this bias, Bear began introducing strategy-specific benchmark standards. For example, the guidance rating for the rate of return of a convertible arbitrage fund under review is now assessed relative to CSFB Tremont’s Convertible Bond Index, thus providing a more granular and meaningful peer comparison. Not all strategies have been broken out as such. Moreover, many strategies, such as event-driven, have a wide range of sub-strategies (e.g., risk arbitrage, distressed arbitrage, etc.), which GCD does not break out further because of the limited granularity of CSFB Tremont data. That said, GCD’s goal is to match up strategy-specific benchmarks with CSFB Tremont’s indices by year end 2005.

As part of the CSE field work, we reviewed the scorecards for two hedge fund families, Basso Capital Management and Tudor Investment Corporation, both with over \$1 billion in assets under management. Both have more than one strategy facing off against Bear. Accordingly, the scorecards for each fund family have separate ratings columns by fund strategy – e.g., Tudor BVI (global macro) and Raptor Global (long/short US equity) for Tudor Investment Corp. Some of the information provided for each factor applies across all fund strategies and ratings are assigned accordingly, while some factor information is provided on a strategy by strategy basis, for instance NAVs, liquidity of assets, etc. Thus, Bear ratings are assigned on a fund strategy by fund strategy basis, as well as on a composite fund family basis, all on one scorecard.

The ratings analysis described above supports the setting of exposure limits for each hedge fund. In general, limits are assigned for potential exposure (PE), long term PE (PELT), PE before collateral (PEBC), DSL, and term. Limits may get revised in the course of an annual review or by request from the client.

Prior to active trading, Bear negotiates an ISDA with each hedge fund. The ISDA spells out the credit terms under which the fund will trade. Bear has several standard “Additional Termination Events” which, if triggered, permit Bear to terminate the ISDA and liquidate the

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<sup>42</sup> Recall, the guidance ratings are automatically generated by the scorecard given the analyst’s assessment or company’s financials for a given factor. These factor ratings in turn guide the category and final ratings assigned by the analyst, and serve as the benchmarks by which analyst ratings deviations are assessed.

position(s), thus providing significant credit risk protection. These include an NAV trigger, defined in percentage loss terms, an NAV floor, defined in absolute terms and which ratchets up as hedge funds grow, a failure to deliver an NAV statement or audited financial statement clause, key person change clause, etc. Within the Credit Support Annex (CSA), Bear generally negotiates a zero net exposure threshold and the ability to margin on a trade-by-trade basis. In limited, but growing, circumstances, VaR or scenario portfolio-based margining may get negotiated into the CSA. This currently applies most frequently for fixed income clearance customers trading swaps, though portfolio margining for credit derivatives looks set to grow. In terms of recent trends in hedge fund credit terms, a fund analyst noted that clients have recently been pushing back hardest on ISDA NAV triggers; although he explained Bear has remained successful in maintaining monthly decline triggers in the 15% range and rolling twelve month declines in the 25% range. In addition, Bear has recently been successful in establishing asymmetric mark-to-market agreements, which absolves Bear from posting collateral (when the mark-to-market is in the counterparty's favor) while maintaining \$0 thresholds from Bear's perspective. In the negotiation of such credit terms, GCD thinks of these various mitigants holistically. For instance, it may be willing to accept a larger NAV trigger in return for a more favorable mark-to-market agreement.

#### Fixed Income Customer Clearing (FICC)

FICC performs two broad functions: it clears customers' fixed income trades and finances customers' fixed income positions. Rather than utilizing margin loans as with GCS, FICC finances counterparties' positions through short-dated repo transactions documented under master repurchase agreements. The business currently has around 190 clients, most of whom are hedge funds. As of September 2005, the equity in these accounts totaled over \$18 billion, with a gross market position value of approximately \$147 billion.<sup>43</sup> FICC has a strong mortgage and governments focus and resides within the Fixed Income Finance (repo) business.

In contrast to traditional repo where financing is essentially provided on an instrument by instrument basis, FICC takes a more holistic, portfolio-based approach to risk management. For instance, it measures risk on a portfolio basis and assesses that risk relative to the equity in customers' clearing accounts, taking into account the fund's trading strategy and internal credit rating. In addition, credit analysts covering this space examine risk not only in the FICC clearance accounts, but in the other Bear derivatives businesses and GCS, as well as repos done at other dealers.<sup>44</sup> In other words, while most accounts are still margined based on trade specific haircuts, the risk management of this business requires a specialized set of analytical tools and risk monitoring processes.

As with other credit exposures, GCD relies heavily upon analytics developed by FAST, in coordination with Credit Risk Measurement, to risk manage FICC activity. Recall that repo positions are broken down by risk sensitivities for PE purposes. For FICC portfolios, a set of pre-specified risk factor stresses/scenarios are applied to those sensitivities, thus yielding

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<sup>43</sup> These numbers are merely intended to provide an estimate of the size of the FICC activity. Note some GCS activity may be included in these estimates.

<sup>44</sup> GCD analysts speak in terms of three views of FICC counterparty risk. The first view is to examine only the risk in the clearance account. The second view is to leverage the information obtained as a fund's fixed income prime broker to anticipate securities it knows are currently being "financed away" with other dealers coming into the FICC account in the near future; Bear personnel explain this is more feasible through fixed income prime brokerage (as opposed to traditional prime brokerage) as funds typically have only one fixed income prime broker. The third view is simply to consider risk as holistically as possible, taking into account all available information regarding the fund's positions. It is worth noting that while FICC is positioned to view all cash/repo activity, it cannot see derivatives transactions done away from Bear.

portfolio level P/L exposures by risk factor scenario. Currently, there are six risk factor scenario types, which relate to the level and shape of the yield curve(s), credit spread levels (including mortgage OAS), and implied volatility levels. These stresses are specified as single stress points, up and down (e.g., rates rise or fall by 25 basis points). These outputs from these stresses flow into GRMS allowing credit analysts to view on a day-to-day basis the drivers behind any FICC client's portfolio's exposure.

With these metrics in hand, GCD computes an aggregate scenario risk metric for the portfolio using a variance-covariance matrix. Rather than simply summing up the P/Ls from each risk factor scenario, some offset for diversification is provided to reflect the fact that not all scenarios will occur simultaneously. Similar to the underlying scenarios themselves, these covariances are subjectively specified rather than empirically estimated. The result is a "stress VaR" like metric, or a single metric which captures the aggregate tail risk of a portfolio. GRMS labels this metric as "Total Risk".

Each FICC portfolio is monitored relative to a Total Risk/Equity threshold, which is generally set at 30 percent. In other words, once the "stress VaR" for a portfolio rises above 30 percent of its equity, GRMS raises a flag for GCD credit analysts to further investigate. A Client Risk Trend report (CRT) is generated each day, highlighting such portfolios and providing drill down into specific accounts. During the CSE fieldwork, we reviewed the portfolio of Stolat Partners, a hedge fund FICC client whose portfolio Total Risk/Equity ratio had exceeded 100 percent. On that day, the fund was hedging interest-only mortgage derivatives (IOs) with TBAs, exposing the portfolio to significant loss should a flattening rally in the yield curve occur. The flag prompted GCD to talk with the desk about contacting the hedge fund manager to discuss an exit strategy and/or an increase in equity. In this instance, conversations resulted in additional equity being deposited. The example highlights the importance of understanding the strategic rationale supporting hedge funds' trading decisions and portfolio compositions.

In addition to the standard stress analyses, GCD builds customized analytics for monitoring portfolios, particular in instances where margin requirements are computed at a portfolio level based on agreed upon stresses. For instance, we reviewed the so-called "DV25 Test", as applied to DE Shaw. Although there was no CRT flag, this ancillary test indicated the allegedly hedged portfolio was unduly exposed to directional rate risk. Similarly, we reviewed a custom report for ARCAP, another hedge fund, which picked up a hedge position which put the portfolio at greater, not lesser, risk to a move in rates.

## **B. Mortgage Banks & REITS and Warehouse Lending**

As one might expect, given Bear's extensive presence in MBS markets, it does substantial business with mortgage originators and investment vehicles. Bear currently has approximately 250 mortgage bank and real estate investment trust (REIT) counterparties. Activity with these counterparties includes typical derivatives/hedging business, but also forward purchases of loans (for eventual securitization) and the financing of mortgage originations. The uniqueness of this activity (e.g., asset backed finance) coupled with the fact that mortgage banks are unregulated, relatively risky counterparties, warrants discussion of risk management in this space.

Approximately 18% of these mortgage related counterparty are REITs, which are structured in a way different from most financial counterparties, as REITs pay out the majority of their earnings via annual dividends. Approximately 60% of Bear's REIT counterparties are the more traditional mortgage REITs with mortgage bank subsidiaries, i.e., REITs that actually originate and then sell mortgages and need to finance their originations. The other 40% are "paper" REITs that are investment vehicles for leveraged mortgage strategies (not unlike some mortgage hedge funds), which invest in MBS but don't generate revenue through loan

origination and servicing. In general, GCD feels less comfortable with these paper REITs (which are essentially relying on a carry trade) from a credit perspective.

Given that mortgage banks do not have access to customer deposits to fund their loan originations, they require alternative financing (although some mortgage banks are actually subsidiaries of commercial banks that also serve as a source of funding). Securities firms and large banks, including Bear, provide such financing in the form of “warehouse” lines or facilities, which are secured loans against the mortgage assets. Once drawn, these lines are repaid through the sale of the mortgages to investors, or by permanently financing the mortgages through a securitization. While warehouse financing is a profitable business on a stand alone basis, in general these facilities are intended to facilitate the overall customer relationship. Namely, Bear hopes to be included in the originators’ securitization rotations or as a participant in their whole loan sales.

The counterparty credit risk associated with warehouse lending is managed by GCD in conjunction with the Warehouse Finance Group (WFG), which is the Operations group responsible for collateral management. GCD’s credit analysis is based on a review of counterparties’ operating profile, financial data, and on-site due diligence. GCD stressed that the on-site due diligence for this portfolio is crucial to the rating process (also discussed in Section II.D above). Much of the risk in this business is reputational, and to that end GCD focuses on avoiding counterparties engaged in predatory lending or other questionable activities. In addition to seeking warehouse financing lines, counterparties may turn to Bear to hedge their interest rate risk, often through short TBA positions or entering into forward purchase contracts. The hedging tends to involve a cocktail of futures and derivatives intended to match the risk in the portfolios. For example, hedging might involve the use of a three year swap to hedge a three year hybrid-ARM. It is worth noting, that Bear’s forward purchases of loans tend to be “right way” risk, as those forwards come into the money from Bear’s perspective as rates are falling and loan originations (and thus origination fees) are rising.

The warehouse financing business has a total limit of \$16 billion (notional loan amount), and \$7.1 billion was funded as of September 2005. It operates primarily in the US, with one London warehousing counterparty. The primary asset classes funded are Alt-A and sub-prime residential mortgages, followed by jumbo and home equity loans. The majority of loans tend to be floating rather than fixed. As mentioned above, take-out is either through securitization or whole loan sales, with securitization being the more frequent option (approximately 90%). The assets are marked daily, and haircuts fall within the 2-7% range. Carrying value of loans is capped at the unpaid principal balance (i.e., par), regardless of market value. Of the 250 counterparties, approximately 35 currently have a warehouse financing line, 19 of whom are starter clients of the “EMC Residential Mortgage Warehouse Program” with much smaller facilities.<sup>45</sup>

While effective limits are in notional amounts, they are then converted into a PE limit, which is calculated by using a “factor PE.” The factor is equivalent to 5% of the notional value of the loan. Therefore, if a haircut is less than 5% a loan may have PE. All clients have an internal warehouse facility limit, a portion of which Bear may have committed to provide for some specified period of time (usually 364 days). With a committed facility, Bear commits to lend to the client as long as it meets certain financial covenants (e.g. in good financial standing, leverage levels, liquidity, etc.). In addition, the loans must meet certain criteria (FICO, zip code

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<sup>45</sup> The EMC Residential Mortgage Warehouse Program was set up in July 2004, focusing on small originators (capital of \$1-25 million). The loan take-out is a sale to EMC (a Bear affiliate) or other approved investors. This is a very on-site, high-touch business model, with a good deal of on-site due diligence. All collateral types are funded, but concentration tends to be in conventional and jumbo mortgages. The business currently has a limit of \$1 billion, and usage of \$679 million as of 8/31/05. The philosophy behind this business is to establish early relationships with small originators that will grow, and move the relationships forward. This also provides BS with insight into the market at a more granular level.

concentration, etc.). Within the US, there is a total of \$1.9 billion committed in warehouse facilities. Recently, MBS deals have been getting larger in terms of notional size, so limits have increased accordingly as clients finance large levels of mortgages for a single deal. Bear may also have limits for “wet” funding, where all loan documentation has not yet been received. This limit is usually between 10% and 50% of the warehouse limit. Once a specified period of time (usually seven – ten days) passes and the documents are not received, the loans are repurchased by the original mortgage bank or assigned a zero market value. After a deal is priced, counterparty credit risk becomes de minimis and execution risk remains.

As mentioned above, GCD focuses on the operating profile, financial data, and on-site due diligence when establishing a credit rating. With respect to the business profile, GCD expects that originators will have at least \$50 million in capital. GCD also examines the origination channels and the type of products. In terms of financial analysis, GCD assesses leverage, funding sources, liquidity, profitability and margins, cashflow, and quality of accounting, and repeatedly stressed the importance of on-site due diligence visits. The Bear team at these visits generally includes someone from GCD, operations, the funding desk, and the relationship manager. The team seeks to assess the quality of operations and management at the potential counterparty. GCD stated that these visits provide an opportunity to validate the stated strategy in person, as well as determine the operational sophistication of a potential counterparty for themselves. GCD, as well as the business, appears to place a high premium on complying with predatory lending standards, and structures many of its processes to capture warning flags associated with predatory lending.

Warehouse facilities are documented under a master repurchase agreement, which specifies criteria for loan inclusion and loan removal. These protections ensure against the risk of Bear financing lesser-quality loans that may not be readily securitized or sold, especially in a challenging credit environment. It also establishes loan quality and underwriting criteria, a key control against predatory lending. In addition, this agreement will contain financial covenants if covering a committed facility, such as those discussed above. Actual loan files are housed at a custodial bank, and governed by a custodian and disbursement agreement. The custodian issues a trust receipt evidencing the existence of the mortgage documents. GCD also seeks out legal opinions as to the enforceability and perfection of the security interest.

As WFG, rather than GCD, is responsible for the mortgage collateral itself, they coordinate documentation, custodian trust receipts, pricing, financing, and periodic file-level due diligence to assure compliance with underwriting guidelines (another check for predatory lending). The internal Warehouse Finance System (WFS) was built to manage day to day deals and store historical data. It allows monitoring of concentration, e.g. by product or FICO score. This also allows the group to notice if a mortgage bank tries to recycle a loan. The pricing system is called PRISM, and is used in conjunction with input from trading personnel to monitor market volatility. For example, if a trader changes the price on a product, and a product is in other deals, there will be a conversation around changing the other prices. This type of monitoring is necessary because while traders will monitor their own positions closely, there is concern that they may not choose to apply the same diligence to client positions that Bear is financing. PRISM allows WFG to address this risk.

As part of the due diligence process surrounding the financing of loans, WFG uses Real Quest, an outside vendor, to test property valuations provided by the client. The client's valuations are subject to a 15% variation threshold, and if breached, WFG next turns to a Hanson Review, which is also an automated valuation report, but with more detail. As for third party due diligence, Bear scrutinizes its vendors and has approved two that have the ability to address predatory lending issues.

As mentioned previously, trader marks are updated daily. Pricing is provided by the Bear whole loan trading desk. Monthly servicer loan performance files are checked for delinquencies, updated loan balances, and aging of loans. Loans are repriced monthly based

on the submitted loan performance data, to make sure that the high quality loans haven't gone out the door, leaving Bear holding the lesser quality loans. Loans greater than 60 days delinquent are generally repurchased from the facility or marked to zero. However, Bear may occasionally agree to fund non-performing loans, usually when they will run the take-out packaged as "scratch and dents." WFG periodically tests a sample of automated valuation of properties. In addition, as mentioned above, WFG conducts on-site due diligence of loan files where they randomly select and test loan files funded for completeness and possible predatory lending. Bear characterized this process as going beyond legal due diligence, and taking on a role more akin to that of an underwriter. They take questionable loan files to the counterparty's underwriting manager, and ask for explanations. Bear noted that many of the questioned files already have Hanson files supporting the valuation in questions.

### **C. Municipals**

Trading with municipal (muni) counterparties generates a significant portion of overall counterparty credit exposure at Bear. Further, there are some unique risk considerations in this space. In general, the trades tend to be longer dated, counterparties do not post initial collateral by market convention, and there are recourse issues unique to muni counterparties. The portfolio contributes approximately \$2.5 billion of PE, and over \$1 billion of CE.<sup>46</sup> There are approximately 350 muni counterparties, with the main sectors (in order of exposure) including government, healthcare, utilities, and housing. Muni counterparties tend to be highly rated, with over 95% of CE attributed to counterparties at least at the Bear 4 level, equivalent to a BBB from S&P. While most of this exposure stems from derivatives, it also represents transactions that allow municipals to reinvest the proceeds from bond issuances.

The goal of municipals entering into derivative transactions is to lower their cost of borrowing. While the bulk of the activity in this space is in plain vanilla rate hedges, even the more complex, structured transactions tend to be a variation on this theme. Municipals generally issue floating rate debt, and swap it to fixed. There are three types of bonds issued by municipals: general obligation, revenue, and variations, with characteristics of both general obligation and revenue. General obligation bonds are backed by the "full faith and credit" of the issuer, who is obliged to increase property taxes if necessary to make the payments. Obligations may be funded by periodic legislative appropriation by an elected body, which creates appropriation risk – unique to municipals. Although this risk has the potential to disrupt the repayment schedule, it is not, according to GCD, a material risk. Historically, municipalities have understood that that nonpayment effectively terminates their ability to access the capital markets. However, municipal entities issuing debt address this risk in various ways. For example, in Kentucky, appropriations are automatic unless otherwise specified. In general, payments are timed to fall at least a few months after the budget date. GCD must understand each set of rules in order to understand the exact nature of the appropriation risk. It is worth noting that a lack of appropriations does not constitute a default – the payment must subsequently not occur. Revenue bonds are secured by a specified stream of revenue, such as tolls or water authorities, and a trust indenture governs the flow of funds, investment of monies, and priority of payments. Swaps hedging revenue bonds tend to trade on par with the bonds (i.e., the fate of the swap counterparty is essentially tied to the bond holders in terms of credit risk).

GCD bases its muni credit analysis on several fundamentals. It considers the economic strength of the counterparty or its service area. For example, it will examine the size of the tax

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<sup>46</sup> These numbers do not include tobacco-related securitizations, or the Tennessee Valley Authority exposure which generates an additional \$800-900 million of PE and \$300 million of CE. These exposures are, however, monitored by the same group of credit analysts who cover municipal counterparties.

base and financial strength, which includes the ability to raise revenues. There are also leverage ratios which may be tied to the economic base or may look more like traditional corporate debt ratios. In some areas, such as healthcare and toll roads, there are competitive issues. In healthcare, the industry has become quite competitive and non-profits (who issue debt in this category) must compete with for-profit entities. With toll roads, drivers have the option to take alternative, free routes.

As a general practice, municipalities do not post initial margin, and there is not an easy way to short muni credit. Therefore, GCD must live with the risk that arises when rates fall and the PE increases, although long-dated contracts may have collateral thresholds and additional termination events based on ratings. Also as credit mitigation, munis often establish debt service reserve funds. These are typically large enough to cover two payments on the bond (one year's worth) and often have the ability to cover any swap termination payments. This acts as a liquidity fund to cover event risk, such as a disruption of sewage service or an airport shutting down.

In addition, munis sometimes use monoline insurers to guarantee their bonds and derivative obligations. This reduces the probability of counterparty credit losses as both the insurer and issuer must default. In most cases, swap termination payments may be insured in addition to the (hedged) bonds. For Bear counterparties that are "wrapped" by an insurer, credit analysis is first done on the underlying credit. At the end of the analysis, the wrap is evaluated. If the insurer's credit is below A, the underlying credit would become the basis for any downgrade triggers. For a wrapped counterparty, the PE is assigned directly to the insurer and hits the insurer's PE limits. GCD is working to develop a system for allocating the PE to the insurer or municipality, in order to have a more granular understanding of their exposure to the respective parties.

## **IV. Corporate Lending**

Bear is a relatively recent entrant (the last of the CSE firms) into the corporate lending business. In 1999, the Corporate Lending group was formed as part of the High Yield business, with a focus on supporting the Investment Banking groups. Broadly speaking, there are three types of loans originated by this business: event driven, relationship, and asset backed relationship loans.

Event driven loans are non-investment grade (or leveraged) loans extended to finance acquisitions, leveraged buy-outs and similar deals. These loans are profitable on a stand alone basis and often involve a financial sponsor such as a private equity firm. The financing packages associated with these deals are typically comprised of several components/loan types. Leveraged loans may be fairly short-term "bridges", which are intended to be "taken out" by subsequent debt or equity underwritings before they are even funded. The leveraged loans may also be "term-loans", which are intended to be drawn down and remain in place for several years or more. It is not uncommon for Bear's event driven transaction commitments to exceed \$250 million. Within Bear's Corporate Lending Group, there is a Leveraged Finance Group (LFG) dedicated to transactions in this space, with bankers organized by sector.

Relationship loans are liquidity facilities, most often revolving lines of credit, provided to corporations in order to facilitate investment banking relationships. The extension of such facilities is common among banks and securities firms, and these are sometimes referred to as "pay to play" or relationship loans. At Bear, relationship loans are extended to both investment grade and non-investment grade counterparties. While investment grade commitments comprise the majority of total commitments, non-investment grade facilities fund much more

frequently and thus represent a larger portion of funded commitments.<sup>47</sup> For non-investment grade relationship loans, the risk of these positions is sold to an internal group within Corporate Lending dubbed the Loan Portfolio Management (LPM) Group, and any subsequent P/L is born ultimately by the Fixed Income Division. For investment grade relationship loans, LPM also manages the hold positions, but P/L is borne by the specific relationship sponsor, for example an investment banking group. In addition to the loan approval and monitoring processes discussed further below, relationship loans undergo an upfront profitability assessment, so that that cost of providing this below market financing can be assessed relative to the expected benefit, in terms of future business.

The Corporate Lending business also has five asset backed relationship facilities in place. These are fully collateralized bankruptcy remote vehicles that are used to finance auto loans and mortgages, with clients such as Ford and GMAC.

For a detail of Bear's limits and exposures by loan category as of May 6, 2005, see the "Loan Portfolio Management Exhibits to SEC Presentation (May 18, 2005)". In addition to having aggregate limits in place for the above categories, more granular limits, by industry and largest issuer, are in place to limit the concentration of hold positions. Bear personnel assert individual target hold amounts are "in most cases quite low and realized the vast majority of the time". The total exposure is spread across more than one hundred counterparties.

### Loan Approval Process

The loan approval process at Bear can be described as multi-step and involving a variety of groups/participants. In addition, the ultimate approval of the sizeable loans occurs a senior levels within the organization – i.e., at the Principal Activities and Executive Committee levels. The primary groups/participants involved throughout the ex-ante approval of a loan are 1) the business unit/deal team proposing a loan, 2) two quasi-independent functions established within the Corporate Lending business: a Quality Management Function (QMF), and LPM, and 3) the Principal Activities and Executive Committees - i.e., Bear senior management. Relative to its peers, Bear's independent credit function has a relatively light touch on the corporate lending business, which is exercised by Mike Alix, Head of GCD.<sup>48</sup>

Deal teams are responsible for loan diligence. These teams are coordinated under the oversight of COOs (there are five COOs in LFG), who ensure appropriate staffing in terms of industry/product group as well as seniority. Deal teams typically consist of three to five banking members. Within the team, a Diligence Captain is assigned, who appears before committees and answers questions. Diligence is performed using an "analytical approach" that involves the analysis of earnings, capitalization, liquidity, cash flows, asset and/or collateral coverage, sensitivity analysis, risks and potential risk mitigants, etc. The credit analysis performed by the deal team places a heavy focus on the prospective cash flows of the underlying company. For each transaction, the teams produce Committee deal memos that include deal recommendations and rationales.

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<sup>47</sup> Typically investment grade counterparties can access capital markets through the commercial paper market more efficiently than through these liquidity facilities, and thus the facilities are largely unfunded. Non-investment grade counterparties, on the other hand, tend not to have access to commercial paper markets.

<sup>48</sup> Mr. Alix is a member of Principal Activities Committee and anecdotally has explained he spends a fair amount of time reviewing these transactions as presented to Committee for approval. When Bear entered this business, the decision was made that it would not be worthwhile for GCD to "reinvent the wheel" so to speak, by performing loan level due diligence and replicating the work of leveraged finance bankers (who have the greatest expertise in this space). That said, the Corporate Lending business has developed strong internal controls, and large transactions require approval at very senior levels in the organization.



QMF is responsible for designing the overall analytical methodology for credit analysis and prescribing content guidelines for committee memos, and for providing due diligence training to the LFG bankers. The due diligence standards are described as flexible so that particular credit analyses can be geared towards the particular counterparty and transaction under consideration. In other words, the broad philosophy is that bankers should be able to defend a particular credit, but approval cannot be boiled down to a simple check list. Before the deal team analyses are presented to the Committee for review and approval or rejection, QMF bankers conduct a Pre-Committee Review, providing a second set of eyes to the analyses before going to the Committee. QMF reviews the deal memo and meets with the deal team to discuss any possible issues, and at times requests additional work or redrafting.

Also, in addition to assigning the initial mark for relationship loans and managing the hold loan portfolios (discussed briefly above), the LPM group “is responsible for evaluating transactions originated by investment bankers and advising on pricing and other consideration during the due diligence process”, and assigns initial risk ratings to loans. These ratings are assigned using scorecards, expert judgment, and external ratings and models. In addition to informing the loan approval process, these ratings affect the management of exposures after closing, both in terms of hedging strategy and hold amount. These ratings are distinct from the GCD ratings process.

Commitments are approved at different levels based on their size. The Principal Activities Committee approves commitments of \$25 to \$50 million that are less than 25% of total facility to Bear. A certain subset of committee members approves commitments under \$25 million that are less than 25% of total facility to Bear. The PAC and Executive Committee approve all other deals. The Executive Committee reviews are much briefer than the PAC committee reviews - e.g., the Executive Committee deal summary memos are only a couple of pages long, whereas the PAC memos could be as long as 30 pages. The PAC has 16 members consisting of members of GCD, the Risk Management Department, QMF, Co-heads of Investment Banking, and senior management outside of Investment Banking.

Bear, like its peers, manages the risk from originating leveraged loans primarily by syndicating the exposure to third parties, including other banks and hedge funds. As with other credit-sensitive products, investor demand in recent years has been very strong for these types of loans. However, firms originating in this space bear substantial exposure should the credit environment deteriorate. In many instances, Bear has the ability to modify terms, or even withdraw from the deal(s), in the event of certain credit events. But that could be done only at a significant cost, measured in relationships and reputation. Thus there would be real pressure to originate the leveraged loans and other financing that was originally offered, under the terms originally outlined, even if the prospects for syndication had dramatically decreased. Further, the likelihood of leveraged lending commitments being drawn down rather than remaining unfunded would likely rise sharply if the environment deteriorates.

#### Ongoing Portfolio Monitoring/Mark-to-Market/Hedging

Given that the risk in the hold (post syndication) loan portfolios is fairly diversified, it is thought of as market risk for internal risk management purposes. The LPM group and the Risk Management Department share in the risk monitoring of this portfolio. As mentioned above, the LPM, and ultimately Fixed Income, Equities, or Investment Banking, incurs any mark-to-market loss on hold positions. LPM is responsible for the daily marking of bank loan positions, and in the case of investment grade loans, hedging this risk. In addition to having formal lending and diversification requirements, there are formal hedging guidelines in place. The LPM group has a variety of exposure management tools at its disposal, including loan sales, CDS, short positions, and traditional work out. The group is not currently using basket hedges, but has considered doing so in the future. The approach taken by LPM to monitoring credit is described

as “a blended approach of traditional commercial banking and buy side approach, utilizing mark-to-market valuation and risk ratings”. The group performs ongoing risk assessments and rating adjustments by conducting reviews of quarterly financial results, performing on site visits, following pricing of other obligations in the capital structure, following industry trends, attending bank group meetings, and so on. The LPM group also monitors ongoing covenant compliance. The LPM group is responsible for producing certain risk reports and informs senior management of any material credit deteriorations or improvements and mark changes.

In addition, the Risk Management Department maintains a Credit Watch List, which provides senior management with an independent assessment of the credit quality of the trading portfolios, including the bank portfolio. There are number of factors that cause a position to get identified for the Watch List – e.g., large or aged positions, current news stories, stock and spread moves, rating changes, covenant compliance, etc. These reports are sent to the President and COO plus the heads of fixed income investment banking and portfolio managers. They outline the principal risks, identify upside possibilities and forecast potential losses, and make selling/hedging recommendations. Furthermore, the Risk Management Department shares in the monitoring of adherence to bank loan limits and hedging requirements. Finally, the Risk Management Department’s broad mark verification duties, discussed in the Market Risk Review, are applicable in this space as well.

## **V. Areas of Focus**

Overall, we find that the credit risk management function at Bear is robust given its current credit risk profile and meets CSE standards. Though our review uncovered no material deficiencies, we note below several areas deserving of ongoing monitoring going forward.

### CalBear

On September 8<sup>th</sup>, Bear announced it was entering the energy trading business via a joint venture with Calpine Corporation (Calpine). This new venture, CalBear Energy (“CalBear”), which will trade electricity and natural gas, is a wholly owned subsidiary of Bear. Calpine traders will trade as agent on CalBear’s behalf, and Bear and Calpine will share in the P/L of this new venture. In essence, Bear is providing Calpine, a non-investment grade entity, with its A credit rating, while Calpine is providing Bear its trading ability and physical markets expertise, infrastructure, and current customer base. All of the risk generated through CalBear activities will be managed just as any other Bear business. Consequently, GCD has been preparing to integrate this new venture into its risk management processes.

Obviously entry into this new business poses various credit risk management challenges. For starters, GCD will be required to evaluate (and rate) the credit quality of a large group of new counterparties from a new industry group. This will require GCD to develop expertise in this area, including an understanding of the transactions counterparties wish to engage in. The Head of GCD has made the Tax Exempts and Corporates risk manager responsible for this new space. He also wishes to hire two additional credit personnel with energy experience to be located in Houston.<sup>49</sup> Similarly, considerable work will be required in establishing the documentation for the new counterparties. Bear will not be accepting any novated trades from current Calpine customers, rather all trades under the JV will be subject to documentation and credit standards established by Bear.

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<sup>49</sup> It is important to note that none of the current Calpine controls are being eliminated. Thus the Bear risk infrastructure is supplementing rather than substituting for these controls.

In addition, GCD needs to establish credit risk limits and develop its credit risk measurement capacity to manage this new business. From a risk measurement perspective, considerable work has been done in terms of considering how to leverage Calpine's current systems and data, and integrate those with Bear's infrastructure. Likewise, GCD has been thinking about risk appetite with respect to these new counterparties. GCD has established threshold guidelines for these counterparties that are considerably larger than the guidelines discussed in Section II.ii above. For instance, the maximum threshold for a BBB counterparty will be \$20 million as opposed to \$1 million. GCD explains this is not surprising, given that energy counterparties often do not have excess liquidity to post as collateral and that such trades tend to generate "right way risk" (e.g., an electricity producer owes Bear money as the price of electricity is rising). Along these lines, OPSRA staff note that other CSE firms focused in power trading exhibit some of their largest counterparty exposures to energy counterparties.

CalBear has yet to commence trading. Once this new venture has gone live, OPSRA staff intends to follow up with respect to progress made towards rating new counterparties, the measurement of PE, and other challenges arising from this new business.

### Financing of Illiquid Assets

Through its custodial bank, Bear finances some illiquid assets, such as limited partnership interests in hedge funds and restricted equities or corporate bonds. Gross of collateral, the total notional size of these loans was \$487 million as of August 2005. The hedge fund loans serve effectively as heavily over-collateralized short-term liquidity facilities to funds of funds (FoFs) that move investor money between many different underlying funds. Frequently, a FoF redeems shares in one hedge fund and wishes to reinvest in another without waiting to receive the redemption proceeds. While the overall size of this activity is not troubling at present, OPSRA staff will continue monitor growth in this space.

In addition, through its equity derivatives business Bear transacts in derivatives where the underliers are baskets of hedge fund shares and hedge fund indices. Currently, this Structured Funds Group has \$4.8 billion in notional value transactions, representing \$3.1 billion in "Gap to Zero" (maximum possible loss) exposure. Through these derivative transactions, Bear provides downside protection as well as leveraged exposure to fund investors, often through a FoF manager. Under some structures, Bear owns the fund shares being leveraged and passes the economics of the exposure on to the investors via total return swaps. In a few instances, Bear extends loans to the fund investors. The diversification amongst the hedge fund shares referenced in the individual transactions is a key determinant of the riskiness of this activity. Transactions are typically structured to withstand multiple fund defaults and significant performance deterioration within any particular investment strategy. In other words, considerable customer equity must first be eaten through before Bear could incur losses resulting from hedge fund share moves, but the level of protection afforded by this cushion depends on the number of reference assets that could simultaneously "gap" down.

The Risk Management Department has primary control responsibility for this business. That said, defining the risks generated in terms of market versus credit risk is not entirely straightforward. In some cases leverage is being extended to fund investors, although Bear typically does not have recourse to a credit worthy counterparty and therefore the risk management focus is on the underlying hedge fund shares or indices. In other cases, the delineation between market and credit risk is clearer. For example, some transactions involve the desk writing call options and delta hedging its short position using the underlying fund shares; the resulting basis risk clearly has a market risk flavor, although still quite distinct from a

traditional options business.<sup>50</sup> As this business exposes Bear to hedge fund performance, and given the materiality and complexity of the risks generated, we will continue to monitor and discuss with credit and market risk management this activity.

### PE Model Validation

Due to the relatively longer time horizon across which PE models are used to project potential risks, as compared to the VaR models used for market risk purposes, empirically validating or “backtesting” PE results poses substantial challenges. While Credit Risk Measurement and FAST have implemented processes for assuring the quality of PE inputs and repricing techniques, GCD has not implemented any sort of statistical validation of ex ante model predictions. Given the inherent imprecise nature of PE estimates, GCD personnel convey a feeling that dedicating a great deal of resources towards constructing PE backtests is not a worthwhile venture. That said, OPSRA staff do expect GCD to provide some sort of ongoing validation of the ability of PE models to anticipate material risks. Consequently, we intend to further discuss with GCD approaches (not necessary bound to a focus on a particular statistical test) to gaining comfort with PE model outputs and comply with the requirements under CSE and Basel 2.

### **Conclusion**

We find that the credit risk management function at Bear is robust and that credit risk appears to be adequately measured, monitored and managed given the firm’s current credit risk profile in a manner consistent with the requirements of the CSE rule. That said, we have noted a number of issues warranting supervisory attention going forward. We will continue to address these issues as part of our prudential supervision activities, either through the monthly risk review process or through ancillary focused reviews.

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<sup>50</sup> Obviously the infrequency with which hedge fund share NAVs are published (monthly) and can be purchased or redeemed (typically quarterly) severely limits how often hedges can be re-balanced.

## Appendix A: Bear Personnel Consulted for CSE

Mike Alix	Head of GCD
Judy Modica	MD, Policy and Administration, GCD
Wayne Buchan	SMD, Mortgage Finance & Financial Institutions, GCD
Ross Josephson	VP, Mortgage Finance & Financial Institutions, GCD
Kristen Reifsnnyder	MD, Municipals & Corporates, GCD
Rupert Cox	SMD, Risk Measurement, GCD
Chris Mushell	MD, Hedge Funds/Risk Measurement, GCD
Andrew Louw	AD, Hedge Funds/Risk Measurement, GCD
Barbara Biel	SMD, Hedge Funds, GCD
Eric Cappelmann	AD, Hedge Funds, GCD
Sam Reckford	MD, Systems/Project Management, GCD
Bob Neff	Head of Risk Management Department
Marc Galligan	SMD, Risk Management Department
Keith Barnish	SMD, Leveraged Finance Group
Daniel Celentano	SMD, Leveraged Finance Group (Quality Insurance)
Victor Bulzacchelli	MD, Leveraged Finance Group (LPM)
Chris Engdall	SMD, GCS Risk Control Department
Jeff Marcus	SMD, GCS Risk Control Department
Joe Fusco	MD, GCS Risk Control Department
Mike Fedak	SMD, Interest Rates Trading
Eileen Albus	MD, Warehouse Financing Operations
Gerald Mc Crink	MD, Fixed Income Finance
David Marren	SMD, Fixed Income Finance
Timothy Greene	SMD, Fixed Income Finance
Matthew Chasin	SMD, Fixed Income Finance
Ariadne Capsis	MD, Derivatives Operations
T. Timothy Murray	SMD, Derivatives Documentation
Tammye Erb	MD, Derivatives Documentation
Anita Lee	AD, Derivatives Legal
Ken Kopelman	SMD, Derivatives Legal

Appendix B: Materials Relied Upon

Date	Title	Format
4/20/2005	Credit Risk Management	Presentation
5/4/2005	CSE Application	
5/18/2005	Presentation to the SEC	Presentation
	Corporate Lending	
	Loan Approval Process	
	Loan Portfolio Management	
	Deal Examples	
	Risk Management	
5/18/2005	Loan Portfolio Management, Exhibits to SEC Presentation	Document Request
	Exposure Limits	
	Exposure Reports	
	VaR Reports	
	CDS Report	
	Axe Sheet	
	Administrative Agency Report	
5/18/2005	Loan Approval & Management Process, Exhibits to SEC Presentation	Document Request
6/15/2005	Global Clearing Services Risk Management	Presentation
5/10/2005	Bear Stearns Global Clearing Services Risk Control Group, Policies & Procedures Manual	Document Request
9/7/2005	RACS - Risk Factors Overview (Global Clearing Services)	Document Request
9/7/2005	Theoretical Positions Summary (Global Clearing Services)	Document Request
9/7/2005	Reports (Global Clearing Services)	Document Request
9/7/2005	Overview of Process for requesting Enhanced Leverage (Global Clearing Services)	Document Request
August-05	Global Credit Policies and Procedures	Document Request
8/22/2005	Global Credit Department	Presentation
8/23/02005	Credit Risk Measurement Methodology	Presentation
April-05	Potential Exposure Methodology	Document Request
May-05	GRMS User Guide	Document Request
8/24/2005	Ratings Framework	Presentation
8/23/2005	List of reports used in the management and monitoring of credit risk exposure,....	Document Request
8/23/2005	Derivatives Margin Call Report	Document Request
8/23/2005	Derivatives Exposure Report/Desk as of 7/29/05	Document Request
8/23/2005	Agenda for the Credit Policy Committee (select weekly reports)	Document Request
9/6/2005	Warehouse Lending	Presentation
April-05	Residential Mortgage REIT Portfolio Review	Document Request
9/7/2005	Hedge Fund Credit Framework	Presentation
9/7/2005	Client Risk Trend: Risk Measurement Methodology (FICC)	Presentation
9/12/2005	Collateral Management for Financing Transactions (and Annexes A through E)	Presentation
9/12/2005	Derivatives Operations Credit Process	Presentation
9/12/2005	Derivatives Documentation	Presentation
9/12/2005	ISDA Master Agreements	Presentation
9/12/2005	Legal Certainty Review Process	Presentation
9/13/2005	Municipal Derivatives	Presentation

Note: In addition to these materials OPSRA staff reviewed various counterparty level exposure reports and other credit related documents. Examples include ratings scorecards and risk reports for individual hedge fund fixed income clearance counterparties.

**THE BEAR STEARNS COMPANIES INC.**

**REVIEW OF APPLICATION TO BECOME A  
CONSOLIDATED SUPERVISED ENTITY**

**REPORT ON LIQUIDITY RISK MANAGEMENT**

**September 29, 2005**

**THE BEAR STEARNS COMPANIES INC.**  
**LIQUIDITY RISK MANAGEMENT**

**I. EXECUTIVE SUMMARY**

The Bear Stearns Companies Inc. (“Bear Stearns”, the “firm” or “Company”) has submitted an application to become a Consolidated Supervised Entity (“CSE”) subject to the requirements set forth in Rule 15c3-1 (and related appendices thereto) under the Securities Exchange Act of 1934.

Staff from the Division of Market Regulation reviewed Bear Stearns’s liquidity risk management function primarily to evaluate the firm’s policies and ability to assure adequate liquidity and funding at all times, including periods of significant market fluctuations and financial stress. Discussions and planning of the work began in June 2005 with management of the Bear Stearns Global Treasury function. The majority of the field work was conducted at the firm in late July and August of 2005. Follow-up questions were addressed by telephone and email. The staff’s report was drafted during August and September 2005.

The scope of the review included the firm’s liquidity risk management framework, including the policies and models used for liquidity risk management, governance structure, organization structure, lines of authority, internal management reports, and other documents including the firm’s liquidity crisis plan. Treasury’s policies and controls with regard to sources of funding, and management of the balance sheet including capital, leverage and asset and debt levels were also considered. Staff from the firm’s Internal Audit Department were also consulted.

The review of the liquidity risk management functions of Bear Stearns found two issues, both of which are in the process of being resolved by the firm. First, there are no formal documented policies and procedures for the global treasury function at Bear Stearns, other than the Contingency Funding Plan. While it appears, based on the staff’s review, that the firm has an adequate liquidity risk management system, documented policies and procedures are critical for consistency of the risk management process and are necessary for the SEC to carry out its roles as a prudential supervisor, and as such, are required by rule 15c3-4. Bear Stearns has agreed and is in the process of developing a comprehensive set of policies and procedures with the intent of having a draft by the end of October 2005.

Second, an integral part of the liquidity risk management process at the four previously approved CSEs is the maintenance of a parent company liquidity portfolio consisting of cash and/or highly liquid securities immediately available to the parent company that may be monetized or sold to provide liquidity anywhere in the holding company chain. While it is the staff’s opinion that Bear Stearns’ parent company only



liquidity analysis and process is adequate as a liquidity risk management tool, it does not provide an adequate amount of mobile liquidity available to the parent company that can be accessed quickly to respond to a crisis at an unregulated subsidiary. The staff recommended that Bear Stearns establish a parent company liquidity portfolio. If the securities to be included in the liquidity portfolio are held in a regulated entity, there must be a mechanism in place that allows these securities to be immediately available to the parent company on a daily basis without regulatory restriction. There are multiple ways to achieve this including the daily pledging of securities as collateral for intercompany loans to subsidiaries or via a reverse repurchase agreement between the parent company and the subsidiary.

Discussions were held with the Assistant Treasurer – Liquidity Risk Management, the Controller and the CFO during September 2005 to determine an acceptable structure and minimum amount to be established. Management at Bear Stearns, including the CFO, has agreed to establish a parent company liquidity pool consisting of a minimum of \$2.0 billion in cash equivalents and a minimum of \$3.0 billion of high quality unencumbered debt and equity securities. The method of inclusion of the securities in the liquidity portfolio is currently being discussed with Bear Stearns.

Bear Stearns is implementing some proposed changes to enhance its liquidity risk management function and considering others which are described under “Planned Enhancements”. As of the date of this report, these are works in process which the staff will review with the firm as part of its ongoing supervisory program.

Bear Stearns currently has adequate liquidity and sufficient capital to fund its current business in the staff’s opinion. Overall, with respect to liquidity risk management, Bear Stearns has an adequate liquidity risk management function to become a CSE, and accordingly, it is recommended that the application by Bear Stearns to become a CSE, as it pertains to the liquidity risk management function, be approved.

## **II. REVIEW PURPOSE AND SCOPE**

The primary purpose of the SEC's review of Bear Stearns' liquidity risk management was to evaluate the firm's policies and ability to assure adequate liquidity and funding at all times, including periods of significant market events and financial stress. Most failures of financial institutions have occurred in large part due to a lack of adequate liquidity, which has amplified the impact of other events. The review evaluated the adequacy of current policies, procedures and controls with respect to their effectiveness in managing liquidity and funding risk on a global, consolidated basis. The staff, in developing its review process, identified certain core elements of an effective liquidity and funding risk management framework to be considered as part of the application review. These elements are summarized below.

### **Governance structure**

A well-defined and documented governance structure for the management of liquidity and funding risk should exist. This would include the organizational structure and established oversight executive committees with clearly delineated mandates covering their membership, responsibilities, lines of reporting, and frequency of meetings. A global treasury function to manage the liquidity and funding processes should exist under independent oversight of appropriate committees, such as the Finance Committee.

### **Liquidity and funding management policies and procedures**

Detailed and documented liquidity and funding policies and procedures established by global treasury and approved by independent oversight committee(s) should exist. The firm's policies and objectives should be clearly delineated and accompanied by appropriate procedures. All significant liquidity and funding risk management areas of responsibility of the global treasury function should be described.

### **Management internal reporting system**

Global treasury should have a formal management reporting system that conveys to senior management and oversight committees on a regular basis the relevant qualitative and quantitative information needed to make informed liquidity and funding decisions, as well as related risk management and business decisions. The content of the reporting package may vary by firm, but should include relevant information regarding funding sources and uses, liquidity and leverage ratios, limits and excession reporting, liquidity portfolio, credit facilities, collateral and unencumbered collateral, new issuances and term structure of debt.

## **Stable and diverse funding sources**

Each firm should have established stable and diverse sources of funding to limit dependencies on any one investor group or region. The focus should be to continually expand and globally diversify the firm's funding programs and activities across debt markets, and investor and creditor base to minimize dependence on any one investor group or region. Diversification may be achieved through the use of limits, for example, a limit on the amount of debt concentrated with a single investor.

## **Borrowing capacity of unencumbered assets**

The firm should continually monitor the borrowing capacity of its portfolio of unencumbered assets and related liquidity ratio (ratio of borrowing capacity to amounts due within one year) and establish a target minimum ratio.

## **Less liquid and illiquid assets**

Policies and procedures for identifying, monitoring, and managing less liquid and illiquid assets should be in place. Less liquid assets should be funded by long term debt or equity to the extent that they cannot be funded on a secured basis and illiquid assets should generally be funded with long term debt or equity.

## **Limits**

A formal limit setting and monitoring process should be established and documented by the global treasury function and be approved by the appropriate oversight management committees. Limits on balance sheet assets and limits by borrowing type and maturity should be established. A formal system of limit excession reporting and resolution should be established.

## **Liquidity Portfolio**

Each firm should maintain cash and/or a liquidity portfolio of segregated and unencumbered securities consisting of highly liquid and highly rated securities, such as U.S Government and agency obligations, and asset-backed securities. These assets may be sold or pledged to provide immediate liquidity to repay maturing debt, satisfy collateral calls or meet other obligations. The ability to hypothecate these securities without market impact should be tested regularly.

## **Committed credit facilities**

Firms should maintain an appropriate mix of unsecured and secured committed credit facilities in order to have sources of committed funding in place should a liquidity funding stress event occur. Committed secured credit facilities to fund various assets classes, including less liquid assets, with reliable banks and other counterparties are increasingly common. Committed secured credit facilities are regularly drawn and repaid

in the normal course of funding secured financing transactions. The unsecured and secured committed credit facilities continue to be an area of focus for credit rating agencies. Although firms are aware of the possible signaling effect of draws under the unsecured facilities, many firms have attempted to mitigate the signaling by negotiating with the banks that the facilities will be regularly drawn and repaid. In some instances however, committed unsecured facilities may only be drawn upon in extreme liquidity events, and doing so may result in signaling a liquidity issue and significant reputational damage to the firm.

### **Liquidity crisis plan**

Each firm should maintain a documented and approved (by independent oversight committee(s)) contingency funding plan which sets out a detailed plan of action to manage a liquidity stress event within the firm. The goal of the contingency funding plan is to manage liquidity risk and communicate effectively with creditors, investors and customers during a funding crisis or market stress event.

### **Stress testing**

Liquidity and funding stress testing should be performed on a periodic basis, with results reported to senior management. While such stress testing should satisfy the requirements of Rule 15c3-1g(c), which stipulates at least once a quarter, it is the position of the staff that prudent risk management would require stress testing on a more frequent basis. The assumptions and methodologies of the stress testing should be clearly defined and documented.

### **Internal audit**

The Corporate Audit review should include all significant elements of the global treasury function in its risk-based audit program.

To evaluate Bear Stearn's liquidity management process against these benchmarks, interviews were conducted with senior management, liquidity and funding risk management policies and procedures were reviewed, and management reports were analyzed and discussed with management. Various other documents and reports, including findings from the latest corporate audit reports, were reviewed. The SEC staff also had discussions with Internal Audit concerning their coverage of Treasury and related functions. The SEC staff reviewed documented policies and procedures where available. Additional information and content was obtained from the application, discussions, and presentations to the staff.

### **III. LIQUIDITY AND FUNDING RISK MANAGEMENT**

#### **ADEQUACY OF LIQUIDITY**

Bear Stearns currently has adequate liquidity and sufficient capital to fund its current business.

The firm acknowledges the critical importance of liquidity, as most failures of financial institutions have occurred in large part due to insufficient liquidity. Accordingly, the firm is very focused on and dedicates significant resources and management attention to liquidity risk. The core components of Bear Stearns's liquidity and funding risk management framework are the general funding strategy, alternative funding strategy, and committed secured and unsecured credit facilities.

#### **General Funding Strategy**

The Company's general funding strategy seeks to ensure liquidity and diversity of funding sources to meet the Company's financing needs at all times and under all market environments. The Company attempts to finance the balance sheet by maximizing its use of secured funding. Short-term sources of cash consist primarily of collateralized borrowings, including repurchase transactions, securities lending arrangements and customer free credit balances. Due to the collateralized nature of the borrowing, the Company views its secured funding as inherently less credit sensitive and therefore a more stable source of funding.

Short-term unsecured funding exposes the Company to rollover risk, as providers of credit have no obligation to refinance the instruments at maturity. Short-term unsecured funding includes commercial paper, medium-term notes and bank borrowings, which generally have maturities ranging from overnight to one year. The Company seeks to manage its reliance on short-term unsecured borrowings by maintaining an adequate total capital base and extensive use of secured funding. Also, an emphasis on diversification by product, maturity, geography, and instrument seeks to further ensure prudent and moderate usage of the more credit-sensitive, less stable funding.

In addition to short-term funding, the Company uses equity and long-term debt, including floating- and fixed-rate notes, as longer-term sources of unsecured financing. The Company regularly monitors and analyzes the size, composition and liquidity characteristics of its asset base in the context of each asset's ability to be used to obtain secured financing. This analysis results in a determination of the Company's aggregate need for longer-term funding sources (i.e., long-term debt and equity). The Company views long-term debt as a stable source of funding, which effectively strengthens its overall liquidity profile and mitigates liquidity risk.

## Alternative Funding Strategy

The Company's alternative funding strategy is focused on the liquidity and self-funding ability of the underlying assets and is centered on shifting to a secured funding environment. The strategy centers on the pledging of unencumbered assets to obtain secured funding to redeem maturing unsecured debt. The goal is to maintain sufficient cash capital (i.e., equity plus long-term debt maturing in more than 12 months) and funding sources to enable the Company to refinance short-term, unsecured borrowings with fully secured borrowings. The analysis assumes no liquidation of assets and no access to additional unsecured funding. As such, the Company does not rely on nor does it contemplate asset sales to endure a period of constrained funding availability, but it does not preclude asset sales from occurring for other relevant business reasons.

Bear Stearns uses two primary analytical tools to measure and monitor the firm's ability to shift to secured funding, and thus, constitute the core elements of the Company's alternative funding strategy and its approach to liquidity and funding risk management. These tools are the liquidity ratio (including a stress liquidity analysis) and cash capital.

### Liquidity Ratio

The Company monitors its cash position and the borrowing value of unencumbered securities plus the unsecured portion of the Company's committed revolving credit facility in relation to its unsecured debt maturing over the next 12 months, the goal of which is to maintain the ratio of liquidity sources to maturing debt at 100% or greater, inclusive and exclusive of the unsecured revolving facility. This is done on both a consolidated basis and a parent company only basis.

As of May 31, 2005, the borrowing value of unencumbered securities was \$21.7 billion. The assets primarily comprise agency and non-agency mortgage- and asset-backed securities, investment grade and non-investment grade municipal and corporate bonds and US equities. The average advance rate on these different asset types ranges from 71% to 98% (haircuts of 2% to 29%) and is based predominantly on committed secured facilities that the Company and its subsidiaries maintain in different regions globally. Critical to the liquidity of the unencumbered assets is the size, availability and development of this committed secured funding infrastructure (see "Committed Secured Facilities"). At May 31, 2005 the liquidity ratios were 174% and 163%, respectively as indicated below:

### Liquidity Ratio – May 31, 2005

#### Liquidity available:

Cash and cash equivalents	\$ 5,390
Borrowing value of unencumbered securities	21,744
Unsecured revolving credit facility	1,850
<b>Total available</b>	<b>\$ 28,984</b>

<b>Liquidity required:</b>	
Unsecured short-term debt	\$ 9,935
Long-term maturing in less than 12 months	6,720
<b>Total required</b>	<b>\$ 16,655</b>
<b>Ratio with revolving facility</b>	<b>174%</b>
<b>Ratio without revolving facility</b>	<b>163%</b>

Bear Stearns also tracks parent company only liquidity and the related ratio. Sources of liquidity for the parent company the borrowing value of unencumbered securities held in unregulated subsidiaries (unencumbered assets in regulated subsidiaries are assumed to be unavailable for use by TBSCI), overnight on demand loans to regulated broker-dealers that can be repaid to the parent without regulatory constraint, and the unsecured portion of the Company's committed revolving credit facility. Uses of liquidity are unsecured debt maturing over the next 12 months. The analysis at May 31, 2005 is presented below:

#### **Parent Company Only Liquidity Ratio – May 31, 2005**

<b>Liquidity available:</b>	
Borrowing value of unencumbered securities in unreg. B/Ds	\$ 7,826
Intercompany payable from regulated broker-dealers	8,800
Unsecured revolving credit facility	1,850
<b>Total available</b>	<b>\$ 18,476</b>
<b>Liquidity required:</b>	
Unsecured short-term debt	\$ 7,148
Long-term maturing in less than 12 months	6,720
<b>Total required</b>	<b>\$ 13,868</b>
<b>Ratio with revolving facility</b>	<b>133%</b>
<b>Ratio without revolving facility</b>	<b>120%</b>

#### **Stress Loss Liquidity Analysis**

The stress loss liquidity analysis enhances Bear Stearns' approach to liquidity and funding risk management and expands upon the liquidity ratio and net cash capital analyses. The analysis starts with the borrowing capacity of the firm's unencumbered assets and deducts outflows for two stress scenarios to arrive at an adjusted liquidity number which is compared to expected outflows to determine the number of days this adjusted liquidity will cover expected outflows. One scenario replicates a \$2.0 billion decline in the market value of the firm's MBS inventory by applying three additional stress assumptions: additional requirements to increase margin on repo'd collateral to the

cash capital stress haircuts, additional collateral requirements on derivatives given a one notch downgrade, and additional cash requirements to meet draws on unfunded commitments. The second scenario replicates a \$2.0 billion decline in market value of equities in concert with the three additional stress assumptions. At May 27, 2005 the analysis indicated that after front loading stress outflows, additional liquidity is available to cover expected outflows for 290 days under both scenarios.

### **Cash Capital**

The cash capital framework is utilized to evaluate the Company's long-term funding sources and requirements. Cash capital (i.e., equity plus long-term debt maturing in more than 12 months) required to support all of the Company's assets is determined on a regular basis. The two primary categories of cash capital usage, as described by the firm are firmwide haircuts and illiquid assets/long-term investments. The first category represents the aggregation of the portion of assets that cannot be readily financed on a secured basis in a stressed environment, i.e., stressed haircuts. Asset haircuts for the vast majority of asset classes are set based on the firm's Committed Secured Facilities. This component includes capital needed to support the vast majority of the Company's assets, including trading-related assets, inventory, reverse repos, margin loans and committed funding obligations. The second category consists of items not easily or readily financed on a secured basis and are 100% financed by cash capital. These items include fixed assets, goodwill, merchant banking and other illiquid investments, restricted securities, excess capital in regulated subsidiaries, and other assets.

At May 31, 2005 the Company's net cash capital position was \$305.3 million. Fluctuations in net cash capital are common and are due to fluctuations in total assets, balance sheet composition and total capital. Treasury uses a target minimum for net cash capital of 2.5% of firmwide haircuts as a benchmark, which on average approximates \$1.0 billion. The Company generally maintains net cash capital in excess of \$1.0 billion. In June 2005, the firm issued five year term debt to bring the excess to its historical range. Over the previous 12 months, the Company's net cash capital position averaged \$1.1 billion.

### **Parent Company Liquidity Portfolio – Staff Recommendation**

An integral part of the liquidity risk management process at the four previously approved CSEs is the maintenance of a parent company liquidity portfolio consisting of cash and/or highly liquid securities immediately available to the parent company that may be monetized or sold to provide liquidity anywhere in the holding company chain. When cash is utilized as part of the liquidity portfolio it is held at the parent company. In the case of highly liquid securities, different approaches are used by the CSE firms. Highly liquid securities may be held at the parent company, they may be pledged on a daily basis as collateral for intercompany loans made to subsidiaries or they may be established through a reverse repurchase agreement with a subsidiary broker-dealer whereby cash from the parent company is transferred to the broker-dealer and the broker-dealer warehouses the



parent-owned securities in a segregated “fully paid for” account in the parent company’s name.

While it is the staff’s opinion that Bear Stearns’ parent company only liquidity analysis and process is adequate as a liquidity risk management tool, it does not provide an adequate amount of mobile liquidity available to the parent company due primarily to the nature of the unencumbered assets that are included in the analysis and the inclusion of the unsecured committed credit facility as available liquidity. The majority of the unencumbered assets cannot be deemed to be highly liquid (as evidenced by the larger haircuts stipulated in the firms committed secured facilities) and there is no formal legal construct such as a pledge agreement or repo arrangement that ensures the parent company’s access to the securities. Regarding the unsecured credit facility, while the firm clearly believes that the funds from the facility would be readily available in a stress event, it is the SEC staff’s view that such facilities are distinct from cash and unencumbered liquid securities that can be readily hypothecated and thus should not be considered as part of the liquidity portfolio. The SEC staff does recognize that such facilities are a source of liquidity that may be appropriately considered in overall liquidity planning.

Therefore, the staff recommended that Bear Stearns establish a parent company liquidity portfolio. Discussions were held with the Assistant Treasurer – Liquidity Risk Management, the Controller and the CFO during September 2005 to determine an acceptable structure and minimum amount to be established. Management at Bear Stearns, including the CFO, has agreed to establish a parent company liquidity pool consisting of a minimum of \$2.0 billion in cash equivalents and a minimum of \$3.0 billion of high quality unencumbered debt and equity securities. The method of inclusion of the securities in the liquidity portfolio is currently being discussed with Bear Stearns.

### **Committed Secured Facilities**

The Company has a committed revolving credit facility ("Facility") totaling \$3.70 billion, which permits borrowing on a secured basis by Bear Stearns & Co., BSSC, BSIL and certain other subsidiaries. The Facility also provides that The Bear Stearns Companies Inc. ("Parent Company") and BSIL may borrow up to \$1.85 billion of the Facility on an unsecured basis. Secured borrowings can be collateralized by both investment grade and non-investment-grade financial instruments as the Facility provides for defined advance rates on a wide range of financial instruments eligible to be pledged. The Facility contains financial covenants, the most significant of which require maintenance of specified levels of stockholders' equity of the Company and net capital of BSSC. The facility terminates in February 2006, with all loans outstanding at that date payable no later than February 2007. The firm tests this facility twice a year using a variety of asset classes in the range of \$50-100 million. There were no borrowings outstanding under the Facility at May 31, 2005.

The Company has a \$1.50 billion committed revolving securities repo facility ("Repo Facility"), which permits borrowings secured by a broad range of collateral under a repurchase arrangement, by BSIL, Bear Stearns International Trading Limited ("BSIT") and BSB. The Repo Facility contains financial covenants that require, among other things, maintenance of specified levels of stockholders' equity of the Company. The Repo Facility was renewed in August 2005 and terminates in August 2006, with all repos outstanding at that date payable no later than August 2007. The firm tests this facility once a year using a variety of asset classes in the range of \$25 million. There were no borrowings outstanding under the Repo Facility at May 31, 2005. With the renewal of this facility, the Parent Company ("TBSCI") was added as an eligible borrower to facilitate liquidity availability at the parent level. Management plans to add the parent company to the other facilities as they are renewed.

The Company has a \$350 million committed revolving credit facility ("Pan Asian Facility"), which permits borrowing on a secured basis collateralized by foreign securities at pre-specified advance rates. The Pan Asian Facility contains financial covenants that require, among other things, maintenance of specified levels of stockholders' equity of the Company and net capital of BSSC. The Pan Asian Facility terminates in December 2005 with all loans outstanding at that date payable no later than December 2006. The firm tests this facility once a year using a variety of asset classes in the range of \$25 million. There were no borrowings outstanding under the Pan Asian Facility at May 31, 2005.

The Company also maintains a series of committed credit facilities to support liquidity needs for the financing of investment-grade and non-investment-grade corporate loans, residential mortgages, commercial mortgages and listed options. The facilities are expected to be drawn from time to time and expire at various dates, the longest of such periods ending in fiscal 2007. All of these facilities contain a term-out option of one year or more for borrowings outstanding at expiration. The banks providing these facilities are committed to provide up to an aggregate of approximately \$2.86 billion. At May 31, 2005, the borrowings outstanding under these committed credit facilities were \$269.7 million.

### **Contingency Funding Plan**

Bear Stearn's liquidity risk management framework is supported by the maintenance of a formal documented Contingency Funding Plan ("CFP"). The purpose of the CFP is to provide a list of action steps to ensure the ability of The Bear Stearns Company, Inc. and its affiliates to manage a liquidity crisis on a consolidated basis. A liquidity crisis is defined as an event-driven loss of uncommitted, unsecured, confidence based funding. The objective is to allow the firm to meet its maturing obligations as they occur over a 12-month period with minimal disruption to ongoing business operations and without having to rely upon access to additional unsecured funding.

The CFP includes a detailed delegation of authority and precise action steps for managing an event-driven liquidity crisis. The responsibility for the management of the

liquidity of the firm during a liquidity crisis is delegated to the Liquidity Crisis Working Group (“LCWG”). The LCWG has been established to manage the execution of the CFP, should the need arise. The LCWG consists of the following individuals: the CFO, Treasurer, and Assistant Treasurers heading up Global Funding, Liquidity and Capital Management, Bank Relations, and London Treasury. Responsibility for the declaration of a liquidity crisis, along with the determination of the liquidity stress level, rests with the heads of Liquidity and Capital Management and Global Funding in tandem. The CFP details an effective internal and external communication strategy, and facilitates the greater information flow required to effect a rapid and efficient transition to a secured funding environment. In summary the CFP addresses the following issues:

- Delegation of responsibility and authority to the LCWG
- Definition of liquidity crisis and liquidity stress levels
- Notification procedure
- LCWG meeting schedule
- Management reporting requirements
- Action steps – alternative financing arrangements
- Restructuring of the balance sheet
- Utilization of credit facilities
- Key internal/external contacts

With regard to restructuring of the balance sheet, the objective of the CFP is to allow the firm to make a smooth transition from an unsecured funding to a secured funding environment without necessitating the liquidation of assets. However, actions may be taken, at the discretion of the LCWG, to identify inventory positions or other assets that can be reduced or liquidated at reasonable market levels to shrink the balance sheet and reduce leverage and generate cash where such opportunities appear attractive and sensible.

## **ADDITIONAL RISK MANAGEMENT OBJECTIVES**

### **Concentrate unsecured funding through the Parent Company (“TBSCI”)**

TBSCI is the primary issuer of all unsecured, non-deposit financing instruments that are used primarily to fund assets in subsidiaries, some of which are regulated. The management of unsecured debt is centralized within Treasurer’s Department. Funding is downstreamed to subsidiaries in the form of equity, subordinated debt, and intercompany advances. Intercompany loans to subsidiaries generally have an average maturity shorter than the parent company’s borrowings in order to mitigate parent liquidity risk. A significant portion of the intercompany loans to subsidiaries are overnight on demand loans that can be repaid to the parent without regulatory constraint, thus providing immediate liquidity to the Parent Company if needed. The benefits of centralized funding are enhanced control, reduced financing costs, wider name recognition by creditors, and greater flexibility to manage the portfolio across maturities, currency, investors, and regions, taking into account market capacity and pricing, and to meet the variable funding requirements across subsidiaries.

Within this funding framework, the Company attempts to fund equity investments in subsidiaries with equity from the parent company (i.e., no equity double leverage). At May 31, 2005, the parent company's equity double leverage ratio was approximately 0.68 based on common equity and 0.65 including preferred equity. At November 30, 2004, these measures were 0.70 based on common equity and 0.66 including preferred equity. Additionally, all subordinated debt advances to regulated subsidiaries for use as regulatory capital are funded with long-term debt issued by the Company that have maturities equal to or greater than the maturity of the subordinated debt advance. The Company regularly monitors the nature and significance of assets or activities conducted outside the regulated subsidiaries and attempts to fund such assets with both capital or borrowings having a maturity profile and relative mix consistent with the nature and self-funding ability of the assets being financed.

Regulatory capital requirements may restrict the free flow of funds from subsidiaries to the parent company and also between subsidiaries. Bear Stearns takes these types of restrictions into consideration when assessing the liquidity of individual legal entities and the parent company.

### **Maintain relationships with creditors and investors**

An important component of the Company's liquidity and funding risk management efforts involves ongoing dialogues with a large number of creditor constituents. Critical to the effectiveness and viability of Bear Stearns' alternative funding strategy is the size, availability and development of the firm's committed secured facilities. The establishment and maintenance of good working relationships with a diverse base of creditors and debt investors are crucial to the Company's liquidity. The Bear Stearns Treasurer's Department has an Assistant Treasurer – Bank Relations responsible for the establishment and maintenance of these relationships.

### **Manage refinancing risk**

Bear Stearns monitors the maturity profile of its unsecured debt to minimize refinancing risk. The maturity of the long-term debt portfolio is monitored on an ongoing basis and structured within the context of two diversification guidelines. The Company has a general guideline of approximately no more than 20% of its long-term debt portfolio maturing in any one year, as well as no more than 10% maturing in any one quarter over the next five years. The Company continued to meet these guidelines at the end of the May of 2005. As of May 31, 2005, the weighted average maturity of the Company's long-term debt was 4.3 years.

## **GOVERNANCE STRUCTURE**

Bear Stearns' CFO and Treasurer monitor the firm's liquidity and leverage on a regular basis. They are supported by three assistant treasurers responsible for liquidity risk management, global funding and bank relations. Each individual has clear

responsibilities for informing the firm's senior management and communicating with third parties on matters relating to liquidity risk management and capital management. The Treasurer's Department serves as an independent risk oversight group responsible for managing global liquidity and funding risk, providing independent input to the business units on funding and liquidity risk, and providing relevant reports and recommendations to senior management. The Assistant Treasurer – Liquidity Risk Management has direct line reporting responsibility to the CFO with a dotted line to the Treasurer.

There are regular reports summarizing the firm's inventories of liquid assets and securities available for pledging as well as a schedule of liabilities maturing within various maturity ranges. The principle management report prepared by the Treasurer's Department is the monthly Funding and Liquidity Report ("FLiP") which details the firm's overall liquidity position. The report is distributed to an executive and senior management group that encompasses the main business units and the staffs of the CFO, the Controller, Internal Audit, and the Treasurer. The FLiP contains the following information:

- Net cash capital
- Consolidated excess of the borrowing value of unencumbered assets over maturing unsecured liabilities (liquidity ratios)
- Maturity profile of long-term and short-term debt
- Investor concentrations/diversification monitoring
- Stressed liquidity ratio
- Aggregate bank facility size and composition
- A parent company oriented liquidity ratio focusing on sources of liquidity available to the holding company to repay maturing short-term debt
- Allocation of cash capital required to support business units for the month just concluded and recent history
- Balance sheet leverage and holding company double leverage measures
- Interest rate sensitivity position and analysis for "non-repo" funded balance sheet
- Historical data on the firm's longer-term funding costs and business unit capital charge transfer pricing rate

Bear Stearns has a Treasury Committee that is comprised of the Treasurer, his direct reports as well as key members of their staff and staff from the Treasurer's control unit that report into the Corporate Controller. This committee meets on a daily basis to review important treasury related issues. An agenda is prepared for each meeting. Key elements discussed include projected cash flows daily and for month end encompassing funding needs and excess funds, intercompany borrowing levels, Rule 15c-3 deposits, investments in money funds, stock loan activity and customer activity. Other relevant topics may include:

- Long-term funding plans (scheduled deals or possible strategies)
- Interest rates outlook
- Credit facilities
- Activities with key relationship banks

- Credit rating agencies information and reports
- Internal benchmark rates
- Collateral postings

Bear Stearns has a formally documented contingency funding plan that is reviewed and updated annually. This plan is discussed in a separate section of this report beginning on page 11.

Bear Stearns assesses the adequacy of its liquidity position taking into consideration the possible elimination of all sources of unsecured funding and the simultaneous maximum drawdowns of collateral and committed funding. Stress liquidity measures assume that under such circumstances, the firm would obtain funding from its committed bank facilities. Bear Stearns maintains a liquidity position that contains a cushion above internal guidelines for minimum net cash capital and minimum liquidity ratios. These guidelines have been determined based both on the firm's experience and collective judgment as well as benchmarking to peer firms.

These liquidity guidelines, the CFP, all funding and policy decisions, and all other recommendations from the Treasurer's Department are approved by senior management of Bear Stearns, principally the CFO and in some cases, the President of the firm. The CFO is primarily responsible for monitoring and reviewing Treasurer's Department's management of liquidity and funding risk. Bear Stearns does not have a "Finance Committee" devoted to liquidity and funding issues, but rather relies on a constant communication flow to facilitate the monitoring and oversight process.

### **Documented Policies and Procedures – Staff Recommendation**

There are no formal documented policies and procedures for the global treasury function at Bear Stearns, other than the Contingency Funding Plan. While it appears, based on the staff's review, that the firm has an adequate liquidity risk management system, documented policies and procedures are critical for consistency of the risk management process and are necessary for the SEC to carry out its roles as a prudential supervisor, and, as such, are required by rule 15c3-4. Bear Stearns has agreed and is in the process of developing a comprehensive set of policies and procedures with the intent of having a draft by the end of October 2005.

## **BALANCE SHEET MANAGEMENT**

### **Highly Liquid Balance Sheet**

Bear Stearns maintains a highly liquid balance sheet and marks to market nearly all of its assets daily. The fair value at which the firm's inventory is carried on the books reflects the amount at which the position could be exchanged in a current transaction between willing parties, other than in a forced or liquidation sale.

Total assets for Bear Stearns were \$277 billion at May 31, 2005 and \$256 billion at November 30, 2004. The firm's Capital Markets and Global Clearing Services businesses are the largest users of balance sheet assets consequently, have the largest funding needs on both a secured and unsecured basis. Capital Markets comprises the institutional equities, fixed income and investment banking areas. Global Clearing Services provides execution, clearing, margin lending and securities borrowing to facilitate customer short sales to clearing clients worldwide. Prime brokerage clients include hedge funds and clients of money managers, short sellers and other professional investors. Of the total assets of \$277 billion at May 31, 2005, Capital Markets assets were \$159 billion and Global Clearing Services assets were \$104 billion.

## **Balance Sheet Management**

The overall size of the Bear Stearns balance sheet fluctuates from time to time reflecting primarily the nature of the Company's market-making and customer-financing activity. At year end and quarter end, the Company's total assets are lower than would be observed on an average basis. The Bear Stearns management, like all of its major competitors in the securities industry, takes various steps to reduce the total assets on its balance sheet at quarter end.

Among the actions typically taken to reduce total assets are to use excess cash to finance high-quality, highly liquid securities inventory that would otherwise be funded via the repurchase agreement market. Additionally, the Company reduces its matched book repurchase and reverse repurchase activities at the end of the quarter. The Company may also reduce the aggregate level of inventories through ordinary course, open market activities in the most liquid portions of the balance sheet, which are principally U.S. government and agency securities and agency mortgage pass-through securities.

Despite the reduced total assets at the year end and quarter ends, the Company's overall liquidity, market, and credit risk profiles generally do not change materially since the reduction in asset balances is predominantly in highly liquid, low risk, short term instruments that are financed on a secured basis.

While emphasis is placed on the amount of total assets at the end of the year and the end of the quarter, management is also cognizant of the balance sheet size and usage throughout the whole year. The management group is experienced and knows the history of balance sheet usage. Flexibility is an objective that allows the firm to pursue the "hot business of the day" by allocating balance sheet assets to it. There are no formal balance sheet limits, and formal balance sheet limits are not set for individual business units or broad business groups, such as fixed income.

The balance sheet management process is flexible and geared to setting at a total balance sheet target and meeting it at the year end or quarter end. Gross leverage drives the total balance sheet size. The process of setting the total balance sheet target usually begins about the middle of the quarter when a total balance sheet target or ceiling is set

using projected equity and a proportional mix of resales and stock borrows measured against the previous quarter. During the last month of the quarter, the Balance Sheet Management Group meets every Wednesday. This group consists of senior management from fixed income, accounting, controllers, treasury and administration. The balance sheet management process intensifies during the last week of the month with the daily distribution of departmental balance sheets and coordination among the functional areas to hit the quarter end balance sheet target which becomes firm as the projected equity and other relevant amounts are firmly established for the end of the quarter.

### **Less Liquid and Illiquid Assets**

The liquidity of the balance sheet is closely analyzed as part of the Cash Capital Model. The total of less liquid assets and illiquid assets is defined as the sum of those having a cash capital haircut of 100%; plus unfunded, committed funding obligations, and global clearing house/exchange deposits. The haircuts represent the amounts of less liquid assets that cannot be funded in the secured financing markets and thus, are financed 100% by cash capital. Less liquid assets totaled \$17.0 billion and at May 31, 2005. Less liquid assets with a 100% haircut totaled \$13.3 billion. Significant categories consisted of corporate loans including domestic distressed loans and corporate warehouse loans, unsecuritized product like REO and non-performing loans, and foreign common equity. Unfunded, committed funding obligations amounted to \$2.0 billion with bank and bridge loans for investment banking and high yield transactions dominating. The total of clearing house and exchange deposits was \$1.7 billion.

Illiquid assets, including merchant banking, illiquid investments and advances, fixed assets, and restricted securities total \$5.8 billion. For the firm, the total of less liquid assets and illiquid assets at May 31, 2005 was \$22.9 billion.

Amounts of illiquid and less liquid assets are monitored by Treasury. Increases in these assets increase the amount of cash capital required by the firm. Bear Stearn's classification of less liquid and illiquid assets as assets with a cash capital haircut of 100% represents an aggressive view when compared to its peer firms. This is the classification that is done for internal management purposes. The SEC staff will continue to monitor this approach.

## **IV. TOTAL CAPITAL – FUNDING AND CAPITAL RESOURCES**

The firm funds its business on a global basis through diverse sources. These sources include common and preferred equity, long-term debt, commercial paper, repurchase agreements, securities lending, other short-term obligations, letters of credit, and committed and uncommitted credit facilities. Both secured and unsecured committed and uncommitted credit facilities are in place. Customers are a substantial source of the firm's funding, particularly through the prime brokerage activities where customer free credit balances are a significant source of funding, although such balances are subject to immediate payment on demand to customers. The firm's total capital consists of long-



term debt and stockholders' equity which totaled \$49.3 billion at the year ended May 31, 2005. Total capital was composed of long-term debt of \$39.7 billion, including subordinated debt from trust preferred of \$262 million, and stockholders' equity of \$9.6 billion. Total capital at the fiscal year ended November 30, 2004 was \$45.8 billion consisting of long-term debt of \$36.8 billion, including subordinated debt from trust preferred of \$262 million, and stockholders' equity of \$9.0 billion.

The amount of long-term debt as well as total capital that the firm maintains is driven by a number of factors, with particular focus on asset composition. The firm's ability to support increases in total assets is a function of its ability to obtain short-term secured and unsecured funding, as well as assess to longer-term sources of capital, i.e. long-term debt and equity.

A substantial portion of the firm's balance sheet consists of highly liquid marketable securities and short-term receivables that provide the firm with flexibility in funding and managing its business. The size, availability and development of the firm's secured funding infrastructure are also an important component.

The firm regularly measures and monitors total capital requirements, which are a function of the self-funding ability of its assets. The equity portion of total capital is primarily a function of on- and off-balance sheet risks (market, credit and liquidity risks) and regulatory requirements. The liquidity and risk characteristics of assets being held are critical determinants of both total capital and the equity portion thereof, thus significantly influencing the amount of leverage that the firm can employ.

Given the nature of the firm's market-making and customer-financing activity, the overall size of the balance sheet fluctuates from time to time. The firm monitors and manages the composition and size of its balance sheet while applying various metrics to measure funding and capital adequacy in accordance with the firm's liquidity, funding, and capital policies and practices.

Bear Stearns seeks stable and diversified funding sources not only in terms of the types of transactions and instruments used provide funding but also with regard to diversification of investors. Emphasis is placed on broad diversification of investors with limits on the maximum amount authorized from any one investor to protect the firm from investor concentration. There is also an emphasis placed on geographical diversification, facilitated by the strong interest in U.S. securities firms being shown by European investors.

**Total Funding (\$ in millions)**

	May 31, 2005	November 30, 2004
<b>Short-term borrowings:</b>		
Commercial paper	\$ 6,339	\$ 3,924
Secured master notes	10,034	6,300

Other short-term borrowings	3,596	1,987
	<u>19,969</u>	<u>12,211</u>
Securities sold under agreements to repurchase	54,629	58,604
Securities loaned	11,031	10,719
<b>Long-term borrowings:</b>		
Senior debt	39,426	36,581
Subordinated debt	262	262
	<u>39,688</u>	<u>36,843</u>
<b>Stockholders' equity:</b>	9,642	8,991
	<u>49,330</u>	<u>45,834</u>

### Credit Ratings

Long-term debt totaling \$32.7 billion had remaining maturities beyond one year at May 31, 2005. The Company's access to external sources of financing, as well as the cost of that financing, is dependent on various factors and could be adversely affected by a deterioration of the Company's long- and short-term debt ratings, which are influenced by a number of factors. These include, but are not limited to: material changes in operating margins; earnings trends and volatility; the prudence of funding and liquidity management practices; financial leverage on an absolute basis or relative to peers; the composition of the balance sheet and/or capital structure; geographic and business diversification; and the Company's market share and competitive position in the business segments in which it operates. Material deterioration in any one or a combination of these factors could result in a downgrade of the Company's credit ratings, thus increasing the cost of and/or limiting the availability of unsecured financing. Additionally, a reduction in the Company's credit ratings could also trigger incremental collateral requirements, predominantly in the over-the-counter derivatives market. As of May 31, 2005, a downgrade by either Moody's Investors Service or Standard & Poor's to the Company's long-term ratings to the level of A3 or A- would have required the Company to post approximately \$1.15 billion in additional collateral for outstanding over-the-counter derivatives contracts.

At May 31, 2005, the Company's long-term/short-term debt ratings were as follows:

	Rating
-----	
Dominion Bond Rating Service Limited	A(high)/R-1 (middle)
Fitch	A+/F1+
Moody's Investors Service	A1/P-1
Standard & Poor's (1)	A/A-1
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- (1) On September 29, 2004, Standard & Poor's affirmed the Company's credit ratings and maintained a "stable" outlook.

## **Stock Repurchase Program**

The Company has various employee stock compensation plans designed to increase the emphasis on stock-based incentive compensation and align the compensation of its key employees with the long-term interests of stockholders. Such plans provide for annual grants of stock units and stock options. The Company's share repurchases, which are facilitated throughout the year through open market and private transactions, are almost exclusively to mitigate the dilutive effect of equity based compensation plans. On January 5, 2005, the Board of Directors of the Company approved an amendment to the Stock Repurchase Program ("Repurchase Program") to replenish the previous authorizations to allow the Company to purchase up to \$1.0 billion of common stock in fiscal 2005 and beyond. During the six months ended May 31, 2005, the Company purchased under the current and prior authorizations a total of 2,988,625 shares at a cost of approximately \$295.8 million. Approximately \$768.7 million was available to be purchased under the current authorization as of May 31, 2005.

During the six months ended May 31, 2005, the Company purchased a total of 868,535 shares of its common stock at a total cost of \$86.8 million pursuant to a \$200 million Capital Accumulation Plan Earnings Purchase Authorization, which was approved by the Compensation Committee of the Board of Directors of the Company on November 30, 2004. Approximately \$113.2 million is available to be purchased under the current authorization as of May 31, 2005.

## **V. PLANNED ENHANCEMENTS**

The Treasurer's Department at Bear Stearns has several enhancements underway and under consideration that are designed to enhance the risk management process. To enhance the parent company only liquidity position, Bear is adding the parent company, TBSCI, as an eligible borrower under all of its committed secured facilities. The parent company was added to the Repo Facility (see page 10 of this report) when it was renewed in August 2005 and will be added to the remaining facilities at their renewals. Also, Bear is giving consideration to developing a pledge mechanism to TBSCI for unencumbered securities as collateral for intercompany payables. This would ensure the parent company's access to the securities so that they could be monetized in a liquidity crisis. This is the approach used by one of the other CSE firms to strengthen its parent company liquidity position.

Several systems enhancements are underway at Bear Stearns to fully automate the identification and tracking of the firm's global securities sources and uses, including firm positions and derivatives collateral, on both a consolidated basis and legal entity basis. The identification and tracking of unencumbered securities on a consolidated basis and by legal entity, which is currently a manually intensive process, is critical for the analysis of firm-wide and parent company liquidity. The systems enhancements will allow for

more frequent reporting and analysis of unencumbered securities, including advance rates as stipulated in the committed secured facilities, with the most significant asset classes moving from monthly or weekly reporting to weekly and daily reporting. These systems enhancements are being phased in using three applications. Tracking and reporting for Government securities, MBS, ABS and whole loan was completed in August 2005. The anticipated completion date for corporates, convertibles, municipals and equities is October 2005. For derivatives collateral received the anticipated completion is scheduled for the first quarter of fiscal 2006.

The Treasurer's Department has organized a group to vet and design an "optimal post-CSE structure" from a funding standpoint. The group will evaluate the impact on the firm's capital structure of the application of the new capital standards on both the consolidated and regulated entity basis with the goal of developing the most efficient capital structure.

SEC staff will monitor the firm's progress in these areas as part of the ongoing CSE supervision program.

## **VI. CONCLUSIONS**

The review of the liquidity risk management functions of Bear Stearns led to two staff recommendations. First, there are no formal documented policies and procedures for the global treasury function at Bear Stearns, other than the Contingency Funding Plan. While it appears, based on the staff's review, that the firm has an adequate liquidity risk management system, documented policies and procedures are critical for consistency of the risk management process and are necessary for the SEC to carry out its roles as a prudential supervisor, and as such, are required by rule 15c3-4. Bear Stearns has agreed and is in the process of developing a comprehensive set of policies and procedures with the intent of having a draft by the end of October 2005.

Second, an integral part of the liquidity risk management process at the four previously approved CSEs is the maintenance of a parent company liquidity portfolio consisting of cash and/or highly liquid securities immediately available to the parent company that may be monetized or sold to provide liquidity anywhere in the holding company chain. While it is the staff's opinion that Bear Stearns' parent company only liquidity analysis and process is adequate as a liquidity risk management tool, it does not provide an adequate amount of mobile liquidity available to the parent company that can be accessed quickly to respond to a crisis at an unregulated subsidiary. The staff recommended that Bear Stearns establish a parent company liquidity portfolio. If the securities to be included in the liquidity portfolio are held in a regulated entity, there must be a mechanism in place that allows these securities to be immediately available to the parent company on a daily basis without regulatory restriction. There are multiple ways to achieve this including the daily pledging of securities as collateral for intercompany loans to subsidiaries or via a reverse repurchase agreement between the parent company and the subsidiary.

Discussions were held with the Assistant Treasurer – Liquidity Risk Management, the Controller and the CFO during September 2005 to determine an acceptable structure and minimum amount to be established. Management at Bear Stearns, including the CFO, has agreed to establish a parent company liquidity pool consisting of a minimum of \$2.0 billion in cash equivalents and a minimum of \$3.0 billion of high quality unencumbered debt and equity securities. The method of inclusion of the securities in the liquidity portfolio is currently being discussed with Bear Stearns.

Bear Stearns is implementing some proposed changes to enhance its liquidity risk management function and considering others which are described under “Planned Enhancements”. As of the date of this report, these are works in process which the staff will review with the firm as part of its ongoing supervisory program.

Bear Stearns currently has adequate liquidity and sufficient capital to fund its current business in the staff’s opinion. Overall, with respect to liquidity risk management, Bear Stearns has an adequate liquidity risk management function to become a CSE, and accordingly, it is recommended that the application by Bear Stearns to become a CSE, as it pertains to the liquidity risk management function, be approved.

**Information Memorandum  
Non-Public**

To: Robert Colby, Deputy Director  
Michael Macchiaroli, Associate Director  
Matthew Eichner, Assistant Director  
Division of Market Regulation

From: Lori A. Richards, Director  
Mary Ann Gadziala, Associate Director  
Office of Compliance Inspections and Examinations

Re: CSE Examination of Bear, Stearns & Co. Inc.

Date: November 4, 2005

**Introduction**

Staff from the Office of Compliance Inspections and Examinations (exam staff in headquarters and the Northeast Regional Office), herein referred to as “staff”, conducted a risk management and internal-controls based examination of the consolidated organization (collectively referred to as “Bear Stearns” or the “firm”), including the registered broker-dealer, Bear, Stearns & Co. Inc. (“BS&Co.”), its ultimate holding company, The Bear Stearns Companies Inc. (“TBSCI”), and various affiliates.<sup>1</sup> The examination was conducted in connection with BS&Co.’s application to use an alternative, risk-based method for calculating deductions from net capital for market and derivatives related credit risk and thereby, consenting to be supervised as a consolidated supervised entity (“CSE”) pursuant to Rule 15c3-1 under the Securities Exchange Act of 1934 (“Exchange Act”).

The examination focused on the following areas: internal audit; anti-money laundering controls; capital computations<sup>2</sup>; Sarbanes Oxley internal controls; and the firm’s internal control systems for managing market, legal and compliance (“L&C”), credit, funding and liquidity, and operational risks, including business continuity planning. The staff conducted various tests of the firm’s implementation of its procedures and their compliance with the requirements under Exchange Act Rule 15c3-4 focusing on the following businesses conducted within material affiliates: credit derivatives – primarily credit default swaps, fixed

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<sup>1</sup> Approximately 24 individuals participated in the examination which was initiated with a document request letter to the firm dated August 8, 2005.

<sup>2</sup> The staff’s review of the capital computations included the computation done at the holding company level as well as the combined capital computation at the broker-dealer level for BS&Co. and Bear Stearns Securities Corp. for the period of May 31, 2005.

income derivatives – primarily municipal and mortgage derivatives, residential whole loans, and commercial mortgages.<sup>3</sup>

The staff held an examination exit interview with the firm on October 26, 2005 to outline findings from the examination. This memorandum summarizes the examination findings that the staff deems most significant. Each finding is followed by the firm’s initial verbal response (if provided) in italics. A comprehensive deficiency letter with all of the staff’s findings is being prepared to be sent to the firm requesting formal responses to all the staff’s findings. In addition, a comprehensive examination report is being finalized.

## **Significant Examination Findings**

### **Internal Audit**

The staff’s review of the firm’s Internal Audit Department (“IAD”) noted the firm’s policy of discarding certain audit workpapers 60 days after the issuance of the Audit Report. While IAD’s procedures require that certain workpapers be maintained, the procedures also require that other supporting documents, such as the Potential Issues Log, general testing schedules, narratives describing procedures performed, and other underlying documents that evidence the review, testing, and potential findings of the audit, are to be discarded 60 days after the final Audit Report is issued. The firm noted that it does retain the underlying workpapers for SOX-related work and for audits that the firm’s external auditor reviews. The staff found that the policy of discarding IAD audit supporting documents leaves no evidential support that IAD performed its planned audit work. The lack of workpapers also deprives IAD of a useful source of information in evaluating the need for and scope of future audits. In addition, the staff noted that low risk findings are not included in the final Audit Report, are not maintained by IAD in its workpapers, and are not tracked in the firm’s tracking system for following up on audit findings. Although a finding may appear to be of low risk at the time of the audit, it could potentially become of increased significance to the firm at a later date. Due to a lack of supporting information, there is no way to ascertain the appropriateness of the audit team’s determination that a finding was low risk. Additionally, when aggregated across audits, low risk findings may pose a larger risk to the firm than they may appear to pose as individual low risk findings.

*Firm’s Response: IAD noted that it is reconsidering the policy on document discarding, but that IAD is hesitant to change it, especially without specific guidance on what document retention would be sufficient.*

Staff’s Comment: The staff has consulted with the Division of Market Regulation (“DMR”) on this issue. Both the DMR and the staff agree that an agreement must be reached with the firm prior to the approval of its CSE application regarding the retention of internal audit

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<sup>3</sup> These primary business activities are conducted in the following affiliates: Bear Stearns Credit Products Inc.; Bear Stearns Capital Markets Inc.; EMC Mortgage Corporation; and Bear Stearns Commercial Mortgage, Inc.

workpapers in order to document the extent of the work performed in conducting periodic reviews of the firm's risk management systems as required by Rule 15c3-4.

IAD's procedures appear to permit senior management of the business audited to have undue influence in the draft Audit Report and to require that approval of the Audit Report be obtained from auditee senior management before its issuance. The staff is concerned that such procedures appear to permit business personnel rather than the independent audit team to make a determination on findings.

*Firm's Response:* IAD asserted that the senior management's input in the process of audit report drafting is limited to confirming facts that the auditors include in the report. The firm also stated that it will revise the procedures to reflect the role that the senior management of the audited business has in the preparation of the Audit Report.

### **Market Risk Management**

The staff's review noted that, unlike its other CSE peers, Bear Stearns does not have a Board or Committee level approved overall firmwide VaR limit for its aggregate businesses that is sub-allocated downstream to its individual business lines. Rather, Bear Stearns sets and manages its VaR limits at the business desk level. The staff's review also noted that certain business heads can establish new trading limits and approve existing limit breaches with their sole written approval without direct approval from Risk Management. Risk Management receives a copy of the limit approval memorandum after the limit has been established. The staff believes that establishing an overall firmwide VaR limit and requiring Risk Management approval in establishing trading limits and limit breaches would enhance and strengthen the Risk Management control function at Bear Stearns.

*Firm's Response:* To date Bear Stearns has not made it a priority to have a firmwide VaR limit. The firm generally takes a "bottom-up" approach to setting limits. "Bottom-up" is an approach which emphasizes knowledge of the details of the risk and scrutiny of it. Well justified risk-taking will be approved. The firm then evaluates the sum-total of the approved risks for overall acceptability.

*At Bear Stearns, risk taking is evaluated first and foremost at the trading desk level. Bear Stearns doesn't tend to take big positions in the risk factors most common across all desks and thus doesn't often find itself with VaR spikes driven by everyone having the same position. When a risk measure does not tend to spike there is less need to set a limit on it to constrain the spikes. Desk-level exposures to the most ubiquitous risk factors (e.g. general level of interest rates) have typically been kept to a moderate level. As a result, the firm believes that its risk profile tends to be dominated by a diversity of risk factors. Firmwide VaR is measured daily and disseminated but has not exhibited sufficient magnitude or volatility to compel the firm to place a limit upon it.*

*The firm indicated that it would not be difficult to implement a firmwide VaR limit. However, the firm does not believe that the previous lack of this limit is indicative of any weakness in*



*its internal controls nor does it feel that the introduction of such a limit would add in a meaningful way to its control environment.*

*With regard to the limit approval process, the firm noted that Risk Management is currently a signatory to new limit approvals but they will modify their policy so that new limits are not officially approved until signed-off upon by Risk Management.*

Staff's Comment: The staff believes that the firm's setting of a firmwide VaR limit would need to be accompanied by a thorough analysis approved at the Board or Committee level rather than simply setting a number.

The staff's review also noted the need for Bear Stearns to establish controls and written procedures related to the process of updating the VaR data inputs. The staff reviewed six data files within the Unix Database which serve as inputs into the RIO system and are utilized in calculating daily VaR. The staff noted the firm's failure to update on a timely basis two of six files which are used for sensitivities of corporate/credit spreads. The staff noted that the data inputs had gaps of several weeks and up to a month without the updated spread/sensitivity information although the firm's internal practice requires a weekly update. As a result, the firm's daily VaR amounts could be based on stale data at any point in time. Additionally, the staff noted the need for the firm to establish a periodic model review process as required by Exchange Act Rule 15c3-1(e)(d)(1)(ii).

Firm's Response: *The firm will implement a "maintenance manual" for its RIO system which will identify a program of review and updates of key RIO models, assumptions and inputs.*

The staff conducted various risk management reviews and tests of the daily risk management reports and systems. Discrepancies in the data contained in the firm's Market Risk Management reports disclosed the following:

- The staff's data integrity review of EMC Core loans revealed that the EMC whole loan feed into RIO, the firm's VaR calculation engine, did not properly include unsettled positions.
- A sample review of three mortgage derivative trades revealed that one trade with trade date July 6, 2005, was not processed by RIO, the firm's VaR engine, until approximately July 18, 2005. This timing delay was due to the fact that the desk trader was still programming a pricing model for the aforementioned trade in the Unix database, a trade entry system. The staff is concerned that a mortgage derivative trader has the ability to prevent new trades from flowing into RIO, thus causing an inaccurate VaR calculation.

Firm's Response: *The firm is in the process of addressing the concerns raised by the staff. A new approach for EMC unsettled loans is under development and the firm is evaluating potential solutions to the concern that a trader has the ability to prevent trades from flowing into the VaR engine.*

## **Legal & Compliance**

In addition to a number of issues related to policies and procedures discussed below, the staff's review of the L&C area noted several weaknesses in the firm's L&C controls. L&C has not formally documented the identification or assessment of all applicable rules, laws, regulatory requirements and risks pertinent to the entire organization. The staff's review also noted that the firm failed to sufficiently document the identification, escalation and resolution of L&C issues as required by Rule 15c3-4 of the Exchange Act. The firm's written procedures generally state that matters should be escalated to the appropriate parties, but there is no specific escalation process. As a result, the firm failed to maintain an audit trail of issues identified and escalated from subordinates to L&C senior management. In addition, the firm's L&C monitoring and surveillance system is based on an informal process and does not have the capability to track issues or trends that develop over time. The staff also noted that the Compliance Department has undergone significant personnel changes which has left various areas of the Compliance Department understaffed and employees taking on multiple responsibilities.

*Firm's Response: The firm's Senior Managing Director of Global Compliance has only been in her position since August 2005 and is in the process of reorganizing the Compliance Department in addition to implementing new processes where there are gaps. The firm plans on improving the surveillance process. The firm also responded to the staff's comments by stating that the firm is concerned about the potential of exposing the firm to legal risk by tracking legal issues. Additionally, the firm is concerned about privilege issues.*

Staff's Comment: Based on the firm's response regarding their concern about the potential of exposing the firm to legal risk by tracking legal issues, the staff remains concerned about the extent to which the firm will establish, document, and maintain a system of internal risk management controls to assist it in managing the legal risks associated with its business activities as is required by Rule 15c3-4.

## **Capital Computations**

The staff's review of the firm's capital computations noted that the firm's reconciliation process between the general ledger, the market risk and credit risk systems, and the capital calculator are currently in various stages of development. The staff noted the need to finalize the reconciliation process to ensure the completeness of the capital calculations going forward.

*Firm's Response: The firm is in the process of enhancing its reconciliation process and expects to have it completed in the short-term.*

## **Operations**

The staff's review noted that reconciliation differences between the EMC front-office (i.e., MORT) to back-office (i.e., GOTS) trade blotters do not appear to be resolved in a timely manner. As of July 15, 2005 there was a total of 492 differences or "breaks", of which, 234 (48%) were aged greater than 100 days.

*Firm's Response:* The firm agrees that this is a concern and is researching this issue.

## **Funding and Liquidity**

Bear Stearns' contingency funding plan does not consider realistic stress scenarios, contain projected weekly cash flow analyses, or require specific actions when liquidity falls below stated goals in a stress environment according to internal analyses. The addition of these components to the funding plan would improve the firm's internal risk management controls for liquidity risk which are required under Rule 15c3-4.

*Firm's Response:* The firm agreed to enhance its contingency funding plan.

## **Policies and Procedures**

The reviews conducted by different examination teams consistently identified issues with regard to the firm's written policies and procedures. The staff's review noted that in a number of areas the firm's written procedures were newly created or updated during the staff's examination. As a result, the staff was unable to test compliance with these procedures. In some instances, the staff noted that the firm had written policies but lacked written procedures or that the procedures lacked specificity with regard to the various functions performed. In other instances the firm did not maintain any procedures surrounding the function that was reviewed. The firm's lack of procedures resulted in inconsistent actions taken by the firm. Highlighted below are a few examples noted by the staff regarding such issues:

- The firm's Market Risk Management function has a set of general policies but no procedures for its risk management functions. As a result, the firm has established limited policies addressing new trading limits, limit breaches, exceptions, limit reporting and all other risk management controls, but such policies lack specificity of the risk management procedures utilized.
- A review of the firm's price verification process revealed that existing policies lacked procedural controls to require trader level or portfolio level reviews based upon predetermined thresholds. Additionally, the policies failed to specify the Risk Management and Business Unit Controller responsibilities regarding price verification.

- A review of the firm’s pricing model validation policy disclosed a lack of specificity as to the procedures to be utilized to address concerns raised during the validation process. The staff reviewed ten model review reports from early 2004 to early 2005. The review disclosed that in one instance an “initial analysis” cited concerns about outdated models but no recommendations for corrective actions were made. In addition, three reports recommended advanced pricing models be implemented, however, as of the time of the staff’s review, the advanced models had not been implemented because the recommendation was not a high priority.
- A review of the inventory aging reports for the products reviewed by the staff noted the lack of policies and procedures for the aging of fixed income derivatives. As a result, the firm did not age fixed income derivatives. In addition, the procedures did not specify the timing of the distribution of the reports as the staff noted that Risk Management received an EMC Aged Report for the period ending May 31, 2005 on August 23, 2005, approximately 11 weeks aged.
- The firm lacks formalized policies and procedures regarding the middle office and operational controls in processing transactions.
- A review of the firm’s unsigned confirmation backlog revealed that the firm used inconsistent practices in resolving outstanding unsigned confirmations. The Derivatives Documentation Handbook does not include guidelines defining the time frame within which the first follow-up attempt, and subsequent follow-up attempts, should be made with counterparties that have outstanding unsigned confirmations.
- With the exception of a limited contingency funding plan, the firm has not implemented written policies and procedures related to the funding and liquidity area.
- The firm has not yet fully developed comprehensive policies and procedures for its independent Operational Risk Management function, particularly with regard to the delineation of responsibilities and the process for collection and verification of events.
- The Derivatives Operations area does not have written procedures regarding how to resolve disputed margin calls or how to handle delinquent margin calls.

In addition to the lack of procedures, the staff also noted a number of instances where the firm failed to follow its own procedures. Examples of such instances include the following:

- The staff’s review of the Credit Risk Management area noted that the firm failed to perform an annual review for all counterparty’s limits and ratings on an annual basis as required by its written policies and procedures. The staff’s review of the September 22, 2005 Clients to be Reviewed report revealed that 745 counterparties (of a total of approximately 9,500 counterparties) were overdue for a credit review. Of these, nine were overdue by greater than 90 days.

- The staff’s review of twelve scorecards (which were utilized in the credit ratings process) found that the credit analyst did not record the rationale as required in five of the eleven instances when one or more category ratings differed from the scorecard’s suggested rating.
- L&C failed to document its review for Qualified Institutional Buyer (“QIB”) compliance for Leveraged Finance transactions.
- The firm failed to enforce its written procedures by not documenting all surveillance reviews conducted by the Control Group surveillance analysts. In particular, the firm failed to produce records that evidence the review of the Watch List for the duration the security remained on the Watch List.
- The firm failed to follow its written procedures regarding the escalation and documentation of surveillance review exceptions of mortgage securities transactions (specifically, ARMs transactions).

*Firm’s Response: In general, the firm accepted the staff’s comments with regard to the need for additional or enhanced written policies and procedures and acknowledged the lapses noted by the staff.*

The staff expects any updated procedures to be provided in response to the deficiency letter that will be sent to the firm and the staff will again review the policies and procedures to assess the firm’s progress in strengthening this area during the next examination of the firm.

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## ACTION MEMORANDUM

October 14, 2005

**TO:** The Commission

**FROM:** The Division of Market Regulation

**SUBJECT:** The application of Lehman Brothers, Inc. (“LB”), a registered broker-dealer and a subsidiary of Lehman Brothers Holdings, Inc. (“LBHI”), its ultimate holding company, for Commission supervision as a consolidated supervised entity.

**RECOMMENDATION:** That the Commission issue the attached order approving the application of LB.

**NOVEL, IMPORTANT OR COMPLEX ISSUES:** LBHI would be the fourth investment bank holding company to be supervised by the Commission, and LB would be the fourth broker-dealer to obtain an exemption from the standard haircut method of calculating net capital charges and would instead be approved to use the statistical methods of new Appendix E to Rule 15c3-1 (“Appendix E”) of the Securities Exchange Act of 1934. The Commission approved the applications under Appendix E of Merrill Lynch, Pierce, Fenner & Smith Incorporated on December 23, 2004, Goldman, Sachs & Co. on March 23, 2005, and Morgan Stanley & Co. on July 28, 2005.

**ACTION REQUESTED:** Seriatim consideration by October 28, 2005.

**OTHER OFFICES OR DIVISIONS CONSULTED:** Office of Compliance Inspections and Northeast Regional Office (Lori Richards, Mary Ann Gadziala and John Nee)  
Office of International Affairs (Sherman Boone)

**PERSONS TO CONTACT:**

Michael A. Macchiaroli	(202) 551-5525
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## I. SUMMARY

Lehman Brothers Incorporated, a registered broker-dealer and a subsidiary of investment bank holding company Lehman Brothers Holdings, has submitted an application to the Commission to be supervised at the group level as a consolidated supervised entity (“CSE”).<sup>1</sup>

As part of the review of the application, the staff has assessed the firm’s financial position and the adequacy of its internal risk management controls, including the mathematical models the firm will use for regulatory purposes. The staff also conducted on-site reviews to verify the accuracy of the information included in the application and to assess the adequacy of the implementation of the firm’s internal risk management policies and procedures.<sup>2</sup>

Based on this review, the staff believes that LB has adopted and implemented strong internal risk management controls and has sufficient financial strength to meet the requirements of Appendix E. Capital adequacy at the holding company level will be computed in a manner consistent with the international standards developed by the Basel Committee on Banking Supervision. In addition, LBHI has executed the undertaking required by the rules in a form that is acceptable to the staff and is in compliance with the terms of that undertaking.

The staff therefore recommends that the Commission approve the application and issue the attached order authorizing LB to compute market and credit risk capital charges pursuant to Appendix E. By issuing the order, the Commission will place LB and the entire conglomerate under the Commission’s consolidated supervision regime.

Even after approval by the Commission, the nature of this supervisory regime requires that CSEs continually enhance risk controls related to financial and operational condition. Further, the standards developed by the Basel Committee on Banking Supervision continue to be clarified and interpreted, both by US regulators and internationally. Some of this guidance will necessitate adjustments to the policies and procedures for computation of holding company capital adequacy. These expectations have been communicated to, and acknowledged by, LBHI and other CSEs. Therefore, CSEs will have substantial motivation to continue to actively address issues identified during the application review process on an ongoing basis.

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<sup>1</sup> The application, a lengthy document, has not been attached to this memo, but is available upon request.

<sup>2</sup> The staff participating in the review process included staff from the Division of Market Regulation, the Office of Compliance Inspections and Examinations, and the Northeast Regional Office.

## II. REGULATORY FRAMEWORK FOR CONSOLIDATED SUPERVISED ENTITIES

The CSE rules<sup>3</sup> contain provisions applicable to the broker-dealer and provisions applicable to its ultimate holding company.<sup>4</sup>

### The Broker-Dealer Provisions

Firms that qualify for CSE treatment may apply a voluntary, alternative method of computing net capital. Under the alternative method, contained in new Appendix E to Rule 15c3-1, firms with strong internal risk management practices may utilize the mathematical modeling methods they use to manage their own business risk, including value-at-risk (“VaR”) models and scenario analysis, to compute deductions from net capital.<sup>5</sup> A broker-dealer calculating net capital adequacy using the alternative method must maintain tentative net capital<sup>6</sup> of at least \$1 billion and net capital of at least \$500 million. Moreover, if the tentative net capital of a broker-dealer using this alternative method falls below \$5 billion, it must notify the Commission. The Commission then would consider whether to require the broker-dealer to take appropriate remedial action.

In addition, a broker-dealer that uses the alternative method must have in place comprehensive internal risk management procedures that address market, credit, liquidity, legal, and operational risks at the firm. These requirements are designed to help ensure the integrity of the broker-dealer’s risk measurement, monitoring, and management processes and to clarify accountability, at the appropriate organizational level, for defining the permitted scope of activities and level of risk.

A broker-dealer also must provide the Commission with specified financial, operational, and risk management information on a monthly, quarterly, and annual basis. The broker-dealer will continue to be subject to oversight by the Commission as well as its designated examining authority, primarily the New York Stock Exchange.

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<sup>3</sup> Exchange Act Release No. 49830 (June 8, 2004), 69 FR 34428 (June 21, 2004).

<sup>4</sup> If the ultimate holding company is an entity that has a principal regulator, as defined in the rules, it is subject to a streamlined regulatory regime to avoid duplicative or inconsistent regulation. LBHI, however, is not an entity that has a principal regulator.

<sup>5</sup> These deductions are intended to help ensure that a broker-dealer maintains sufficient capital to account for various risks, including market, credit, operational, and liquidity risk, and the models and scenario analyses are tailored to compute these risks given a firm’s unique risk profile.

<sup>6</sup> “Tentative net capital” is defined in the CSE rules as net capital before deductions for market and credit risk.



## The Ultimate Holding Company Provisions

As a condition to granting a broker-dealer an exemption from the standard net capital rule, the broker-dealer's ultimate holding company must consent to group-wide Commission supervision if it does not have a principal regulator. Generally, Appendix E requires the ultimate holding company to execute a written undertaking in which it agrees, among other things, to do the following:

- Implement an internal risk management control system for the affiliate group;
- Keep records, and make reports regarding the ultimate holding company, including calculation of a group-wide capital adequacy measure consistent with the standards adopted by the Basel Committee on Banking Supervision ("Basel Standards").<sup>7</sup>;
- Consent to Commission examination of the books and records of the ultimate holding company and its affiliates that do not have principal regulators;
- Make available to the Commission information about the ultimate holding company or any of its material affiliates that is necessary to evaluate financial and operations risks within the ultimate holding company and its material affiliates; and
- Make available examination reports of principal regulators for those affiliates that are not subject to Commission examination.

The ultimate holding company must provide the Commission with monthly, quarterly, and annual reports. The reports must include specified consolidated financial and credit risk information, including a consolidated balance sheet and income statement audited by a registered public accounting firm; the capital adequacy measurement (statements of allowable capital and allowances for market, credit, and operational risk); the results of a registered public accounting firm's review of the risk management and control system of the ultimate holding company; and certain reports that the ultimate holding company regularly provides to its senior management to assist in monitoring and managing risk. The ultimate holding company must make and keep current records of funding and liquidity stress tests, the basis for the determination of credit risk weights for

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<sup>7</sup> The Basel Committee has issued the "International Convergence of Capital Measurement and Capital Standards" ("Basel I") (1988) and the "International Convergence of Capital Measurement and Capital Standards, A Revised Framework" ("Basel II") (2004). The implementation date of Basel II is year-end 2006, except that the most advanced approaches have an implementation date of year-end 2007. The Basel Standards establish a common measurement system, a framework for supervision, and a minimum standard for capital adequacy for international banks. The CSE rules generally specify the use of the Basel Standards as implemented by the Board of Governors of the Federal Reserve System ("Federal Reserve").

each counterparty, the basis for the determination of internal credit ratings for each counterparty, and a record of the calculations of allowable capital and allowances for market, credit, and operational risk.

These reports will assist the Commission in monitoring the financial condition, the risk management control system, and the activities of the affiliate group to detect any events or trends that may adversely affect the broker-dealer.

### **CSE Supervisory Program**

The Commission's supervisory program with respect to CSEs has four components:

The first component is a staff review of the application. As part of the review, the staff assesses the firm's financial position, the adequacy of the firm's internal risk management controls, and the mathematical models the firm will use for regulatory purposes. The staff also conducts on-site reviews to verify the accuracy of the information included in the application, and to assess the adequacy of the implementation of the firm's internal risk management policies and procedures.

Second, Commission staff reviews monthly, quarterly, and annual filings containing financial, risk management, and operations data. These reports include consolidating financials (which show intercompany transactions that are eliminated during the preparation of consolidated financial statements) and risk reports substantially similar to those provided to the firm's senior managers. At least monthly, the holding company files a capital calculation made on a consolidated, group-wide basis consistent with the Basel Standards.

Third, the Commission staff meets monthly senior risk managers and financial controllers at the holding company level to review the packages of risk analytics prepared at the ultimate holding company level for the firm's senior management. The focus is on the performance of the risk measurement infrastructure, including statistical models; risk governance issues including modifications to and violations of risk limits; and the management of outsized risk exposures. In addition, there are quarterly meetings focused on financial results, the management of the firm's balance sheet, and, in particular, the liquidity of the balance sheet.

Fourth, Commission staff conducts examinations of the books and records of the ultimate holding company, the registered broker-dealers, and material affiliates that are not subject to supervision by a principal regulator. The examinations focus on the capital calculation and on the adequacy of implementation of the firm's documented internal risk management controls.

### III. HOLDING COMPANY AND BROKER-DEALER

LBHI, the investment bank holding company, and its subsidiary LB, the broker-dealer applicant, are described below. A description of the remaining material affiliates of LBHI is attached at Tab C.

#### **Ultimate Holding Company - LBHI**

LBHI is a U.S. investment banking firm that is not part of a bank holding company. It has broker, dealer, and other financial services affiliates. Notably, the group includes Lehman Brother Bank, which is regulated by the Office of Thrift Supervision (“OTS”). OTS is expected to exert its statutory authority with respect to holding companies such as LBHI that includes thrifts. We continue to discuss with OTS the exact scope of these activities, and how to minimize any duplication in regulatory efforts.

LBHI is headquartered in New York, has principal offices in London, Tokyo, Hong Kong, and other world financial centers, and employs approximately 20,000 people. For the fiscal quarter ending August 31, 2005, LBHI reported net revenue of \$3.9 billion and net earnings of \$879 million. Lehman’s return on common stockholders’ equity for the quarter was 23.0 percent. Total capital, consisting of equity and long-term borrowing, totaled \$76 billion as of May 31, 2005.

LBHI divides its activities into three business segments:

- **Investment Banking.** This segment consists of Advisory Services and Global Finance activities. Specialized product groups within Advisory Services include M&A and restructuring. Global Finance includes Equity Capital Markets, Debt Capital Markets, Leveraged Finance, Private Placements, Derivatives and Product Development. This segment accounted for approximately 19% of 2004 net revenue.
- **Capital Markets.** This segment includes institutional customer flow activities, prime brokerage, research, and secondary trading and financing activities in fixed income and equity products. Activities involving mortgages, including the origination and securitization of loans backed by both residential and commercial property constitute a large and growing component this segment, which accounted for approximately 66% of 2004 net revenue.
- **Investment Management.** This segment includes Private Investment Management and Asset Management. Private Investment Management generates transactional revenues from high net worth clients. Asset Management generates fee revenue from high net worth clients and institutional investors. This segment accounted for approximately 15% of 2004 net revenue.

## **Broker-Dealer Applying for CSE Treatment – LB**

LB is a U.S. broker-dealer with approximately 270,000 active customer accounts. The Commission is its primary regulator. As of August 31, 2005, LB had total assets of \$227.8 billion, total liabilities of \$224.4 billion, regulatory net capital of \$1.9 billion, and excess net capital of \$1.7 billion.<sup>8</sup> Tentative net capital stood at \$5.4 billion.

### **IV. STAFF REVIEW OF INTERNAL RISK MANAGEMENT FUNCTIONS**

In addition to reviewing the proposed capital calculation, the staff spent significant time on-site at LBHI's headquarters examining the internal risk management control functions and processes described in the application. Division staff reviewed the models and related processes for measuring, aggregating, and limiting the firm's exposure to market and credit risk, as well as the firm's treasury and related functions, which are intended to assure adequate liquidity at the holding company level under all market conditions. These processes and functions are not only fundamental to effective internal risk governance, but they also generate critical inputs to the holding company capital calculations required under the CSE rules.

Examination staff in OCIE and NERO ("examination staff") conducted targeted testing of the operational controls mandated by the CSE rules. The focus of this effort was to assess the adequacy of documentation and then to test that the controls described in the documentation were in place. These reviews included, among other things, a review of the internal audit function, testing of the systems and processes intended to ensure that transactions are properly reflected in the books and records and in the risk management systems of the firm, and testing of the controls around the legal structure of transactions intended to assure enforceability and compliance with applicable laws and regulations.

While the staff identified various issues warranting follow-up, we concluded that these are not material to the overall financial and operational condition of the firm, nor to the overall adequacy of risk controls. The work of the staff, and related conclusions, are summarized below.

#### **A. Market and Credit Risk Management**

In May and June 2005, Division staff performed a review of the market and credit risk management functions at LBHI. The firm manages market and credit risk in an integrated fashion through the aggregation of both types of risk into a single measure known as Risk Appetite ("RA"). Value at Risk ("VaR"), potential exposure ("PE"), and other risk measures are components of the Risk Appetite calculation. Thus the staff chose to conduct its review in an integrated fashion, considering the market and credit risk management processes together. Overall, the risk management function at Lehman

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<sup>8</sup> Regulatory net capital includes qualifying subordinated debt.

is robust, and market and credit risks are adequately measured, monitored and managed given the firm's current overall risk profile.

The review focused largely on the activities of the Risk Management Department ("RMD") at LBHI. RMD is headed by the Chief Risk Officer ("CRO") who is a member of LBHI's Management Committee and reports to the Chief Administrative Officer. The Chief Administrative Officer reports to the Chief Executive Officer and, ultimately, to the firm's Board of Directors. A Risk Committee, consisting of the Executive Committee, the CRO and Chief Financial Officer, meets weekly to review exposures and concentrations of market and credit risk.

The firm's authorizing guidelines assign three core functions to RMD. First, the group is charged with understanding risks material to the firm, at both a business unit and aggregate firm level. Accordingly, the group has developed metrics to measure and aggregate risks across products and businesses, which they refer to as RA. Second, RMD must ensure that the appropriate limits are in place for all transactions and exposures. For example, RMD typically specifies limits at a business level in terms of permissible RA. Finally, RMD manages the firm against catastrophic loss. To this end, RMD measures and monitors "tail risk" for trading positions and deal risk for large transactions.

RMD has approximately 190 employees divided into five groups. The Market Risk Management ("MRM") and Credit Risk Management ("CRM") groups are responsible for the development, maintenance, and operation of the risk quantification methodologies for market and credit risk respectively, and for monitoring exposures against relevant limits. A Quantitative Risk Management group ("QRM") is responsible for the independent review and approval of the pricing models used across the firm. QRM is also responsible for the overall architecture of the risk systems and generation of risk reports. Finally, separate Sovereign Risk Management and Operational Risk Management groups exist within RMD.

During the review, the staff focused on businesses generating material or difficult to capture market risk exposures, including interest rate trading, credit trading, mortgages, municipals, equity volatility, real estate, and risk arbitrage. Calculation of the primary market risk component of RA, VaR, was considered in detail, as were the approaches taken to capturing the material market risks that are not well-captured by VaR. The staff also reviewed the integration of these models and other analytics into the firm's market risk management system. In this regard, staff reviewed the market risk reporting generated for senior management and business unit management. Staff also reviewed the firm's processes for monitoring risk-taking and measuring exposures against the relevant risk limits established by senior management. The staff also considered the control processes surrounding these and other market risk metrics (e.g., price verification and profit and loss reconciliation), and the likelihood that potentially material failures in risk measurement and aggregation would likely be identified quickly by financial and product controllers through regular reconciliation processes.

For credit risk, the staff focused on the business areas with the most material counterparty credit exposure. These include the leveraged lending business, which provides unsecured financing – including revolvers and bridge loans – to non-investment grade counterparties; the OTC derivatives and securities financing areas, which generate “current” (i.e., unsecured) as well as “potential” credit exposures to a variety of counterparty types; prime brokerage, which provides collateralized (i.e., secured) financing to hedge funds; and the warehouse lending business, which finances large pools of whole loans for residential mortgage originators. The PE methodology, a primary tool used to manage and limit counterparty credit risk, and a key input into the credit component of the risk appetite calculation, was reviewed in detail as was the overall estimation of the counterparty risk appetite usage. In addition, we focused on the credit department’s processes for assessing counterparty credit quality and permissioning risk taking, including the determination of limits and the assignment of internal credit ratings (“ICRs”).

At Lehman, much of the attention of senior risk management personnel, as well as the firm’s governance committees, is devoted to the pipeline of large financing deals that drive the material market and credit risks faced by the firm. In contrast, the appetite for traditional proprietary positioning by individual desks is quite limited, and concentrated in a small number of locations within the firm. The large deals may be of several types, including securitizations of mortgages and other assets and packages of financings assembled in support of merger and acquisition activities. These deals generate market risk, resulting from the process of selling securities in the market. But they also involve significant credit risk. In the case of securitizations, Lehman often finances on a secured basis the “warehousing” of assets by third party originators for eventual securitization. In financing deals related to acquisitions and mergers, Lehman may retain certain loan positions for a considerable period of time before syndication occurs. This risk profile, which is driven by large deals with both market risk and credit risk exposures, is a key rationale for the integration of market risk and credit risk management.

As noted above, this integration is accomplished through the use of RA. RA exposures are an amalgamation of three types of risk, market risk, credit risk and event risk, which includes business-specific gap risks, such as the sudden downgrade of debt instruments or the collapse of a local real estate market. Each component is calculated separately, for market and credit risk by transforming existing metrics such as VaR and PE. These components are then aggregated using certain ad hoc but conservative correlation assumptions. A central idea that underlies the RA framework is that a dollar of risk is a dollar of risk, no matter the source. Therefore, there is value to having a methodology that aggregates across risk types, and presents the resulting exposures in an intuitive way to senior management.

RA exposures are measured against RA limits, which are set through a process that considers the budget for the firm, projected revenues in a down year, and minimally-acceptable returns on equity. The aim is to constrain risk taking to levels that will not place the franchise at risk, for example by necessitating asset liquidations, even in the face of the simultaneous slowdowns in customer flow, proprietary trading, and banking

activities that might occur in an adverse environment. RA limits are set considering losses that would occur over a one-year period with a probability of five percent. The RA process contrasts with the more typical setting of VaR-based limits, where the focus is on the amount that senior management is comfortable losing two or three times each year. At Lehman, the aggregate RA limit is by design a “hard” limit, and not meant to be exceeded under any conditions as any excession would indicate that the franchise was at risk.

The staff found that the VaR models in use at LBHI to calculate general market risk charges meet the qualitative and quantitative standards of the CSE rules. In particular, the models are well integrated into the firm’s internal risk management processes.<sup>9</sup> The models are validated using multiple methods, including backtesting against actual daily profit and loss. The staff also concluded that the models are sufficient to capture, for purposes of regulatory capital calculations, the specific market risk associated with concentrated positions in the securities of a single issuer for equity, equity derivatives, and investment grade debt positions.<sup>10</sup>

More generally, the staff concluded that LBHI’s system for measuring, aggregating, monitoring, and controlling the firm’s market and credit risks, and communicating that risk to senior management, was adequate, and that RMD is organizationally independent of the firm’s business units.

However, the staff identified some areas of potential weakness. In almost all cases, these areas were already identified by firm personnel as warranting attention and are slated for upgrade in the near future.

Stress testing, including historical or hypothetical scenario analysis, provides insight into risks that are not well-captured by VaR. In the past, RMD has occasionally conducted ad-hoc scenario analysis calculations based on historical events and shared these results with senior management, including the Board of Directors. However, RMD has not previously conducted (or had the ability to conduct) scenario analysis on a periodic or automated basis. QRM is currently developing the capability to perform automated scenario analysis. Although the firm has not currently “locked down” the complete list of scenarios they plan to run, the eventual list will most likely include both historical market events of significance as well as hypothetical scenarios. RMD expects to have this initiative completed by the end of the current year.

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<sup>9</sup> The models also satisfy the requirements of the 1996 Market Risk Amendment to Basel I (“Amendment to the Capital Accord to Incorporate Market Risks,” Basel Committee on Banking Supervision, January 1996), which is still the standard for trading book positions and which is reflected in the CSE rules.

<sup>10</sup> Presently, neither the Basel Standards nor the CSE rules contain detailed standards for evaluating models used to compute specific risk. The firm understands that as standards are developed, for example, requiring backtesting against positional profit and loss, it may have to improve its specific risk model validation procedures to meet those standards.

Traditionally, the use of models to price OTC derivatives and other complex products was overseen by the financial controllers. These pricing models not only generate marks that flow into the firm's books and records, but also are, in many instances, critical inputs to the risk measurement and aggregation processes. A new model control framework, intended to improve control of pricing models by applying uniform standards throughout the firm, is under development by QRM within RMD. Like most of its peer firms, Lehman felt a need to formalize existing processes in this area to meet the requirements of the Sarbanes-Oxley legislation and the CSE rules. While QRM has articulated a risk-based approach, which is intended to concentrate resources on the most material models, the implementation is not yet complete.

We will monitor progress on these two initiatives, as well as on several minor enhancements involving the PE calculations, going forward.

## **B. Liquidity Risk Management**

Division staff reviewed LBHI's liquidity risk management function primarily to evaluate the firm's policies and its ability to assure adequate liquidity and funding at all times, including during periods of significant market fluctuations and financial stress. The review consisted of presentations, interviews, and discussions with senior management of Lehman Brothers Global Treasury ("Global Treasury"), as well as consultation with the internal auditors. The staff reviewed the governance structure, organization structure, lines of authority, policies, internal management reports, and various other documents including those related to the liquidity pool and the Funding Action Plan, which are described below. The staff found no material deficiencies in LBHI's liquidity risk management control system.

The liquidity and funding function for LBHI is managed by Global Treasury and is overseen by the Management Finance Committee ("MFC"), which is chaired by the CFO and meets weekly to review the firm's liquidity, funding, and capital position. Global Treasury is responsible for managing funding and liquidity risk, recommending balance sheet limits at the business and division level to the MFC, and providing relevant reports and recommendations to senior management committees. Global Treasury monitors liquidity risk and ensures compliance with liquidity policies, short-term and long-term financing, and cash management, and manages relationships with creditors and rating agencies. Key elements of the firm's liquidity framework are the liquidity pool and the Funding Action Plan.

LBHI's policy is to maintain a liquidity pool for the holding company and its unregulated subsidiaries that would cover all expected cash outflows for one year in a stressed liquidity environment. The liquidity pool is intended to cover the roll-off of unsecured debt for one year, fund additional requirements during liquidity events such as additional collateralization of derivatives and the drawing down of unfunded commitments, and to fund the buyback of equity and debt if the firm chooses to do so.



The liquidity pool, as viewed by LBHI senior management, includes the undrawn portion of the holding company's \$1.5 billion committed unsecured working capital credit facility. While the firm clearly believes that the funds from this facility would be readily available in a stress event, the staff's view is that such facilities are distinct from cash and unencumbered liquid securities that can be readily hypothecated, and thus should not be considered as a part of the liquidity pool. The amount of the liquidity pool, without considering the \$1.5 billion committed credit facility, would have been \$17.2 billion at the year end November 30, 2004 and \$17.3 billion at the end of February 2005. The pool, thus defined, consists of Treasuries, G7 sovereigns, investment grade asset-backed and corporate fixed income securities, S&P 500 equities, and other instruments with sizable secured funding markets. In particular, debt-like preferred equity investments are included in the pool in the amount of \$2.3 billion. These instruments can be put back to the issuers, AA-rated European banks, on five days' notice.

Lehman has developed and regularly updates a Funding Action Plan, which represents a detailed strategy to manage a stress liquidity event, including a communications plan for creditors, investors, and clients. The contingency plan considers two types of liquidity stress events; a firm-specific event and a broader market-wide event, which affects not just Lehman but the entire market. In a firm-specific event, the firm assumes that there is no access to the unsecured funding market for a full year with full reliance on the liquidity pool to fund the balance sheet. In a market liquidity event, it is further assumed that counterparties to whom the firm has extended liquidity facilities, for example revolvers, draw on these facilities. To mitigate the effect of a market liquidity event, the firm has developed access to additional liquidity sources beyond the liquidity pool. These sources include unutilized funding capacity in bank subsidiaries as well as syndicated and bilateral bank facilities. During an event, the firm would also make extensive use of secured funding arrangements, and particularly triparty repurchase agreements, to monetize unencumbered assets.

The firm funds its balance sheet on a global basis through diverse sources. These sources include equity capital, long-term debt, repurchase agreements, commercial paper, other short-term obligations, asset-backed securities, letters of credit, securities lending, and committed and uncommitted credit facilities. Bank demand deposits and time deposits are also a significant source of unsecured funding. Financing guidelines are designed to enable the firm to access adequate funding to service its financial obligations when they come due without material adverse franchise or business impact.

The firm obtains short-term financing on both a secured and unsecured basis. Secured financing is obtained through the use of repurchase agreements and securities loaned agreements, which are primarily collateralized by government and equity securities. Unsecured financing is obtained primarily by the issuance of commercial paper. As of February 28, 2005, the LBHI balance sheet included \$202 billion of securities borrowed and repurchase agreements, and \$3 billion of commercial paper.

LBHI pursues a strategy of diversification of funding sources by product, investor, and geographical region. The firm uses interest rate swaps to more closely

match its borrowings to the duration, holding period, and interest rate characteristics of the assets being funded and to manage interest rate risk. These swaps effectively convert certain of the firm's fixed rate borrowings into floating rate obligations. In addition, for non-U.S. dollar currency borrowings that are not used to fund assets in the same currency, the firm has entered into currency swaps that effectively convert the borrowings into U.S. dollar obligations. At February 28, 2005, the firm's long-term borrowings were \$59 billion and stockholders' equity was \$16 billion.

The review of the liquidity and funding risk management functions of LBHI found no material deficiencies. However, some initiatives underway at LBHI will enhance the ability of Corporate Treasury to manage liquidity. These initiatives include the enhancement of the Reliable Secured Funding Model, which is intended to estimate the secured funding available to the firm during a stress event, exploration of additional opportunities to use banking entities as a funding source, and improvements to the infrastructure used by the firm for implementing secured funding operations. As part of our routine supervisory activities, we will monitor the implementation of these firm initiatives.

### **C. Internal Audit**

Examination staff conducted a review of LBHI's Corporate Audit Department. The review focused on the adequacy of the audit program and, in particular, its coverage of unregulated affiliates. The staff evaluated whether the Department adhered to its stated audit procedures, and whether the internal audit staff communicated its findings to the Audit Committee of the Board of Directors and to senior management in a timely and appropriate fashion. Examination staff also reviewed a number of audits in detail, including workpapers, testing, and resulting remediation.

The Department is responsible for the internal audit function throughout LBHI, including its regulated and unregulated affiliates. The Internal Audit Department is an independent function, reporting directly to the Audit Committee of the Board, that assists senior management and the Audit Committee in the discharge of their oversight responsibilities of risk management, control and governance. The Internal Audit Department and its director also report administratively to the General Counsel.

As of February 2005, the Department had a total staff of 85 professionals, including 58 employees in New York, 19 in Europe, and 8 in Asia. Most staff members have an advanced degree or professional designation, such as CPA or CISA certification.

The staff's review of LBHI's internal audit function highlighted the fact that the fulfillment of Sarbanes-Oxley Section 404 ("SOX") requirements consumed a significant share of the Corporate Audit's staff resources during 2004, resulting in the postponement of certain work related to non-financial controls. The firm responds that all key risk management controls, non-financial as well as financial, will be covered by full-scope audits for all capital markets businesses beginning in 2006. The audit cycle for these full-scope audits will be set at 12 to 18 months for high risk areas, 18 to 36 months for medium risk

areas, and 36 to 60 months for low risk areas. The firm will memorialize these frequencies in the Corporate Audit policy manual.

The staff also expressed concern that all high-risk SOX findings may not have been reported to the Audit Committee. The firm responded that Corporate Audit conveyed the most significant 2004 SOX findings in the November 2004 and February 2005 reports to the Audit Committee. The firm noted in its response that the majority of control concerns, which may pose lesser risks to the firm, were included in the key control themes reported to the Audit Committee. However, the firm stated that, going forward, Corporate Audit will include all high risk finding and control concerns in a report to the Audit Committee, and the Corporate Audit policy manual will be updated to more precisely describe the required reporting. The staff will monitor the firm's progress on this initiative.

#### **D. Operations Risk Management (Trade Processing and Data Integrity)**

The examination of trade processing and data integrity by the examination staff traced the progress of selected transactions from entry into the front office system to proper reflection in the firm's books and records. A particular focus was transactions booked in unregulated entities. Also of particular interest were transactions involving products that are not securities and, therefore, for which the relevant infrastructure has not been previously examined by the Commission. The review sought to verify not only that the resulting positions are properly reflected in the books and records of the firm, but also that the associated market and credit exposures are properly reflected in the relevant risk information systems. In some cases, the information flow to the risk systems consists solely of positions. In other cases, the information flow includes certain risk parameters that are calculated by the front office systems. Reconciliation processes between systems were tested, as were the resolution of discrepancies identified through these processes.

The staff identified various weaknesses in the processing of trades, most notably with respect to the absence of automated reconciliations between the front-office trade capture system, the middle-office systems, and the daily profit and loss systems. The firm indicated that it is currently building systems that will address this concern. Similarly, the staff noted that there was no automated reconciliation between the market risk system and the firm's books and records. The firm indicated that it would be in a position to begin quarterly automated reconciliation on December 1, 2005.

The staff will monitor the firm's progress in addressing these issues during subsequent examinations.

## **E. Legal and Compliance Risk Management**

The examination staff reviewed LBHI's legal and compliance risk management system, including organization and reporting lines, written documentation, and the firm's system for monitoring and surveillance. Because of the increased risk associated with unregulated products, a particular focus of the review was the trading of products such as commodities, foreign exchange, credit derivatives and interest rate products, all of which are frequently booked in unregulated entities.

The staff raised concerns about gaps in the coverage of certain unregulated products by the legal and compliance function was incomplete. As the firm clarified, the legal and compliance risk management framework is comprehensive and all business and products groups are covered. In its response, the firm also noted that for the debt and equity businesses the same legal and compliance staff monitors unregulated products, such as derivatives, as monitors securities transactions. The Mortgage Capital Division, a large and growing business at Lehman, has a separate legal and compliance staff to advise on issues affecting its activities.

The staff was also concerned generally about the quality of documentation for the legal and compliance system. In many instances, legal and compliance risk management committees act on an informal basis, with no formal votes by committee members to, for example, approve new products. In general, the firm acknowledges the need for additional formalization and documentation. The staff will monitor the firm's progress in moving in this direction.

## **V. CAPITAL CALCULATION**

As required by the CSE rules, LBHI will compute capital adequacy monthly at the group level in accordance with Appendix G.

*Allowance for Market Risk.* The firm has determined that most of its positions meet the Basel II definition of trading book assets and are therefore subject to a market risk allowance. This allowance will be calculated either using a VaR model or, in a small number of cases, using scenario analysis. The model-based market risk charge will generally be the VaR measure multiplied by a factor of three, assuming acceptable backtesting results. Where specific risk is included in the model, but where the effectiveness of the model has yet to be demonstrated by, for example, positional backtesting measure, the multiplication factor will be increased by one. Where specific risk is not included in the model, the market risk allowance will include a specific risk add-on, similar to that specified under Regulation Y of the Federal Reserve. As the firm amends its VaR models to more completely capture specific risk, it will likely seek approval to reduce the specific risk add-ons. The capital requirements arising from the specific risk add-ons are more than three times the general market risk charge arising from the use of the model. As of February 28, 2005, firmwide trading VaR was \$46 million. The capital charge associated with this risk measure, before the addition of

certain specific risk charges, was \$517 million.<sup>11</sup> Total market risk charges, including the specific risk add-ons, totaled \$2.2 billion.

*Allowance for Credit Risk.* The firm will calculate credit risk on warehouse lending<sup>12</sup>, event and bridge loans, and non-investment grade loan syndications. Credit risk allowances are also computed for certain retained interests for commercial and residential mortgage securitizations, notably lower-rated and net interest margin (“NIM”) tranches. LBHI has implemented the “expected potential exposure” approach to counterparty credit risk for over-the-counter derivatives described in “The Application of Basel II to Trading Activities and the Treatment of Double Default,” published by the Basel Committee in July 2005. At quarter end on February 28, 2005, the total credit risk allowance was \$3.1 billion.

*Allowance for Operational Risk.* Until the Commission determines that the firm may apply a model-based approach to calculating operational risk, the firm will use the basic approach permitted under Basel II. The operational risk allowance will be 15% of gross income, averaged over the preceding three years. For the fiscal year ending November 30, 2004, the operational risk allowance was \$1.3 billion.

For purposes of its capital calculation, LBHI has requested Commission permission to count certain long-term debt as part of its capital during a three-year phase-out period in accordance with the CSE rules. This inclusion of long-term debt would represent a departure from Basel II. In order to ensure that equivalency issues not be raised, we have informed the bank regulators of our intention to afford LBHI and other CSEs this treatment during the phase-out period. They raised no objections. LBHI has included long-term debt as Tier 2 capital up to a combined limit equal to 50 percent of Tier 1 capital, consistent with Basel II and Appendix G.

Pro forma group level capital calculations, as of February 2005, are attached at Tab B.

LB’s broker-dealer market and credit risk capital charges will generally be computed similarly to the market and credit risk allowances at the group level.

Pro forma broker-dealer level capital calculations, as of May 2005, are attached at Tab B.

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<sup>11</sup> Firmwide VaR is calculated using a 99% one-day confidence level. The capital charge is calculated using a 99% ten-day confidence level and a multiplier of three.

<sup>12</sup> Warehouse lending involves the financing of loans or other assets being accumulated for eventual securitization.

## **VI. CONCLUSION**

Based upon the application, the staff's review of the application, the financial condition and internal risk management control systems of LBHI and LB, and the written undertaking of LBHI, the Division has determined that LB has met the requirements of Appendix E and is in compliance with other applicable rules promulgated under the Securities Exchange Act of 1934 and by self-regulatory organizations, and that LBHI is in compliance with the terms of its undertaking, as provided to the Commission.

## **VII. RECOMMENDATION**

We recommend that the Commission issue the attached order approving the application of LB to compute capital charges for market and credit risk pursuant to Appendix E and for consolidated supervision under the CSE rules.

### **Attachments:**

- Tab A: Order Permitting LB to Calculate Capital Charges Pursuant to Appendix E
- Tab B: Pro-forma Capital Calculations for LBHI and LB
- Tab C: Designated Material Affiliates of LBHI
- Tab D: Report on Credit and Market Risk Management Review
- Tab E: Report on Liquidity Risk Management Review
- Tab F: Summary of OCIE's Examination of LBHI and LB

UNITED STATES OF AMERICA  
BEFORE THE  
SECURITIES AND EXCHANGE COMMISSION

SECURITIES EXCHANGE ACT OF 1934  
Release No. XXX / October XX, 2005

ORDER REGARDING ALTERNATIVE NET CAPITAL COMPUTATION FOR  
LEHMAN BROTHERS INC., WHICH HAS ELECTED TO BE SUPERVISED ON A  
CONSOLIDATED BASIS

Lehman Brothers Inc. (“LB”), a broker-dealer registered with the Securities and Exchange Commission (“Commission”), and its ultimate holding company, Lehman Brothers Holdings International (“LBHI”), have indicated their desire to be supervised by the Commission as a consolidated supervised entity (“CSE”). LB, therefore, has submitted an application to the Commission for authorization to use the alternative method of computing net capital contained in Appendix E to Rule 15c3-1 (17 CFR 240.15c3-1e) to the Securities Exchange Act of 1934 (“Exchange Act”).

Based on a review of the application that LB submitted, the Commission has determined that the application meets the requirements of Appendix E. The Commission also has determined that LBHI is in compliance with the terms of its undertakings, as provided to the Commission under Appendix E. The Commission, therefore, finds that approval of the application is necessary or appropriate in the public interest or for the protection of investors.

Accordingly,

IT IS ORDERED, under paragraph (a)(7) of Rule 15c3-1 (17 CFR 240.15c3-1) to the Exchange Act, that LB may calculate net capital using the market risk standards of Appendix E to compute a deduction for market risk on some or all of its positions, instead of the provisions of paragraphs (c)(2)(vi) and (c)(2)(vii) of Rule 15c3-1, and

using the credit risk standards of Appendix E to compute a deduction for credit risk on certain credit exposures arising from transactions in derivatives instruments, instead of the provision of paragraph (c)(2)(iv) of Rule 15c3-1.

By the Commission.

Margaret H. McFarland  
Deputy Secretary



### 3.4. Pro Forma Capital Computation for Lehman Brothers Inc.

Data as of May 31, 2005  
(in millions)

<b>Gross Regulatory Capital</b>	
Ownership Equity	\$ 3,921
Approved Subordinated Debt	5,290
<b>Total</b>	<b>9,211</b>
<b>Deductions and Other Charges</b>	
Non allowable Assets	2,103
Securities Not Readily Marketable	92
Commodity Charges	17
Finance Charges	82
Market Related & Other Charges	53
Operational Deductions	123
<b>Total</b>	<b>2,470</b>
<b>Net Capital before Securities related Charges (Tentative Net Capital)</b>	
	<b>6,741</b>
Total Securities Haircuts	-
Total Market Risk Allowance (includes Reg Y related Charges)	1,055
Total Non VaR Exposures	52
Total Credit Risk Allowance	63
<b>Total</b>	<b>1,170</b>
Net Capital	5,571
Minimum Capital Requirement	222
<b>Excess Net Capital</b>	<b>\$ 5,349</b>

## **3.2. Pro Forma Capital Computation for Lehman Brothers Holdings, Inc.**

Data as of February 28, 2005

(in millions)

Allowable Capital	
Common Stockholders' Equity	\$ 14,409
Goodwill and Intangible Assets	(3,274)
Deferred Tax Assets, excluding reversals	(1,394)
Perpetual Preferred	1,345
Capital Requirement for Insurance Entities	(138)
Trust Preferred	1,225
Subordinated Debt (Ex Junior Subordinated Debt)	909
Long-Term Debt	4,911
<b>Total Allowable Capital</b>	<b>\$ 17,993</b>

	Risk Allowance	Risk-Weighted Assets
<b>Market Risk Allowance</b>		
VaR	\$ 517	\$ 6,463
Scenario / Stress	105	1,313
Regulation Y Add-on	1,554	19,425
<b>Total Market Risk Allowance</b>	<b>2,176</b>	<b>27,201</b>
<b>Operational Risk Allowance</b>		
	<b>1,319</b>	<b>16,488</b>
<b>Credit Risk Allowance</b>		
Counterparty Credit Risk	1,052	13,150
Real Estate Investments and Loans	909	11,363
Municipal Real Estate	29	363
Mortgage Warehouse & Principal Finance	49	613
Firm Relationship Loans (FRL's)	523	6,537
Private Equity	198	2,475
Insurance Entities	22	280
Retained Interests	370	4,625
<b>Total Credit Risk Allowance</b>	<b>3,152</b>	<b>39,406</b>
<b>Other Assets Risk Allowance</b>		
Cash and Cash Equivalents	68	850
Segregated Cash and Securities	28	350
Receivables from Brokers, Dealers and Clearing Orgs.		
Fail to Deliver	22	275
Clearing Organizations	9	113
Other	80	1,000
Receivables from Brokers, Dealers and Clearing Orgs.	111	1,388
Receivables from Customers		
Fails to Deliver	40	500
Margin Debits	13	163
Other	31	388
Receivables from Customers	84	1,051
Receivables from Others	178	2,225
Property, Equipment and L/H	238	2,975
Other Assets		
Investments in Partnerships and JVs	37	463
Other Assets	85	1,063
<b>Total Other Assets Risk Allowance</b>	<b>829</b>	<b>10,365</b>
<b>Total</b>	<b>\$ 7,476</b>	<b>\$ 93,460</b>

Tier 1 Risk Based Capital Ratio (\$11,639 / \$93,460)	12.5%
Total Risk Based Capital Ratio (\$17,993 / \$93,460)	19.3%
Total Risk Based Capital Ratio (excl. Long-Term Debt)(\$13,082 / \$93,460)	14.0%
CSE Capital Ratio (\$17,993 / \$7,476)	240.7%

Dated: September 26, 2005

**List of Significant Subsidiaries  
(Including Business Descriptions)**

**High Level Stats as of 2/25/05: 852 Legal Entities, 29 (3%) unassigned, 751 (88%) confirmed**

Tier 1		
Count	Name	Business Description
1	ALI INC	US based Entity used primarily to originate mortgage loans, holds a lending license in CA
2	AURORA LOAN SERVICES INC.	
3	BANQUE LEHMAN BROTHERS S.A.	French Commercial Banking entity utilized for Investment banking and FID real estate Activity
4	BNC HOLDINGS, INC	Holding Company for Mortgage Originator
5	BNC MORTGAGE, INC	Mortgage Originator
6	LB (LUXEMBOURG) S.A.	Principal in stock lending activities
7	LB (PTE) LTD.	
8	LB ASIA CAPITAL COMPANY	Primary Yen Securities and OTC Products Trading Entity
9	LB ASIA HOLDINGS LIMITED	
10	LB BANKHAUS AKTIENGESELLSCHAFT	German Commercial Banking entity
11	LB BANKHAUS LONDON BRANCH	
12	LB COMMERCIAL CORP. ASIA LIMITED	Primary Securities and Derivative Trading Entity
13	LB COMMERCIAL CORPORATION	Lehman Brothers Commercial Corporation acts primarily as a dealer in over-the-counter ("OTC") foreign currency forwards and options and exchange-traded futures contracts.
14	LB DERIVATIVE PRODUCTS INC.	AAA Rated Fixed Income Derivative Dealer
15	LB FINANCIAL PRODUCTS INC.	AAA Rated Fixed Income Derivative Dealer
16	LB I GROUP INC.	US Based Entity transacting in strategic and private equity type transactions
17	LB INTERNATIONAL (EUROPE)	Primary European Broker Dealer
18	LB INT'L EUROPE (ZURICH BRANCH)	
19	LB OTC DERIVATIVES INC	US OTC Derivatives Dealer Limited purpose Broker Dealer
20	LB SECURITIES ASIA LIMITED	Broker Dealer for South East Asian Securities
21	LB SPECIAL FINANCING INC.	Primary Fixed Income Risk Managing Entity
22	LB TREASURY CO BV	Netherlands based European Treasury Entity
23	LBEFG CAYMAN	Principal in stock lending activities
24	LBI TAIWAN BRANCH	

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25	LBI TAIWAN BRANCH	
26	LBIE (ITALIAN BRANCH)	
27	LBIE AMSTERDAM BRANCH	
28	LBIE MADRID BRANCH	
29	LBIE SEOUL SECURITIES BRANCH	
30	LBIE STOCKHOLM BRANCH	
31	LBIE-FRANKFURT BRANCH	
32	LBIE-PARIS BRANCH	
33	LEHMAN BROS ASIA LIMITED	Investment Adviser and Customer Agency Business
34	LEHMAN BROS INC SINGAPORE BRCH	
35	LEHMAN BROTHER AUSTRALIA PTY LIMITED	Broker Dealer for Australian Securities
36	LEHMAN BROTHERS BANK	U.S. Federal Savings Bank established to fund mortgage products
37	LEHMAN BROTHERS EUROPE LTD	Investment Banking services and dealer in securities and derivatives markets
38	LEHMAN BROTHERS FINANCE S.A.	Primary Equity Volatility Risk managing Entity
39	LEHMAN BROTHERS FUTURES ASIA LTD	Broker Dealer for Hong Kong Future and Options
40	LEHMAN BROTHERS HOLDINGS INC.	Ultimate Holding Company; SEC registrant; Primary Funding Entity
41	LEHMAN BROTHERS HOLDINGS PLC	Holding Co. for UK entities; Primary Funding Entities
42	LEHMAN BROTHERS INC.	Primary US Broker Dealer
43	LEHMAN BROTHERS JAPAN INC.	Primary Asian Broker Dealer
44	LEHMAN BROTHERS LIMITED	
45	LEHMAN COMMERCIAL PAPER INC.	US based entity transacting in Bank Loans and other credit based instruments
46	LEHMAN RE LIMITED	Bermuda based provider of Reinsurance products
47	LUBS INC	US based entity primarily in the mortgage loan business
48	MABLE	
49	NATIONAL TRUST COMPANY (NATNB)	
50	NB TRUST CO OF DELAWARE (DETST)	
51	NEUBERGER BERMAN INC NBINC	Investment Management Division – holding company
52	NEUBERGER BERMAN LLC (LLCNB)	Investment Management Division legal entity
53	NEW CENTURY FINANCE LTD.	Purchaser of Japanese Performing Loans
54	PROPERTY ASSET MANAGEMENT INC	US based entity used primarily to hold Real Estate exposure
55	SUNRISE FINANCE CO., LTD	Purchaser of Japanese Non Performing Loans

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**Lehman Brothers**  
**Consolidated Supervised Entity Market and Credit Risk Review**

SECURITIES AND EXCHANGE COMMISSION  
Division of Market Regulation  
Office of Prudential Supervision and Risk Analysis  
100 F Street NE  
Mail Stop 6628  
Washington, DC 20549

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## Acronyms in Lehman Consolidated Supervised Entity Market and Credit Risk Review

ABS	Asset Backed Securities
ALS	Aurora Loan Service
ARM	Adjustable-Rate Mortgages
BMA	Bond Market Association
CAO	Chief Administrative Officer
CAS	Credit Approval System
CDO	Collateralized Debt Obligation
CDS	Credit Default Swaps
CE	Current Exposure
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CLO	Collateralized Loan Obligations
CMBS	Commercial Mortgage Backed Securities
CMO	Collateralized Mortgage Obligations
CRM	Credit Risk Management
CRO	Chief Risk Officer
CSA	Collateral Support Agreements
CSE	Consolidated Supervised Entity
CVA	Credit Valuation Adjustment
CWS	Credit Work Station
DQCG	Data Quality Control Group
EAD	Exposure At Default
EE	Expected Exposure
ELP	Estimated Loss Potential
EMG/HF	Emerging Market Firms And Hedge Funds
EPE	Effective Potential Exposure
EPPE	Effective Peak Potential Exposure
FX	Foreign Exchange
GCS	Global Clearing Services
GMG	Global Margin Group
GREG	Global Real Estate Group
HistSim	Historical Simulation
HYCC	High Yield Commitment Committee
IB	Investment Banking
ICR	Internal Credit Rating
IO	Interest-Only
LBO	Leveraged Buy-Outs
LGD	Loss Given Default
LTV	Loan-to-Value
MACs	Material Adverse Clauses
MIS	Capital Markets Technology Group
MMD	Municipal Market Data
MPE	Maximum Potential Exposure



MRA	Marginal Risk Appetite
MRM	Market Risk Management
NAV	Net Asset Values
NIM	Net Interest Margin
NPC	New Products Committee
NPE	Net Potential Exposure
OAS	Option-Adjusted Spread
OEC	Operating Exposures Committee
OPSRA	Office Of Prudential Supervision And Risk Analysis
P&L	Profit And Loss
PC	Product Control
PD	Probabilities Of Default
PE	Potential Exposure
PPE	Peak Potential Exposure
PTG	Principal Transaction Group
QR	Quantitative Research
QRM	Quantitative Risk Management
RA	Risk Appetite
RMD	Risk Management Department
ROTE	Return On Tangible Equity
TBA	To-Be-Announced Market
TMG	Transaction Management Group
VaR	Value-At-Risk
VCV	Variance-Covariance
VoD	Value-On-Default
WLT	Whole Loan Tracking System

## Scope and Methodology of Review

Pursuant to Lehman Brothers' (Lehman) application to become a Consolidated Supervised Entity (CSE), staff of the Office of Prudential Supervision and Risk Analysis (OPSRA)<sup>1</sup> reviewed the independent risk management function at Lehman. We met with members of the Risk Management Department (RMD), trading desk heads, financial controllers, model research heads, and others.<sup>2</sup> The bulk of the field work and analysis was done during May and June of 2005.<sup>3</sup>

The review consisted of on-site interactions with Lehman staff and off-site review and analysis of reports, documents and presentations submitted pursuant to this review.<sup>4</sup> The on-site meetings generally covered one or more topics: (i) business unit risk taking and risk controls; (ii) aggregate risk metrics and the independent risk control function; and/or (iii) control processes supporting risk management. In total, we spent 23 days on-site meeting with Lehman staff, and participated in several follow-up conference calls.

During the review, we sought to assess the adequacy of the independent risk management function and to establish a supervisory framework by which to monitor and gauge risk management developments in the future. For market risk, we focused on businesses generating material or difficult to capture exposures, including interest rate trading, credit trading, mortgages, municipals, equity volatility, real estate, and risk arbitrage. We reviewed processes surrounding the primary market risk component of RA, value-at-risk (VaR), and looked at the calculations behind event risk, another component of RA that will be discussed in greater detail in the following sections. In addition, we focused on the control processes surrounding these and other market risk metrics (e.g., price verification and profit and loss reconciliation). For credit risk, we focused on the risk management of the business areas with the most material counterparty credit exposure. These include the leveraged lending business, which provides relatively large unsecured financing packages to non-investment grade counterparties, the OTC derivatives and securities financing areas, which generate "current" (i.e., unsecured) as well as "potential" credit exposures to a variety of counterparty types, prime brokerage, which provides overcollateralized (i.e., secured) financing to hedge funds, and the warehouse lending business, which finances large pools of whole loans for residential mortgage originators. We examined the Potential Exposure (PE) methodology, a primary tool used to manage and limit counterparty credit risk, and a key input into the credit component of the risk appetite calculation, as well as the overall estimation of the counterparty risk appetite usage. In addition, we focused on the credit department's processes for assessing counterparty credit quality and permissioning risk taking.

One feature of the risk management function at Lehman should be noted up front: unlike at its peer firms, market and credit risk are managed in an integrated fashion, through their aggregation into a single measure called Risk Appetite (RA). This

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<sup>1</sup> The market risk review team consisted of Lori Bettinger, Mike Hsu, and P.C. Venkatesh, with assistance from Matt Comstock in the Net Capital Group. The credit risk review team consisted of Michelle Danis and Steve Spurry.

<sup>2</sup> Our primary contact at Lehman was Madelyn Antoncic, the Chief Risk Officer. For a list of Lehman staff contacted as part of this review process, see Appendix B.

<sup>3</sup> For the past two years, Lehman's market and credit risk departments have met with OPSRA staff under the auspices of the Derivatives Policy Group to present monthly risk information and commentary.

<sup>4</sup> See Appendix A for a catalogue of work papers related to this review.

<sup>6</sup> These deals are discussed in detail in Section III.e.i.

model achieves many of the same goals, such as the efficient allocation of resources, of the economic capital models at its peer firms. Given the integration of market and credit risk, it is difficult to clearly delineate a discussion of market risk management from a discussion of credit risk management, and for this reason both departments are assessed jointly in one document.

At Lehman, much of the focus of senior risk management is on the pipeline of financing deals that make up a large portion of their risk. These deals generate market risk, resulting from the process of selling securities into the market, as well as credit risk, resulting from loan positions retained by Lehman.<sup>6</sup> They also generate significant operational risk (e.g., legal and reputational) and are heavily scrutinized by senior management. The departments work together closely, and in the case of some businesses (e.g., prime brokerage and warehouse lending) jointly manage the risks. This high-level aggregation of risks provide some clear benefits, yet also raises issues surrounding the aggregation process and the assumptions underlying it. Lehman's approach to aggregating and managing risk is discussed in more detail below.

In addition to the standard market and credit risk review topics, we also looked at the integration of market and credit risk management. Nowhere is this integration more evident than in the Quantitative Risk Management (QRM) group. QRM is responsible for independently reviewing and approving the pricing models used across the firm. It is also responsible for the overall architecture of the risk systems, implementation and maintenance of the risk models and generation of risk reports. Within QRM, the Credit Risk Analytics department shares responsibility with Credit Risk Management (CRM) for the development, maintenance and operation of the risk quantification methodologies for credit risk, including Maximum Potential Exposure (MPE) and credit risk inputs for RA and Risk Equity. Similarly, the Market Risk Analytics department shares responsibility with Market Risk Management (MRM) for the development, maintenance and operation of the risk quantification methodologies supporting market risk, including VaR, stress tests, scenario analyses, and RA and Risk Equity.

This review did not focus on operational control issues nor conduct any systems or transactions testing. Rather, OPSRA directed its efforts to gain a broad understanding of Lehman's risk management infrastructure in order to be able to carry out prudential supervision on an ongoing basis. Overall, the risk management function at Lehman is robust and market and credit risks are adequately measured, monitored and managed given the firm's current overall risk profile. Lehman's standards for the measurement of market and credit risk exposures comply with the requirements of the Basel Standards and are consistent with the CSE rule.

This report is organized as follows. The first section provides a discussion of Lehman's risk management infrastructure, highlighting the formal governance structure, the RA framework, and aggregate risk limits. The second section describes and assesses Lehman's market risk management, models and methodologies for measuring risk, businesses generating significant market risk, and control processes around market risk metrics. The third section describes and assesses Lehman's credit risk profile and the processes in place for managing and controlling credit risk, including tools for credit risk management, limits and permissioning, technology systems, and businesses generating significant credit risk. The fourth section looks at RA in detail, including a discussion of its components, the aggregation process, and the framework's limitations. The final section highlights areas warranting ongoing scrutiny and our conclusions.

# I. Risk Management Infrastructure

## a. Formal Governance Structure

RMD has approximately 190 employees and is responsible for the risk management function at Lehman. RMD is independent of Lehman's business units and is headed by a Chief Risk Officer (CRO) who is a member of Lehman's Management Committee<sup>7</sup> and reports directly to the firm's Chief Administrative Officer (CAO), a member of the Executive Committee.<sup>8</sup> The CAO reports to the Chairman and Chief Executive Officer (CEO) and, ultimately, to the firm's Board of Directors. RMD consists of five divisions: MRM, CRM, QRM, Sovereign Risk Management and Operational Risk Management.

Lehman's policies and procedures identify three core functions of RMD. First, the group must understand risks material to the firm, at both a business unit and aggregate firm level. Accordingly, the group has developed metrics to measure and aggregate risks across products and businesses. Second, RMD must ensure that appropriate limits are in place for all transactions and exposures. For example, RMD uses RA to establish these limits at a business and firmwide level. Third, RMD risk manages the firm against "catastrophic" loss. To this end, RMD measures and monitors "tail risk" for trading positions, and deal risk for large transactions.

In addition to RMD, senior management oversight committees have responsibility for ensuring that the firm understands and approves the risks being incurred by various businesses and transactions. The following section highlights four of those committees.

The Risk Committee meets weekly to review exposures and position concentrations (both market and credit). The committee consists of the Executive Committee, the CRO and the Chief Financial Officer (CFO). The committee discusses the firm's top market and credit risks, relying on metrics such as RA; VaR; counterparty credit risk exposures by region, role, product, and top sectors; large exposures and commitments. The CRO communicates with the Executive Committee regularly and provides reports as necessary.<sup>9</sup>

The Operating Exposures Committee (OEC) was formed in 1996 at the CEO's request. The Chief Legal Officer chairs the committee and reports directly to the CEO. Members of OEC are Executive Committee members and senior managers from control functions such as tax and finance, including the CRO. The committee meets monthly. OEC's mission is to protect the franchise and ensure that the firm has implemented an appropriate set of internal controls. OEC examines all activities that expose Lehman to market, credit, operational, technological, documentation and legal risk. It attempts to identify and anticipate areas and issues that leave the firm most vulnerable to losses and sponsors appropriate measures to address those areas and issues. To accomplish its mission, OEC may review any group, department or division where there is the potential for the firm to lose money. Issues that OEC has addressed or continues to address

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<sup>7</sup> The Management Committee includes all major business unit operating heads and is responsible for the operations of, and coordination among, the global business units, including the establishment of near-term strategic objectives.

<sup>8</sup> The Executive Committee is comprised of the most senior members of Lehman and is ultimately responsible for its leadership and strategic direction. The Committee generally meets twice weekly, but will meet more frequently, if necessary. The Committee reviews and approves all major decisions that impact Lehman.

<sup>9</sup> Other risk committees include Investments, Bridge Loan, New Products and Country Risk Committees.

include fraud prevention and continuous audit monitoring, derivatives documentation, client account documentation, business continuity planning, mortgage origination business and infrastructure control, and money laundering prevention, among others. In addition to identifying vulnerabilities, OEC attempts to play a proactive role by providing a forum for addressing issues before they become problems.

The New Products Committee (NPC) determines if Lehman will commit to market a new product or enter into a new business. The NPC is intended to provide a forum for the business units to present new products or businesses to relevant areas of the firm to assess potential risks (including legal, regulatory, market, credit, and operational risks); ensure that the appropriate infrastructure is in place to trade the products or engage in the business; and approve, disapprove or recommend enhancements related to managing risks associated with the new products or businesses. The Chief Legal Officer chairs the NPC. It is comprised of senior managers from control functions, including Compliance, Corporate Audit, Corporate Strategy, Market and Credit Risk Management, Financial Control, Information Technology, Legal, Operations, Product Control (PC), Tax, Transaction Management and Treasury. The CAOs of various business divisions, such as Equities and Fixed Income, may participate in reviews of products that their respective divisions sponsor.

Lehman also has both a firmwide Commitment Committee and divisional commitment committees that perform a number of functions. Prior to bringing the deal to the Commitment Committee, the appropriate divisional commitment committee (equity, high yield, or high grade) considers the profitability and limit usage of a particular transaction. These committees have primary responsibility for determining whether a transaction offers an attractive return on equity and whether it fits within cash capital, RA, credit and single transaction limits. Once a transaction has been approved by a divisional commitment committee, it must then obtain approval from the firmwide Commitment Committee. The firmwide Commitment Committee seeks to address risks that are incurred as a result of capital markets deals, such as acquisition financing and underwritings, areas in which Lehman has a dominant presence. These transactions, such as high yield debt underwritings, can expose the firm to significant amounts of risk. This committee ensures that a particular transaction fits within Lehman's funding and risk frameworks, with particular attention to any reputational risk a deal may incur. The firmwide Commitment Committee determines if due diligence on a transaction has been thorough, the firm is protected on relevant legal issues, the firm is comfortable doing business with the client (i.e., reputational issues) and the syndication strategy is clear.

#### b. Risk Appetite Framework

The RA metric embodies the integrated risk management philosophy discussed above. Unlike its peer firms, Lehman utilizes this firmwide risk metric to capture market, event and credit risk in a single number for purposes of limit setting and senior management reporting.

Lehman's firmwide RA limit is calculated through a process which considers the budget for the firm, projected revenues for a down year, and minimally-acceptable return on tangible (book) equity (ROTE). In this way, the firm's RA limit is constructed from the bottom up, rather than through high-level discussions of loss tolerance, as is often the case for VaR and PE limits.<sup>10</sup> The broad objective is to arrive at a number – the RA limit

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<sup>10</sup> For instance, in setting a firmwide VaR limit, a senior management committee at other firms utilizing a more conventional approach may seek to set the limit directly by considering the dollar amount it is comfortable with losing one out of every 100 trading days, which is what a 99<sup>th</sup> percentile VaR metric is

– which reflects Lehman’s capacity to take risk, based on a one year horizon and 95<sup>th</sup> percentile loss assumption.

In practice, the firmwide RA limit is calculated by the controllers in January, after the Board has signed off on the year’s budget. Beginning with the firm’s baseline revenue, which is a function of the business units’ expected revenues in a normal operating environment, the controllers adjust downward to account for a simultaneous slowdown in customer flow, proprietary trading and banking activities (e.g. origination and mergers and acquisition advisory). The resulting figure represents what the firm can expect to make, even under prolonged adverse market conditions. For 2005, the baseline net revenue was \$12.7 billion. Of this, \$10.4 billion was derived from customer flow and \$2.3 billion from principal investments, private equity and real estate. To simulate a downturn in the market, a -10% revenue shortfall was applied to the customer flow revenues and \$0.6 billion was deducted from the \$2.3 billion.<sup>11</sup> Thus, should the market environment in 2005 turn sour, the firm could be expected to generate at least \$11.1 billion of revenue.

These revenues are offset by expense projections. While most expenses can be assumed to decline in rough proportion to a fall in revenues, compensation-related expenses are assumed to be sticky, reflecting the fact that some headcount must be maintained to protect the franchise in the medium to long term. Moreover, the firm assumes that to protect the franchise it must generate earnings sufficient to maintain for shareholders a minimally acceptable ROTE. This return has been set at 10%. Thus, a portion of the firm’s revenues essentially cannot be put at risk, in order to maintain the viability of the franchise. For 2005, these combined constraints translated into \$8.9 billion. The difference between the \$11.1 billion of revenues the firm can expect to receive (even in a bad year) and the \$8.9 billion of revenues which the firm cannot put at risk in order to cover projected expenses is \$2.1 billion, which represents how much the firm can risk (i.e., lose) without jeopardizing the franchise. In other words, the difference represents the firm’s RA limit: \$2.1 billion.

Two aspects of this calculation are worth pointing out. First, from a senior management perspective, this figure has great intuitive appeal. It encapsulates, in dollar terms, how much total risk the firm can take. Moreover, it is generated based on business considerations (revenues, expenses, ROTE, etc.), rather than on statistical metrics like VaR, which can be difficult for non-risk managers to link to the business activities of the firm. Second, the limit establishes a binding constraint on risk-taking. At Lehman the aggregate RA limit is, by design, not meant to be exceeded under any conditions, as an excession would indicate that the franchise was at risk.

In contrast to the RA limits, which express the firm’s risk capacity, RA exposures reflect the risks being taken by the businesses, i.e., risk *usage*. RA exposures are an amalgamation of three types of risk: market risk, event risk, and credit risk. Each component is calculated separately, largely by transforming existing metrics like VaR

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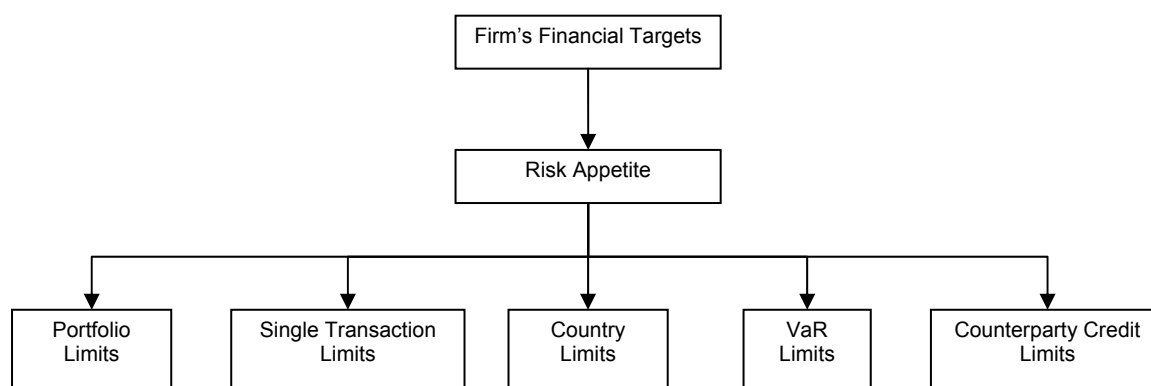
designed to capture. This determination of comfort level is, by its nature, subjective. In addition, at times these limits may be set at relatively low levels, in order to act as “speed bumps” that would trigger discussion if they were to be breached. By contrast, under Lehman’s approach, the firm’s risk tolerance proceeds along more tightly defined criteria, with little apparent subjectivity around the final number itself. Under this latter approach, the number which falls out of the calculation is less a reflection of management’s subjective “comfort level” and more a binding constraint.

<sup>11</sup> The 10% adjustment to baseline projected customer flow revenues is based upon the firm’s revenue history during its existence as a public company, with a focus on the down years. The firm has never experienced a revenue shortfall of this magnitude, thus the adjustment has been deemed to be sufficiently conservative. The \$0.6 billion deduction from the principal investments component reflects what the firm believes it needs to represent the inherent volatility of this revenue stream.

and PE, and then aggregated according to certain correlation assumptions, described below. A central idea behind the RA exposure number is that a dollar of risk is equivalent to all other dollars of risk, no matter the source. To get to a point where this holds true, the existing measures of market, event and credit risk must first be standardized and put on an apples-to-apples basis with each other. By matching these to the one year, 95<sup>th</sup> percentile assumption underlying the RA limit, risk usage and risk capacity can be compared meaningfully.<sup>12</sup>

### c. Aggregate Risk Limits

Lehman’s risk management framework is multi-tiered. The primary firm limits live within the RA framework. As mentioned above, the Executive Committee sets the overall RA limit at a firmwide level and at the division level (e.g. fixed income or equities). RMD, in conjunction with the business heads, sets limits for the businesses. As mentioned in a prior footnote, many firms have their own limits intended to act as a sort of speed bump that prompts discussion with risk management prior to putting on a risky position. At Lehman, RA limits are considered to be hard; that is, they are non-negotiable except in extremely limited situations. If the firmwide RA limit were to be breached, the CRO would immediately notify the CAO and the Risk Committee. If a business level breach occurred, the market risk manager would discuss this with the traders, the desk head, the head of MRM, and the CRO. The CRO, in consultation with the division head, may either allow the excess for an agreed period of time in support of a specific strategy (this type of approval is generally granted only ex-ante), agree to revise the limit if such a change is warranted, or instruct the business to reduce its profile so as to be within the original limit.



Lehman also sets risk limits for the firm on a more granular basis, such as VaR, counterparty credit limits, and country limits.<sup>13</sup> In addition, Lehman is in the process of developing single transaction limits, which would cap the size of individual deals.<sup>14</sup> The

<sup>12</sup> It is worth noting that at many firms, stress tests are thought of as more extreme, yet less likely, occurrences, for which probabilities cannot be assigned. At Lehman, however, event risks are deemed probabilistic for RA aggregation purposes, despite the fact that they appear designed to capture these risks in the same manner as peer firms’ stress tests.

<sup>13</sup> VaR limits are discussed in more detail in Section xx. Counterparty credit and country limits are discussed in more detail in Section III.c.

<sup>14</sup> These limits do not apply to large derivative deals.

purpose of these limits is to minimize headline risk, where Lehman would receive negative press about an outsized loss that might raise questions about its internal risk management processes. A deal will still have to pass through the requisite approval processes, such as formal committee approval. In addition, a deal may fall within VaR and RA limits, but still be considered too big under the single transaction limits. These limits have not yet been rolled out in a formal manner, but the business units are currently operating as if the limits are in place.

Single transactions are limited to \$200 million in potential quarterly pre-tax losses and to an overall deal size of 15% of tangible equity (equivalent to \$1.8 billion). However, with “bells and whistles” such as material adverse clauses (MACs) and pricing flexibility, potential quarterly pre-tax losses and transaction sizes can be larger. RMD has developed a calculator that determines the maximum loss, looking at factors such as place in the capital structure, volatility, event risk, pricing flexibility, business or market MACs. In addition, deals that will take longer to close are penalized within the calculation. Both RMD and the businesses have access to the same calculator, the idea being that it will allow the bankers to proactively structure a deal with the risk mitigants that will ensure the deal is within the limits. A banker will input the size of a deal’s tranches into the calculator, which will give the maximum loss figure. The calculator inputs, mentioned above, are input into the model by risk management. The model incorporates both VaR and event risk at a 99.5% confidence level. As mentioned previously, RMD at Lehman focuses much of its attention on these large deals generating concentrated exposures.

RMD and the affected business units have worked together to develop this framework, leading to acceptance of the limit by the businesses. For example, the high yield leveraged loan group pointed out that a leveraged buyout which is a total revamping of a company’s structure has a lower probability of default in the first year than a comparable company that has just received a cash infusion. Thus, the probability of default was adjusted in the calculator accordingly. However, in areas such as syndication market visibility, MRM is unwilling to adjust the parameters.

The various risk limits set at the senior management level cascade down to the business units and, ultimately, to the trading desks. Both business unit and RMD personnel then monitor usage against those limits. Limit excessions (of RA, VaR, or counterparty exposures, for example) are reported to appropriate supervisory personnel and escalated to senior management, if necessary. In some cases, desk heads may set their own limits based on alternative risk measures (e.g. gamma or delta), but these limits are entirely owned by the businesses units rather than RMD.

## II. Market Risk Overview

This section will discuss the structure and responsibilities of MRM, as well as the metrics used to capture and convey market risk at Lehman.<sup>15</sup> It will then describe the businesses generating significant amounts of market risk, and how the department seeks to capture the risks associated with these businesses. In addition, OPSRA looked at businesses generating significant event risk, which is discussed in further

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<sup>15</sup> Unless otherwise specified by term “market risk component” in this section of the report, the term “market risk” will be used to refer to risk arising from potential changes to various risk factors, and generally captured by VaR. It does not refer to the market risk component of RA, although the market risk component of VaR is directly derived from the daily VaR measure used by MRM.



detail later in this section. Based on these criteria, OPSRA looked at interest rates, credit trading, mortgage trading, municipals, equity volatility, real estate, and risk arbitrage.

a. Structure of Market Risk Management

MRM is responsible for developing and implementing Lehman's market risk management policies and procedures; determining market risk measurement methodologies in conjunction with QRM; monitoring, reporting and analyzing the aggregate market risk of the firm's trading exposures; and administering market risk limits. The Global Head of MRM is based in New York and reports to the CRO. Under the head of MRM, there are risk managers aligned by businesses: a head of real estate, two global heads of interest rate products, a head of equities, and a head of investment management. The heads of collateralized lending report jointly to the head of market risk and the head of credit risk. MRM has teams in the firm's regional trading centers of New York, London, and Tokyo. In addition to the risk managers aligned by business, there are regional heads: a head of European risk management, and a head of Asian risk management. The heads of Asian and European risk management report to the regional CEOs for administrative purposes.

MRM is governed by the Market Risk Policies & Procedures, which are reviewed annually concurrently with the budgeting process, or more often if necessary. MRM is responsible for measuring, monitoring, and reporting VaR, VaR backtesting, stress testing, scenario analysis, and event risk.

Market risk managers physically sit on the trading floors which they cover, and meet daily with the appropriate business unit management.<sup>16</sup> The risk managers are consulted by desk heads prior to large and unusual transactions. While the daily processes vary depending on the product covered, in general a risk manager's day begins with market monitoring and a prior day recap. All of the risk managers' responsibilities are geared towards ensuring that there is a coherent and consistent story being reflected in the data, and reporting that story up through the chain of command. He or she will look at the prior day risk capture through position data, sensitivities, and stress matrices. VaR and risk reports will be generated at desk and aggregate levels, and managers will usually perform a "sanity check" with product control, the middle office, and the traders. In the morning, each risk manager must sign off on the VaR calculation for their business. Without these sign-offs, firmwide VaR cannot be calculated. The risk manager will also provide commentary on major exposures, trades, and market events. Throughout the day, the risk manager monitors the market and intraday risk, and any large and unusual transactions. At the end of the day, the risk manager may provide an additional recap. In addition to these responsibilities which are common to many product areas, some risk managers create daily customized risk reports. In the equity proprietary business, for example, risk management prepares daily limit transaction reports and daily fund managers name overlap and exposure reports at the behest of the business.

The weekly process involves risk aggregation with regard to major sensitivities, and major trade or exposure details. On a monthly basis, the risk manager will comment on VaR or RA changes, as well as discuss the risk with the business head. Lehman stated that informal interaction with business heads occurs on a daily basis. For example, the risk manager for U.S. rates attends an end of day meeting held by the

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<sup>16</sup>OPSRA visited with the head market risk managers at their desks on the trading floor, and the risk managers described and demonstrated their specific daily processes.

business head of interest rates and liquid proprietary trading, where the desk heads give a quick summary on their day's positions, and any notable market movement.<sup>17</sup>

Risk managers prepare daily updates for the head of MRM and the CRO. On a weekly basis, the senior risk managers contribute to a "top line risk report" that is prepared by the head of MRM. This report is then given to the CRO, who presents it to the Executive Committee during a weekly meeting. This report discusses changes in RA, changes to material exposures (e.g. interest rate and foreign exchange (FX) positions), and businesses currently having notable risks. There is also discussion of new trades and positions that have had a material impact on risk, and investment grade and non-investment grade large exposures on a name by name basis. The report that OPSRA reviewed also had a lengthy discussion of principal transactions within the real estate business. MRM also contributes to the Firmwide Risk Snapshot, a one-page report which shows RA and VaR usage by business. It breaks out the top market risks, and large exposure highlights.

While market risk managers monitor overall RA usage for their respective businesses, on a day-to-day basis, they tend to focus on the specific RA component (market or event risk) driving RA usage. In the case of the more liquid businesses, such as equity derivatives and interest rates, RA is driven primarily by VaR, or the market risk component. Therefore, the risk managers for those businesses focus their daily processes on VaR drivers and overall usage. In areas such as real estate, the majority of RA is driven by the event risk component, and it is monitored accordingly. This approach seems appropriate in that it allows risk managers to focus on the metric that best captures a particular business' risks.

Market risk managers also have responsibility for reporting limit breaches, both for VaR and RA. The overall VaR limit is a function of the market risk component of RA, and the division level VaR limits are set by MRM in conjunction with the business heads. While, as mentioned previously, RA limits are considered to be "hard," there tends to be a bit more flexibility around VaR limits, although not at the divisional level. Within a division, however, MRM may approve an overage within one business as long as the division is within its overall limits. As mentioned previously, the CRO and senior business management are made aware of limit overages by risk managers via emails throughout the day. Risk managers include varying degrees of analysis and commentary with the limit breach notification. This flexibility allows managers to respond in a manner consistent with the materiality of the breach, but risks inconsistency in the overall limit breach process. In some cases, senior business management will engage in a dialogue to seek more detailed explanation for the increase in risk. While this provides an audit trail of sorts for limit breaches and management follow-up, the manual nature of this activity means that senior business management is informed of limit excessions only to the extent that risk managers affirmatively report them. Many of Lehman's peer firms use limit processes that are more automated, or have plans to migrate to such systems.

At the highest level, risk managers rely on a technology platform called LehmanRisk to measure aggregate risk-taking by the business units, to store and report relevant risk data, and to otherwise assist them in their analyses of the risk profile of the firm. LehmanRisk calculates RA, VaR, event risk, and aggregate sensitivities and stress matrices for a variety of products and exposures at multiple levels of the firm hierarchy. This information is accessible to risk managers through a web-based interface. In

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<sup>17</sup> OPSRA attended this end-of-day meeting for interest rates, where the business head, his desk heads (e.g. Treasuries, pass-through mortgages, agencies), and the market risk manager for the rates business were in attendance. OPSRA spoke with the business head after the meeting to understand how he viewed his interactions with his MRM counterpart.

calculating the aggregate risk exposures, LehmanRisk leverages off of data in the front office trading and aggregation systems – e.g., position greeks, spread sensitivities and stress matrices. Accordingly, as discussed later in this document, the controls around that data, such as PC-led price verification, are critically important to the robustness of the aggregate risk calculations done for VaR, event risk and RA.

Risk managers also may look directly to the various systems built and used by the business units themselves to provide more granular information on changing risk exposures. For instance, the front office trading systems for mortgages feed into and support a system called RAMP, which aggregates exposure sensitivities to various yield and spread curves and provides a host of other information to its users, primarily the trading desk heads.<sup>18</sup> A similar risk aggregation system exists for rates trading, dubbed IRIS. The finer granularity and higher dimensionality of the exposure information available through these systems provides risk managers with the means to investigate in detail the drivers of any higher level risk changes as evidenced through LehmanRisk. It also provides another set of metrics by which to reconcile changes in aggregate measured risk.

Much of the detailed work from a modeling perspective occurs in the front office systems. Recall, LehmanRisk focuses exclusively on risk aggregation. By contrast, the risk sensitivities which LehmanRisk depends upon are calculated in the front office systems such as RAMP and IRIS. Thus, the model validation process discussed later in this report serves an important role in ensuring the robustness of the risk measurement data eventually calculated and reported by LehmanRisk.

Currently, there is no risk tool to conduct real-time “what if” analysis on large transactions, as is the case at several peer firms. Rather, MRM conducts an ad hoc customized risk analysis for large transactions warranting further review.

#### b. Models and Methodologies for Measuring Risk

As mentioned previously, MRM relies on various metrics to assess the risk in the business areas. For some businesses, such as equities and interest rates, the risk manager’s primary metric is VaR, as the risks tend to be readily captured through the VaR system. In other businesses, such as real estate, the risk managers tend to focus on event risk, which captures the risks not picked up by VaR. Event risk measures the potential loss associated with occurrences which are not captured in market risk. It seeks to measure stress and “gap risks” which go beyond potential market risk losses.

While the exposure characteristics of positions and portfolios can be captured by risk factor-specific sensitivities, such as the Greeks and measures of the incremental impact of a widening of spreads across the curve<sup>19</sup>, calculating a meaningful aggregate risk measure requires some means of taking into account the correlations and dependencies between all of the relevant risk factors and aggregating risk across businesses with exposures to different risk factors. VaR is able to address these aggregation needs. Mathematically, VaR corresponds to a percentile loss of the forecast distribution of a portfolio’s profit and loss (P&L). Conceptually, VaR attempts to answer the question, “What is the maximum amount that can be expected to be lost with

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<sup>18</sup> The market risk manager responsible for mortgages demonstrated to OPSRA how he uses RAMP in his process of risk assessment.

<sup>19</sup> These sensitivities to parallel shifts in the yield curves are found in businesses such as interest rates and credit trading. They are referred to by different nomenclatures, from “DV01” in interest rates to “spread01” in credit. Both are measures of sensitivity to a one basis point parallel change in the appropriate underlying metric across the curve. In this report, these types of risk measures will be referred to as curve sensitivities.

a certain degree of certainty over a given time horizon?" Lehman calculates VaR for a one-day horizon to a 95<sup>th</sup> percentile confidence level.

#### i. Introduction to VaR

Very broadly, there are three central steps to designing a VaR model. The first step involves mapping the firm's positions to risk factors. Examples of risk factors include equity indices, interest rates, corporate spreads, implied volatilities, and option-adjusted spreads. The mapping expresses positional P&L as a function of movements in these factors. The second step involves generating the distribution of risk factor movements that will be applied to estimate the portfolio P&L distribution (using the above mappings). This process must generate simultaneous movements in all risk factors so as to preserve the correlation structure across factors – i.e., a joint risk factor distribution must be generated. There are three broad approaches to modeling this joint distribution: Historical Simulation (HistSim), Monte Carlo simulation, and a Variance-Covariance (VCV) approach. The third step involves taking the risk factor distribution generated and applying a revaluation approach to quantify the P&L impact from each joint risk factor realization.

Lehman utilizes a HistSim approach to calculating the 1-day 95<sup>th</sup> percentile VaR for the firm as a whole, for each division and the business units within the divisions. The HistSim approach relies directly upon historical data to establish the joint distribution of risk factors and hence correlation among risk factors, which in turn serve as the inputs for estimating the portfolio P&L distribution.<sup>20</sup> In broad terms, the portfolio is repriced on each historical date, and each day's P&L is saved, weighted with a decay factor to emphasize recent history, and then rank ordered to form a distribution of gains and losses. The VaR metric then simply reflects a percentile loss from this distribution. To capture specific risk, Lehman either directly maps to name-specific risk factors, for most equities, or utilizes a Monte Carlo method, for bonds.

In calculating a HistSim VaR, the following are critical: (a) the revaluations of the positions in the portfolio (based upon the movements in risk factors) must be robust, especially if the portfolio has non-linear positions, e.g., options; (b) the mapping of positions to risk factors must be robust, especially for securitization-related positions which are backed by customized collateral pools; and (c) the historical times series data upon which the revaluations are based must be robust and sufficiently granular to permit capture of all of the material risk in the portfolio.

#### ii. Revaluation

To calculate the changes in position values and thus portfolio P&L, those positions must be revalued as a function of the changes in risk factors. The revaluation techniques utilized by Lehman's VaR model attempt to capture: (1) linear risks; (2) non-linear risks; and (3) issue-specific risks.

Linear risks are measured by calculating the local sensitivities of positions to certain risk factors, and then multiplying those sensitivities by historical movements in the corresponding risk factors. This yields the hypothetical P&L effect of risk factor movements on the portfolio. For instance, if an equity position has a delta of +\$100, a

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<sup>20</sup> In other words, the past is assumed to be an indicator of the future, and no other statistical assumptions are imposed. By contrast, under the Monte Carlo approach, individual and joint distributions are specified by the VaR modeler, i.e., parameterized, though they may be calibrated using historical data. Under the VCV approach, all of the distributions are assumed to be a distribution with fat tails, such as a joint normal.

\$2 decrease in the price level of that equity would correspond to a \$200 loss. Similarly, if a cash government bond position has a spread sensitivity of \$1,000 per basis point, a 5 basis point rise in rates would correspond to a \$5,000 gain. In short, the magnitude of the P&L is approximated as a linear function of the movement(s) in the underlying risk factor(s).

Of course, many instruments exhibit non-linear price dynamics. For example, options prices generally do not change linearly with changes in the prices of the underlying assets. In these cases, using only local sensitivity measures to calculate the P&L distribution for VaR could introduce significant estimation error. In addition, many derivatives positions are sensitive to the non-linear co-movements of multiple risk factors, so-called cross-partial effects.<sup>21</sup> Thus, even if one were able to capture the non-linear sensitivity of a position or portfolio to one risk factor, the cross-partial effect exerted by another risk factor could result in further estimation error. Lehman addresses both the non-linear and the cross-partial effects through the use of stress matrices. With a stress matrix, a number of stress points for two risk factors are specified and revaluations are done at each intersection. For instance, for equity options Lehman uses stress matrices consisting of eleven price points and five volatility points. For interest rate derivatives, the stress matrix has eleven parallel shifts in the yield curve and nine parallel shifts in the volatility curve. At each intersection the position or portfolio is fully revalued.<sup>22</sup> Once full revaluations are completed for all of the intersection points of the stress matrix, the matrix serves as a look-up table for the VaR calculation. When the actual historical moves in the various risk factors fall between the grid points, the non-linear P&L for that day is estimated using an interpolation technique. This stress matrix approach provides a shortcut to full revaluation for each position for each historical day's movements in risk factors, thus saving considerable computation time presumably without sacrificing too much accuracy. The number of points on each axis of the grid, as well as their spacing, should be evaluated in light of the portfolio for appropriateness.

Where stress matrices are used, all revaluations are done in the using the front office calculators, which are not owned by MRM. This makes the VaR calculation in the risk system more manageable and straightforward, since only multiplication and addition are required to interpolate in between grid values during the VaR calculation. The truly computationally demanding hard work occurs through the revaluations. With mortgage products, for instance, this calculation is done only once per week because of the computational burden.

Not all convex, or non-linear, exposures get stress matrix treatment. For instance, in high grade credit, much of the risk is linear. However, for the products in the book generating non-linear risks (e.g. emerging market positions), full repricing through stress matrices is done only for positions with "significant" convexity. All other positions use linear approximations. OPSRA will be following up with MRM to understand how convexity is determined to be "significant" versus determining that the use of linear approximations is sufficient, particularly in books with a higher proportion of non-linear instruments. In addition, OPSRA will discuss how MRM assesses whether the linear character of a portfolio has changed over time.

Issue-specific risk is discussed in the next section on mapping. In basic terms, where positions are mapped to indices for VaR calculation purposes, the risk is that

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<sup>21</sup> For example, equity options exhibit non-linear sensitivity to both the price of the underlying asset (gamma) and the implied volatility (vega).

<sup>22</sup> For instance, given a -5% shock in the price of the underlier and a +2 point shock in implied volatility, the position under consideration may yield a loss of \$30.

those positions will only be partially explained by movements in the indices – the unexplained portion of risk is issue-specific risk and is captured through the means described below.

### iii. Mapping

All positions must get mapped to a set of risk factors. Under HistSim, these risk factors must have sufficiently robust and complete histories of observations to be useful. These observations may come from external sources, such as Bloomberg, or from internal marks, such as credit correlations, which are subject to scrutiny and review by product controllers. Alternatively, the risk factors utilized may be synthetically created where the historical risk factor time series are weak or non-existent. For example, in the case of municipal bonds, a special index was created to provide a meaningful time series to which particular positions can be mapped. In the calculation of firmwide VaR, Lehman utilizes approximately 12,000 risk factors in its VaR calculation – 9,000 for equities and 3,000 for fixed income. In general, a high number of risk factors facilitates more granular risk capture, especially where basis exposures may be significant.

Nearly all name-specific equity exposures are mapped directly to name-specific time series. This obviates the need to calculate issue-specific risk for equities since the mappings are on a name-to-name basis, which effectively captures both the systematic and idiosyncratic components of risk.

For high grade and high yield bonds, however, several mapping approximations are utilized. For instance, in the high grade bond space, the risk factors are segmented by industry sector, credit rating, tenor, and currency. A distinct time series corresponds to each combination of those four attributes. Thus, each investment grade corporate bond, for instance, is mapped to an attribute-specific, but not name-specific, time series. To the extent that the mapped time series is unable to explain the risk (variance) of the position, the unexplained variance is considered issue-specific risk. That variance is used to specify a distribution (mean zero, variance X) from which a Monte Carlo simulation draws to estimate the issue-specific risk arising from that position on any given day in the HistSim P&L distribution. This internal creation of issuer-specific risk effectively adds another 10,000 risk factors to the VaR calculation. Because of the high number of unique bond instruments and the limited time series data on each, this method requires that positions' issue-specific risk be proxied by that exhibited in each attribute-specific index. This introduces some approximation error. Other challenges include dealing with ratings migrations, particularly by big names (like General Motors) which may disproportionately affect index levels and estimates of index volatility and issue-specific risk.

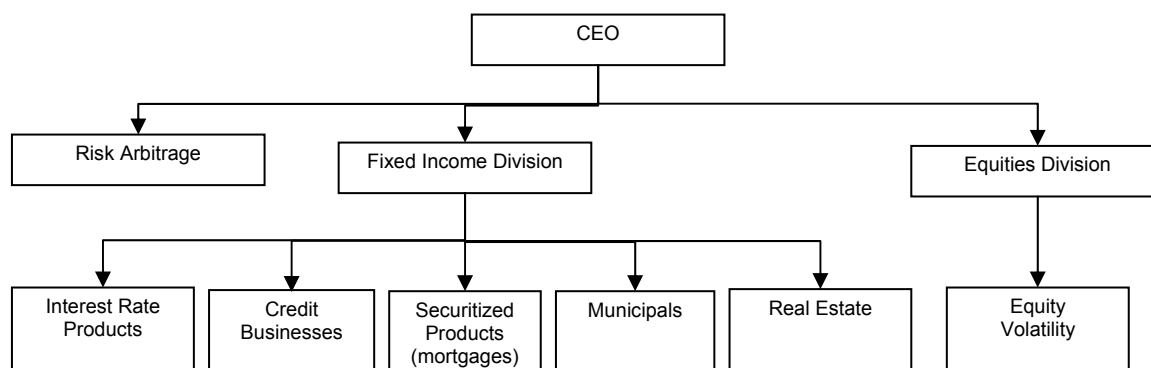
### iv. Historical time series

The integrity of Lehman's HistSim VaR calculation relies upon quality time series data for each risk factor. Ensuring and maintaining that quality requires significant resources given the large number and specialized nature of many of them. Lehman has a group within QRM called the Data Quality Control Group (DQCG), which is responsible for the integrity of the historical data. This group has one dedicated full time QRM employee, who has a PhD. He is assisted by market risk managers who are charged with responsibility for specific time series. DQCG is responsible for checking the data and working with MRM when irregularities arise. Given the number of data series used by Lehman, ensuring data quality is a time-intensive task, and QRM is in the process of developing a new set of reports to monitor the historical database. With only one person

dedicated full time to maintaining the quality of the time series data used in VaR, Lehman sits at the lower end of the spectrum of resources allocated to that important control. OPSRA will continue to discuss the issue of data quality with QRM.

c. Businesses Generating Significant Market Risk

The following sections describe businesses which have material and/or complex market risk profiles. OPSRA met with the heads of each business to discuss the range of products and activities that fell within their jurisdiction. Also present at the meetings were members of MRM and product control, who explained the specific control processes around each business. The chart below shows how the businesses discussed are organized at a divisional level.



i. Interest Rate Products and Liquid Markets Proprietary

Business Overview

This business is one of the largest within the fixed income division, which is the key driver of Lehman’s RA usage. There is a client-focused flow business, where risk is incurred while facilitating trades, and a proprietary business. Interest rate products, the flow portion of the business, has a global RA limit of \$300 million, and liquid markets proprietary trading has a limit of \$100 million. As of 2/28/05, RA usage in rates was \$347 million, and in liquid markets proprietary was \$121 million.<sup>23</sup> Both businesses are predominantly in the United States, but also have significant presences in Europe and Asia. As both lines of business are run by the same business head, they exhibit similar characteristics and will be discussed in tandem.

Lehman trades in two product groups within the flow business: governments and derivatives. Trading activity centers on facilitating clients’ requests to increase or hedge exposure to interest rates across the globe and related risk factors such as volatility and inflation. Within the liquid market proprietary group, there is foreign exchange as well as interest rate trading.

One area of note within the flow business is fund derivatives, a topic that occupied a significant amount of time during discussions between Lehman and OPSRA. The notional size of this business is \$5.7 billion, with just over 200 trades. Within this line of business, centered mainly in Europe, Lehman creates principal-protected hedge fund

<sup>23</sup> All RA usage numbers in the discussion of businesses are as of 2/28/05. As noted in the discussion on limits, excessions are permitted within a division as long as the division is not breaching its overall limit.

linked structured notes, which allow leveraged investment into hedge funds. The primary risk in this space is gap risk, where the business would find itself unable to rebalance its portfolio quickly enough. Other risks in this area include systemic event risk, fraud risk, market risk such as rate, equity and volatility risk, legal risk, operational risk, and reputational risk. The group manages these risk through due diligence at the fund of funds or individual manager level, diversification across underlying funds and products, and gap options. Gap options, generally sold by insurance companies, protect again a discontinuous market move. The fund derivatives business will be an area of focus for OPSRA following the formal CSE review.

Recently, within the flow business, Lehman executed its largest trade in 11 years – an inflation linked interest rate swap with a sovereign. As part of the CSE review, OPSRA was walked through the trade approval and execution process. The trade was developed by Lehman's derivatives solutions group, which then proposed the trade to the sovereign. The trade was explained to senior management in the firm, as well as at all levels of the fixed income division. The factors considered were the initial rate risk, the volatility and inflation risk, the planned hedging strategy, the credit risk exposure, and lack of liquidity in the inflation derivatives market. Once approved at all levels, including by the CEO who had visited the country in person to discuss the trade, the London derivatives desk executed the trade.<sup>24</sup>

Proprietary trading consists of interest rate and foreign exchange strategies. This area tends to have fewer positions than the flow business, and they are unwound once value is captured. Within rates, Lehman trades basis spreads, swap spreads, calendar spreads, volatility arbitrage, and gamma (relative value between different types of interest rate options). Within foreign exchange, they trade foreign basis (hedged foreign exchange forward contracts versus local swaps), global curve arbitrage (sovereign yield curves through the foreign exchange markets), and cross-border arbitrage (trading off-shore versus on-shore interest rate markets). Similar to the flow business, risks within these two areas include rate risk, basis risk, volatility risk, and convexity risk. They are managed within the business by limiting traders to specific strategies, employing a dedicated risk monitor who reports directly to senior business managers, and using appropriate hedges. In addition, the group is subject to standard MRM oversight.

## Risk Management

Within this space, the key drivers for VaR are interest rates (government, agency, swaps, Eurodollar futures, and treasury futures), rates volatility, spot foreign exchange, and foreign exchange volatility. P&L distributions are calculated for every desk position using a variety of methods. For instance, the P&L distribution for cash products may be calculated using treasury on-the-run and off-the-run yield or Libor/swap yields, amongst other time series, while distributions for Treasury futures are generated using the Lehman cheapest-to-deliver model. In the interest rate derivatives space, to capture vega risk the five year into ten year USD swaption implied volatility is utilized as a reference time series for synthetically generating a sufficiently rich set of rate volatility risk factors. Non-linear components of the P&L are calculated using stress matrices, representing 11 parallel shifts of the yield curve from minus 100bp to plus 100bp and nine parallel shifts in the volatility levels from minus two volatility points to plus two volatility points. As part of Lehman's drive to capture specific risk, mapping is often quite

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<sup>24</sup> OPSRA has regularly discussed this position during the ongoing monthly risk reviews with senior members of the risk management department.



detailed. For example, Lehman maps government bond exposures to a set of fairly granular risk factors – e.g., on-the-run versus first off-the-run Treasuries and agencies, sixteen groupings for Japanese Government Bonds, thirteen yield curve shift scenarios for bond futures, etc. Inflation risk, traded mainly in the European markets, is not yet in VaR, but including this risk factor is one of MRM's priorities. Lehman's approach allows the capture of first and second order effects (the second order effects are captured through the stress matrices), but third order effects such as volatility skew, are not picked up in the VaR calculation. QRM would prefer to capture this type of third order effect, even if in an imperfect manner, in VaR rather than develop one-off supplementary risk measures.

Specific daily risk reports include spread sensitivities by bucket, currency, and underlying (e.g., treasury or agency). For agency positions, spread sensitivity by issuer is calculated. For treasury futures, MRM looks at notional and spread sensitivity by underlying bond, and by maturity. Vega is measured in terms of caps and swaptions, while foreign exchange is reported by currency spot, rates, vega, and gamma. For the weekly reports, spread sensitivity is aggregated by business and by currency.

Event risk in interest rates occurs with fund derivatives, in the form of gap risk. Fund derivatives are hedged dynamically, but markets can occasionally gap. If the desk cannot hedge in time, losses can be significant. This mainly occurs when net asset values (NAV) of funds gap downwards. There is very limited data on gaps, as by definition they are rare events. This risk does not yet show up in risk appetite. As mentioned in the earlier discussion of fund derivatives, OPSRA will be following up with Lehman to learn about this business in further detail, including the calculation of event risk charges in this space.<sup>25</sup>

## ii. Credit Businesses

### Business Overview

Lehman's High Grade and collateralized debt obligation (CDO) business consists of several different desks. High Grade has a RA limit of \$475 million, with actual usage of \$251 million. The CDO business has a limit of \$100 million, with a usage of \$62 million. Flow trading, the most active of the group, trades and makes markets in cash credit, single name credit default swaps (CDS), and index credit. The CDO desk structures and trades cash and synthetic CDOs. The hybrid capital desk trades and makes markets in corporate preferreds. The proprietary desk takes positions in credit through all of the various instruments.<sup>26</sup>

In the cash CDO space, the desk engages primarily in "primary activity" (i.e., working with top managers to issue new collateralized loan obligations (CLO) and structured finance CDOs). For example, Lehman might partner with a manager at a pension fund, and enter into an agreement whereby the manager sources assets to be inventoried for eventual distribution through a CDO structure. The process generally

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<sup>25</sup> With respect to PC, within interest rate products and liquid markets proprietary, approximately 83% of the balance sheet is considered to be Level 1, or assets with active reference markets. 16% are Level 3, and 1% are Level 4. Level 3 consists mainly of the derivatives business, where PC gets dealer quote to verify trader marks. Level 4 consists of the fund derivatives business in Europe, where it is difficult to capture volatility around prices of the underlying funds. For a full discussion of the level definitions, see the section on price verification within Control Processes.

<sup>26</sup> Currently, proprietary trading in credit is relatively small (approximately 5% of revenues), though the business head noted that this may potentially grow to about 20% in the future.

takes six to nine months. The underlying assets are generally high yield loans or asset backed securities. Upon distribution, the entire capital structure is sold to investors. In this space, the primary risk for Lehman is inventory risk.

In the synthetic CDO space, the underlying collateral is generally high grade CDS, and the products are generally bespoke or static baskets. Demand is global, with most of Lehman's market share in the U.S. and Europe. Distribution occurs through the structured credit desk. Here, the risk stems primarily from retained residual pieces, since the sourcing process is relatively straightforward. The residuals expose Lehman to various risks, such as spread volatility, liquidity risk, and correlation skew. With regard to correlations, recent stresses to the structured credit market have demonstrated the difficulties associated with risk managing the correlation skew for tranching products, and OPSRA will continue to focus on Lehman's approach to managing this risk factor.<sup>27</sup> Lehman uses a system called Scorpion, which calculates the desk's exposure to these risks through sensitivity metrics like correlation spread sensitivity, curve sensitivity, the gain or loss associated with a default assuming a specific recover rate, also known as value-on-default (VoD), and curve risk.

Interestingly, the exotics desk trades swaptions (mostly on CDX indices, occasionally on single name CDS), bond options and warrants, and recovery locks/fixed recovery CDS (instruments which reflect recovery rate assumptions in default scenarios). Though these exposures are relatively small, they are complex to model with some exposures tracked using spreadsheets.

The hybrid capital desk focuses on "subordinated product" – e.g., preferreds and subordinated debt. It leverages Lehman's origination and structuring businesses both to take relative value proprietary plays such as capital structure arbitrage and to pitch such ideas to clients. The key risks in this space include the shape of the yield curve (flat to inverted hurts demand because of call features), rates convexity, correlation with other parts of the capital structure, and relative illiquidity. The latter two risk factors can be difficult to measure and risk manage in a systematic way. To the extent that activity in this space increases, OPSRA will discuss the capture of these risks with MRM.

The proprietary desk essentially consists of two people: one capital structure arbitrage trader and one fundamental credit trader. Both use fundamental, as opposed to quantitative or statistical, trading strategies. The investment horizons are short to medium term (up to 18 months), with relatively low trading volumes. Both strategies trade across products/asset classes. As such, in addition to the greeks, VaR is one of the primary metrics used to risk manage this book. Value on default (VoD) is used to manage tail risk. Exposure to event risk such as downgrades, leveraged buy-outs (LBO), and leveraged recapitalizations must be carefully tracked. In addition, the risk of correlations coming unglued remains difficult to manage. So far, risk-taking in this space has been relatively small, but may grow in the future.

## Risk Management

On a VaR basis, the risk manager estimated that the risk breakdown by desk was approximately as follows: Synthetic CDO (20-30%), Flow (15-25%), Hybrid (20%), Proprietary (10-15%), and Cash CDO (10%).

MRM utilizes a number of metrics to risk manage exposures from the activities described above. In addition to the standard spread sensitivities, the front office

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<sup>27</sup> During a conversation with OPSRA, the CRO stated that finding increasingly sophisticated ways to deal with correlation skew was amongst the top priorities of MRM. This is a proactive measure, as Lehman did not suffer material losses during recent credit market events referenced above.

systems also calculate: (1) VoD (2) value-on-default-zero (VoD0), the gain or loss should an issuer default with a zero recovery rate assumption; (3) VoDProb, the default probability adjusted VoD (PD x VoD); and (4) Credit10%, the change in an instrument's value for a 10% change in credit spread. These metrics assist the risk managers in identifying low probability/high impact exposures or concentrations of risk that are not readily captured in VaR. Other risks include CDS basis risk, concentration risk, and correlation risk.

Perhaps the key market risk in credit trading is correlation skew. As mentioned previously, this can be difficult to capture and manage with regards to tranced products, and addressing this issue is a priority of the CRO. OPSRA will be following up with MRM as to the success of this initiative. Within exotics, trades can be one-way, leading to illiquidity in the market. In addition, single name swaptions are subject to gap risk due to the illiquidity of the market – these risks can be difficult to manage quantitatively, and instead need qualitative solutions (e.g., being selective on names traded for single name swaptions). Again, within proprietary trading, correlations continue to be a challenge. This is addressed within this area by monitoring each leg of a paired trade to watch for correlated assets beginning to “uncorrelate.”

For the event risk component of Risk Appetite, losses due to downgrades for high grade securities and losses due to defaults for high yield securities are calculated. This is discussed in greater detail later in the credit risk section of the report.<sup>28</sup>

### iii. Mortgage Trading

#### Business Overview

Pass-through mortgages and mortgage options are traded through a joint venture with interest rates and the mortgage group. Most of the traders in these more vanilla products sit within the interest rate group, and positions therefore roll up through Liquid Markets. This venture is based on the premise that the multi-trillion dollar mortgage industry is intricately tied to the rates markets, and many flow customers take interest rates positions, especially in convexity, through mortgage products. The more complex residential mortgage trading business sits within Securitized Products, which also includes commercial mortgage backed securities (CMBS), asset backed securities (ABS), and CDOs. Securitized Products rolls up into Liquid Markets as well. Mortgage trading has a RA limit of \$350 million, with usage of \$364 million.

In the structured residential mortgage space, there are four product divisions: agency collateralized mortgage obligations (CMO), prime mortgages, sub-prime mortgages, and warehouse lending. In the agency CMO space, Lehman seeks to arrange CMOs supported by selective collateral and leverage, rather than just doing high volume/low margin CMO issuance. Similarly, in the prime and sub-prime businesses, Lehman focuses on product design (securitizations and whole loan sales), by leveraging off its three mortgage origination platforms.

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<sup>28</sup> With regards to PC, nearly all of the derivatives inventory is Level 3. PC for synthetic CDOs, which are in Level 4, must rely on MarkIT Partners for credit spreads, bespoke calibrations, correlation skew adjustments, and recovery rate assumptions. MarkIT supplies raw data recovery rate and spread data on single name corporates at a number of points on the term structure, by baskets, for 11 CDO portfolios. Participating firms' controllers then use that raw data to generate spread sensitivities and base correlations for the tranches of the 11 CDOs at various maturities. Each firm sends that data back to MarkIT. MarkIT collates submissions from 23 contributors and then reports the consensus data (means, not variances). Lehman's PC use this consensus data in the price verification process.

The origination platforms form a core piece of Lehman's mortgage trading franchise. Last year, the platforms originated a total of \$62.7 billion in residential mortgages. Lehman's fully owned subsidiary Aurora Loan Service (ALS) originates prime mortgages, mostly Alt-A, through a set of correspondent mortgage originators. ALS averages around \$4 billion in originations per month and has a significant servicing portfolio of \$50 billion. The risk arising from servicing activity has several dimensions, with operational risk being the most obvious. Less clear, but often significant, is the market risk associated with this activity. This is discussed further in the "Risk Management" sub-section. The two other Lehman originators, BNC Mortgage and Finance America, originate subprime mortgages through a wholesale network and utilize third party servicing.

These platforms provide Lehman with a considerable advantage in intermediating between borrowers (mortgagees) and lenders (investors). Many of Lehman's peer firms source loans for securitization through purchases of large pools of whole loans from third-party originators, often commercial banks. As such, their primary tool for affecting the characteristics of the underlying collateral is indirectly through contact with the third party originators and eventually through pricing. At Lehman, the origination platform provides a direct mechanism to adjust the characteristics of the underlying collateral to suit investor demand. By having an early touch on the mortgage loans, Lehman can source exactly what is needed to support the securitizations and whole loan pools most in demand. Going the other way, the investor touch stemming from Lehman's strong distribution/capital markets franchise generates efficient loan pricing information for the originators. From a risk management perspective, this business model facilitates a faster and more efficiently priced pipeline, thus reducing the risk of getting stuck with unwanted loan pools or residuals. Some of Lehman's peer firms are now moving towards this type of vertically integrated model.

The pipeline nature of the prime and subprime businesses creates exposure to certain key risks. The primary risk stems from holding inventory. Changes in interest rates, housing prices, or rating agency methodologies may adversely affect the value of the loans which are being inventoried for eventual securitization or sale. In the prime space, Lehman seeks to hedge this risk using the to-be-announced (TBA) market where applicable, in an attempt to reduce the basis risk which otherwise would be incurred if Treasuries or swaps were used to hedge interest rate risk. For non-prime product, a mix of non-TBA hedges must be used, thus introducing more basis risk. In addition, Lehman often retains the risk on residual positions, including interest-only (IO) exposure and net interest margin (NIM) exposure, as well as servicing risk via ALS. In the subprime space, there is no robust TBA market (especially for ARMs and other hybrid products), thus Lehman must hedge with Treasuries and swaps and incur significant basis risk. To minimize this, the sales team tries to sell securities forward to the extent possible. The pipeline is fairly efficient, as the turnaround for a deal is generally less than 90 days.

The desk head emphasized that most of the value from the mortgage franchise resides in the intermediation/pipeline process. As such, there is not a twin "secondary trading" desk which takes discretionary proprietary bets on certain factors using loan and investor information generated by the pipeline business. Rather, the business is selective in the loans it sources –owning the originators helps here – which allows it to exploit market inefficiencies by engaging in the pipeline activity itself.

In a way, then, Lehman's model essentially substitutes operational risk for market risk. Instead of incurring market risk to generate excess returns through bets on rates or prepayments, Lehman incurs significant operational risk through the origination platforms in order to generate excess returns from the pipeline activity itself. To this

end, Lehman has a sizeable Mortgage Capital Division which focuses on managing the operational risk arising from the three originators.

As mentioned previously, an aggregation system called RAMP serves as the centralized infrastructure which supports the monitoring of mortgage trading risk exposures on a highly granular basis. The various front office trading systems feed into RAMP, which captures all desk positions and trades (real-time), computes all sensitivities and aggregates exposures (daily), and calculates the stress matrices used for non-linear risk measurement purposes (weekly). RAMP feeds into the risk systems used to calculate VaR, event risk, and Risk Appetite.

In addition to providing the standard sensitivities, RAMP also captures model risk. It provides “model” versus “trader” calculations for option adjusted durations and 10-year equivalent exposures by trade, by trader, by desk, by product, etc., and calculates the difference between the two. Finally, RAMP is also used to produce customized risk reports, e.g., for the hybrid pipelines.

### Risk Management

Within MRM, the VaR calculation sources the curve sensitivities from RAMP by the following risk factors: rate risk across four points on the yield curve, rates volatility, option adjusted spreads, and mortgage current coupon spreads over Treasuries.

Given the size of Lehman’s mortgage business, the mapping of mortgage exposures deserves specific discussion. Mortgage positions – e.g., in residential whole loans, mortgage backed securities (passthroughs), CMOs, and mortgage derivatives – expose the firm to various types of risk, most notably to interest rates, rate volatility, and convexity (prepayments). The mapping of interest rate and rate volatility exposures follows fairly standard methods. However, other mapping decisions are not so straightforward. For example, say Lehman senses investor demand for pools of Alt-A hybrids from the Mid-Atlantic region. The inventory which gets built up for eventual securitization exposes Lehman to market risk, and leads to the question of which benchmarks should the exposure get mapped to for VaR purposes. An insufficiently specific benchmark may lead to a misstatement of risk, especially when hedging activities are factored in. Prepayment risks can also pose a dilemma. The primary metric for prepayment risk, option-adjusted spread (OAS), is dependent on extensive modeling and at the desk level is finely calibrated to the underlying collateral. For VaR purposes, of course, the prepayment risk component must be mapped to a time series. This requires an assignment algorithm, conceptually similar in some respects to the bucketing by attributes for corporate bonds, whereby positions are mapped to OAS time series, such as a government agency issuance or home equity loan credit spread benchmarks.<sup>29</sup> Lehman utilizes a wide range of OAS time series, some of which are synthetically created, e.g., convexity-adjusted collateral-specific CMO OAS’s and collateral-specific non-agency OAS’s. The robustness of the VaR calculations for mortgages relies in part on the granularity, specificity and robustness of these benchmarks. Given that the greatest growth in mortgages has been in non-agency collateral – e.g., Alt-A, Jumbos, and sub-prime – OPSRA will follow-up on the quality control processes surrounding these mapping specifications and the maintenance of these time series.

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<sup>29</sup> Of course, the assignment of specific corporate bonds to particular buckets requires minimal parameterization, as the attributes such as tenor and rating are fairly obvious. By contrast, in the mortgage context, the assignment procedure is less clear cut and requires more subjective parameterization.

Sub-prime mortgage loans are also subject to default assumptions through the event risk charge. A stress is approximated by assuming a reduction (which can also be thought of as an increased haircut) in market value of the non-rated retained exposures. Lehman will stress any non-securitized residual positions currently on the books, and a portion of any whole loans. With whole loans, Lehman assumes that 4% of the capital structure qualifies as non-rated retained exposure. These residuals, or NIMs, will be subject to a 25%, or 25 basis point, charge. This is considered by MRM to be fairly punitive given the liquidity and high turnover in the market.<sup>30</sup>

#### iv. Municipals

##### Business Overview

The municipal group's activities at Lehman are a microcosm of the fixed income division in which it is housed: origination, syndication, high grade debt, high yield debt, derivatives, structured products, funding, mortgages, asset-backed, money market, and taxables. Across current and anticipated CSE firms, Lehman is the number one book runner for municipal debt (and third overall). Within municipals, 25% of revenue is driven by cash trading (high grade, high yield, and short term), 21% of the revenue is derivatives, 19% is structured products, 18% is origination, and 17% is proprietary trading (including client driven special situations). Municipals has a RA limit of \$200 million, with a usage of \$193 million.

Cash bond trading includes a wide range of products, such as general markets and long bonds (over 20 years). A unique aspect of trading municipals is that they essentially cannot be shorted, and one cannot borrow to buy the bonds, because the interest payments associated with borrowing to finance a tax-exempt position are not tax deductible. In general, each issuance tends to be unique, and therefore relatively illiquid on a stand-alone basis. The business often incurs significant basis risk. While trading the general markets, traders hedge through the use of 5, 10, and 30 year Treasury futures as well as Bond Market Association (BMA) swaps and options. In the zero coupon bond space, the market is not as active and positions tend to be smaller. The bonds trade from one to 50 years on the curve, and hedges include government futures along the curve and BMA swaps and options. Long bonds, going out 20 years or more, are all investment grade, tax-exempt, and with a coupon. They are hedged using Treasuries, municipal bond futures, LIBOR swap futures, BMA and LIBOR swaps. This business tends not to run much spread risk. The retail trading desk is relatively small, and seeks to provide liquidity for the high net worth franchise at Lehman. These trades are done in response to specific client inquiries. Lehman is very active in the high yield/taxable municipal trading sector, and is one of the primary market makers in this space. In the short term market, Lehman specializes in notes. The short term market tends to exhibit seasonality, notably in April when people pull out money to pay taxes, and again in September when corporations do the same. The municipals group also has a proprietary desk, which trades in such strategies as housing bonds and generic bonds.

The municipals derivatives group looks to help municipal issuers with asset and liability management, as well as reduce their borrowing costs. The most common derivatives used by municipal issuers are interest rate swaps, forward starting interest rate swaps, and swaptions. The tax-exempt status of municipalities makes it more efficient for them to issue floating rate debt, as inefficiencies in the market cause the

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<sup>30</sup> With respect to PC, 35% of the inventory is in Level 1. 64% is in Level 3, and 1% is classified as Level 4.

actual tax-exempt yield curve to be much higher than the implied tax-exempt yield curve at the long end of the market, making it expensive to issue fixed rate debt. The municipalities then swap out the floating rate debt in order to pay fixed. With interest rate swaps, the municipalities often receive a floating rate index. This index is generally the BMA index, a tax-exempt short term rate, or a set percentage of LIBOR. Terms range up to 40 years. The business stated that the Greeks tend to be relatively low, and do not approach limits set by the businesses to manage risk on a more micro basis. Lehman hedges these swaps in the interdealer market and sells Eurodollar futures to hedge the interest rate risk. With swaptions, clients often seek to monetize the value of the call option present in issued callable debt. The client sells a swaption to Lehman, with an exercise date equal to the callable date. To hedge, Lehman will again use the interdealer market and Eurodollar futures, and will also sell vanilla swaptions to offset the volatility risk produced by this trade. Lehman will also enter into synthetic floating rate debt swaps, where the issuer pays Lehman a variable rate such as BMA and Lehman pays a constant fixed rate. The rate risk is generally fully hedged, and these swaps tend to be more a story about counterparty credit risk.

Structured municipal derivative products include the tender option bond program, total return swaps, principal lending, and opportunistic situations. Total-return swaps are becoming increasingly common in the municipal space. Bond issuers tend to use them as synthetic refundings for existing bonds, and synthetic variable rate debt for primary market bonds, which allows issuers to achieve the economic equivalent of variable rate tax-exempt financing without many of the requirements of traditional variable rate debt. The risk focus on these tends to be in the counterparty credit space, as Lehman retains all of the credit risk on the issuer's bonds. Direct lending solutions, such as synthetic variable rate debt, allow issuers to borrow against unique forms of collateral, such as construction products. Lehman has a joint venture between the Real Estate Principal Transactions Group and the Municipal Structured Products which allows them to create customized structures.

## Risk Management

The drivers of VaR within municipals are interest rates, yield curve, swap spread curve, municipal market data (MMD) scales, BMA ratios, and swaption volatility. The municipal cash business drives most of the VaR, as it incurs basis risk by hedging municipals with Treasuries (municipals tend to lag Treasuries by a few days). In calculating the P&L vectors behind VaR, the linear components are derived from curve sensitivities, the swap spread, muni and BMA basis, and vega. The non-linear components depend on a stress matrix including interest rate and volatility moves. In addition to focusing on VaR, MRM looks at concentrations and various spread sensitivities. For the cash desk, MRM reports net interest rate risk, muni basis risk (the change in an instrument's present value due to one basis point change in the MMD muni scale), and notional concentrations on a daily basis. For derivatives, MRM reports net interest rate risk, swap spread risk, BMA basis, and vega on a daily basis. Municipal derivatives drive the counterparty charge, and the lower-rated municipals drive the event risk charge. Municipal products are subject to the following event risk: downgrade for A and above, and default for BBB and below. The municipal cash desk tends to drive the majority of event risk.

For certain positions within municipals, it is necessary to go beyond VaR and take a more qualitative perspective. A recent transaction that caused a breach of the municipal VaR limit provides an example of this type of trade. When the government sought to increase military housing stock, the Department of Defense privately placed

bonds.<sup>31</sup> Lehman approached the government about restructuring the trade to lower the cost of financing. They did this by working with the ratings agencies to develop a tranching structure, and then worked with Congress' appropriations committees to issue bonds publicly according to the results of these discussions. They were able to increase the proceeds while lowering the yield. Lehman did this by going to the holders of the older bonds and purchasing the original issuance, and underwriting a new issuance that was approximately 7% larger than the original deal. The deal took two months to restructure and then exit, during which time Lehman was fully hedged with interest rate swaps but was exposed to spread risk, benchmarked to a taxable index. As this deal caused municipals to breach its VaR limit, MRM ran marginal analysis and discussed the trade with the head of fixed income and the CRO. The head of fixed income approved the overage within fixed income, and the CRO approved the deal as it would not cause an overall fixed income VaR breach. This deal was noted on the top line risk report, which is presented weekly to the Executive Committee by the CRO.<sup>32</sup>

#### v. Equity Volatility (Equity Derivatives)

##### Business Overview

While Lehman has a significantly smaller presence in equities than in fixed income, the firm is looking to grow the business consistent with client demands. The recent decision to appoint Bart McDade, the former head of fixed incomes, as head of equities reflects this approach. Within equities, OPSRA reviewed the global volatility business. This business is allotted 50% of the RA allocation for the equity division. Equities volatility has a RA limit of \$225 million, with a usage of \$182 million.

The business trades in both listed and OTC products. Lehman is a major player in the synthetic convertible market, driven by long-only investors interested in gaining exposure to a specific sector or stock. The synthetic convertible is essentially a bond with a warrant, leaving Lehman with positions that are relatively easy to hedge.

Within equity volatility, customer driven trades contribute over 95% of the group's revenue. These trades fall into either the flow (listed options, vanilla OTCs) or structured (equity linked notes, synthetic convertibles) volatility categories. The products traded in the structured bucket tend to group around sets of customers. For example, hedge funds tend to buy synthetic convertibles, while insurance companies look to hedge their equity risk with equity swaps. While proprietary trading currently generates a small portion of the group's revenues, management hopes to build on this business and eventually have it contribute around 20% of the group's revenue. Within the proprietary business, Lehman does statistical arbitrage and trades on automated market making electronic options exchanges. Volatility arbitrage, where traders seek to capture pricing differentials between volatility levels of an index and of its component single stocks - so-called dispersion trading – formerly resided within this group but has recently been moved to the proprietary trading group within the equities division.

The equity volatility business heads noted three areas where risk management is the most challenging: capturing correlations, dispersion trades, and capturing the term structure of volatility and volatility skew. They also stated that they do not have a

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<sup>31</sup> This deal was also mentioned to OPSRA during a regular monthly risk meeting.

<sup>32</sup> With respect to PC, 51% of municipal's balance sheet is in the Level 1 category, consisting mainly of cash positions. 34% is in Level 3, consisting mainly of the derivatives positions. The remaining 15% is in Level 3. This consists mainly of interest rate swaps where options are tied to tax events – an option that is difficult to price verify.



strategic “long gamma” or “long vega” philosophy, an approach that would leave them protected against large movements in either direction. Instead, the business heads feel that they can successfully delta hedge their positions, and do not feel it necessary to adopt a strategy of paying for insurance, i.e. experiencing theta bleed in order to remain long gamma. Heavy trading in certain structured products may effectively impose a directional view, but that is usually a relatively transient phenomenon, as structured products tend to have a tangible lifespan.

## Risk Management

For MRM, overall risk exposures are measured by delta, gamma, vega, and theta. Key drivers for volatility VaR are stock prices and volatilities. Non-linear risks area captured through price/volatility stress matrices, stressing prices up and down 25%, and volatility points up and down 10%. The equity volatility group works with MRM to create a number of bespoke reports to capture less obvious risks.

This business also has an event risk component. Within equity derivatives, event risk tries to capture the discrepancy between the actual dividend and the assumed dividend used in the option pricing model (quantitative front-office programmers will price in dividends increasing at a given growth rate). The P&L impact of a 75% discrepancy for single-stock options or a 25% discrepancy for basket options in the assumed dividend used in the model is considered to be the event risk. The event risk charge makes up a significant portion of the business’ risk appetite usage.<sup>33</sup>

### vi. Global Real Estate Group

## Business Overview

The Global Real Estate Group (GREG) generally focuses on commercial real estate, including non-performing loans which are often backed by commercial real estate. The bulk of the real estate business at Lehman consists of originating and securitizing commercial real estate loans, though there is also sizeable principal investment activity and, more recently, bridge lending. Because of the absence of prepayment risk and the chunkier nature of the underlying loans, the business is much more credit-oriented than residential mortgages. The real estate group has an RA of \$500 million, with usage of \$411 million. The vast majority of risk in this business is event risk.

The pipeline business (i.e., the origination and securitization of commercial real estate loans) is the dominant business within GREG. On the origination side, this includes direct lending (fixed and floating rate commercial mortgage loans, lines of credit and term loans), conduit financing (for loans less than \$75 million), and whole loan purchases. Lehman then effectively warehouses this risk leading up to an exit, which typically takes the form of a securitization or loan syndication.<sup>34</sup> For fixed rate loan pools Lehman averages a securitization every six to eight weeks, resulting in seven to eight securitizations per year. The key risk mitigant is maintaining a short warehousing period. Lehman accomplishes this, in part, through a Large Loan Floating Rate

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<sup>33</sup> With respect to price verification, PC uses its own algorithm to determine a volatility surface. 52% of the business is considered to be Level 1, 25% is Level 3 and 23% is Level 34. Positions that have long-dated vega, with no observable point on the curve, are classified in Level 4.

<sup>34</sup> A large number of GREG staff are dedicated to commercial mortgage loan origination and underwriting. The underwriting criteria are based heavily upon rating agency credit support criteria.

Securitization Program which is a joint venture with UBS. To hedge the warehouse risk, Lehman effectively replicates a securitization with the existing inventory at any given time and hedges both the rate and spread risk. Approximately 20-30% of the spread risk is hedged using total return swaps, which are relatively expensive and short-dated. There are also plans to potentially use a Lehman CMBS default swap index product which is currently under development. OPSRA will follow up on this initiative, as the ability to effectively short CMBS may facilitate greater capacity to for this business, which is structurally long CMBS. Lehman also has a surveillance group which monitors in real time the credit conditions of the underlying collateral (defaults, vacancy rates, etc.).

In addition to the pipeline business, through the Principal Transaction Group (PTG) Lehman makes strategic equity investments in commercial real estate. Lehman has also set up commercial real estate-focused private equity fund structures with co-investors.<sup>35</sup> These equity investments are longer term (two to three years) and are relatively illiquid. For the PTG investments, the primary risk management concern revolves around cash control and recourse in the case of default. For the private equity investments, the primary risk flows from the special servicers who are retained as asset managers. As noted above, more recently Lehman has engaged in bridge equity investing where Lehman's equity investment in a property is taken out by another equity investment or debt.

On the secondary trading side, Lehman trades to facilitate customer flow, but does so primarily to glean market information, not necessarily to make markets and earn a spread or to take proprietary positions. Lehman also engages in a wide range of investment bank-type activities in this space, such as real estate investment trust IPO underwriting.

## Risk Management

Rate and spread risk are the dominant market risks in the pipeline business. Curve sensitivities are bucketed by maturity. For loan inventory, spread sensitivities are estimated and mapped against a composite CMBS time series based on recent securitizations. Concentration risk (i.e., specific or basis risk) can be quite significant given the large size of many exposures, e.g., \$500 million to a single property. This concentration risk is not captured in VaR, but is monitored by MRM. The risk manager responsible for real estate cited an example of a \$900 million exposure to a single property, and stated that in order to mitigate the concentration risk, the property was being put into three deals. This allowed the business to quickly securitize at least \$300 million of the exposure. The risk manager also explained that on average, a securitization occurs every six weeks. He cited this regular turnover as one of the primary risk mitigants for concentrated positions. For secondary CMBS securities, spread sensitivities are estimated and mapped to CMBS spread index curves bucketed by rating, maturity, etc. These metrics are calculated in the front office systems and fed up to the MRM risk systems for VaR calculation purposes as for other businesses.

The event risk for the Real Estate desk is quite high. The measured event risk was \$345 million (easily the highest of all of the desks), compared with a \$115 million market risk measure. To put these numbers in context, the total measured event risk for the firm as a whole was \$449 million. For real estate and related loans, the stress is only applied to principal transactions, and not to collateralized mortgage backed

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<sup>35</sup> In 2001, Lehman established its first real estate equity fund. The second such fund was expected to close in May 2005 (\$2.3 billion). A mezzanine loan fund was expected to closely shortly thereafter (\$1 billion).

securities. With non-performing loans, the underlying name will be stressed. The measurement is the capital value loss due to a real estate downturn, and is therefore looking at a very long-term loss. Lehman uses a “historical simulation” approach to determine the P&L impact, by revaluing each property. The market value of the property is multiplied by the historical times series of property value changes, then senior debt is subtracted (if applicable), and finally the Lehman Loan mark-to-market basis (which determines the existence of a loss) is subtracted. This results in a simulated P&L distribution for each loan. Losses across property types are aggregated within a region, assuming perfect correlation. Losses across regions are then aggregated assuming zero correlation between regions, and a joint probability distribution, similar to the methodology found in high grade credit, is used to determine overall losses at the desired confidence level. Collateral concentrations, such as malls or hotels, are not specified in the event risk stresses, even though this risk may at times be significant (e.g., with hotels after 9/11).<sup>36</sup>

## vii. Risk Arbitrage

### Business Overview

While Lehman takes proprietary positions within both its equities and fixed income divisions, there is also a standalone group dedicated to proprietary risk taking. While formally called Risk Arbitrage, this group has a scope beyond what its name might imply. Risk Arbitrage has been given a risk appetite of \$450 million, equivalent to the RA limit for the entire equity business. Current usage is \$278 billion. Balance sheet usage for the group is provided by the firm, i.e., there are no outside investors. The group of 31 employees is housed in a physically isolated area from Lehman’s customer businesses.

Risk Arbitrage trades within six strategies, all of which utilize a research fundamentals approach: long/short fundamental equity, merger arbitrage, distressed securities, special situations (investing in companies subject to corporate restructurings, stock buybacks, bond upgrades, and earning surprises for a period of years rather than months), convertible arbitrage, and privately structured transactions (both in public entities and private equity investments). Their biggest positions are held through high yield instruments (used in more than one strategy), long/short plays, and merger arbitrage. The group moves in and out of areas opportunistically, based on market dynamics. For example, they briefly entered the credit trading space during the turmoil surrounding the downgrades of General Motors and Ford debt. This group tends to hold

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<sup>36</sup> With respect to PC, all of the positions in Real Estate are classified as Level 3 or Level 4 – i.e., there are no direct external price quotes (Level 1) for any of the positions. As such, the product controllers must interact often with the traders and servicers to verify prices. For equity investments, PC usually get monthly data (the “tape”) from servicers. They compare that with interpolated spread data, information from the trading desks, etc. For loans, floating rate loans are priced off a matrix (current spread vs. loan-to-value (LTV) by property type). For fixed rate loans, prices are based upon a “mock securitization” based on Lehman’s models. CMBS securities are valued using a spread matrix and Bloomberg’s Yield Table function. Mezzanine and B notes are priced using a theoretical shadow rating based upon LTVs, which serves as a basis for determining the spread. Real estate investment trust letters of credit and term loans are priced similarly. Real estate price verification uses a mix of external published data (e.g., CMBS spreads) and pricing tools such as Bloomberg’s yield table or internally-generated pricing grids. For exposures lower in the capital structure, PC use a “shadow rating” based on LTVs to interpolate spreads and then price using a net present value analysis. A good portion of the pricing for real estate relies upon data supplied by servicers. PC noted that last year there were 180 deals realized, providing numerous chances to “backtest” the data supplied by servicers. They feel that servicer-supplied data integrity is fairly high.

investments over a longer time horizon, leading to lower trading P&L than might be found within a flow business.

Risk Arbitrage monitors their portfolio two to three times a day on a more micro basis and seeks to manage idiosyncratic exposure, as they do not care to have general market exposures. They generally have exposure to 300-350 names at a time, and they also monitor names not yet in the book. The majority of their risk is within the equity space, and they tend to use very liquid hedges. The business heads stated that their use of options is primarily for risk management rather than leverage.

## Risk Management

Risk Arbitrage has a dedicated market risk manager who is physically located with the group, in order to facilitate maximum interactions with the business. Market risk, as measured by VaR, arises mostly from market moves in the equity and distressed high-yield spaces. The group also incurs event risk, from security downgrades for high grade, defaults for high yield, and deal break risk for merger arbitrage. To calculate the deal break risk for merger arbitrage, target and acquirer are assumed to experience the reverse of percentage price movements at the time of the deal announcement, i.e. the target price drops and the acquirer price rises. The probability of a deal break is calculated by assuming that the current target price is the expected value of the deal complete value and the deal break value. This methodology is considered by MRM to be more objective than the desk prediction. Events across different merger and arbitrage deals are assumed to be independent, and the portfolio loss distribution is calculated using a binomial probability distribution. Of these three categories, most event risk arises from defaults for high yield positions. Some securities held by Risk Arbitrage have already defaulted, and in these cases MRM looks at the uncertainty in the traded price, and the uncertainty of recovery in determining event risk. It is worth noting that this measure of event risk is biased towards long bond positions, as it does not account for bond upgrades, which would create losses if the group were to be short securities. Risk Arbitrage and MRM stated that the group currently has few short positions, but this is an area warranting further discussion.<sup>37</sup>

### d. Control Processes

#### i. Price Verification

PC performs formal price validation on a monthly basis to ensure that the inventory is marked to market and "fair valued". PC verifies market or fair value for cash instruments and listed derivatives by utilizing vendor prices, broker quotes, exchange prices or similar instruments. To the extent that valuation adjustments are required to arrive at fair value, PC is responsible for ensuring that the marking follows Lehman's formal valuation adjustment policies.

In April 2005, Lehman adopted an adapted version of FASB's fair value hierarchy. Level 1 estimates of fair value are obtained from quoted prices in active reference markets of identical assets or liabilities. Where Level 1 cannot be applied, Level 2 applies and fair value is determined by quoted prices for "similar assets or

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<sup>37</sup> With respect to PC, the employee in charge of Risk Arbitrage does not work with any other capital markets groups, so as to maintain independence. 90% of the portfolio is screen priced, or Level 1, and the rest is verified through external quotes. 1 to 2% of the portfolio consists of private equity, and PC goes to the investment management desk to get marks for these positions.

liabilities” adjusted for “objectively determinable” differences. Lehman has elected not to price verify using the Level 2 criteria. Where quoted prices on similar assets or liabilities are not available, Level 3 applies, which relies upon quote prices for similar assets or liabilities in active reference markets or model-based valuation techniques. For model-based valuations, the focus for Level 3 pricing is on the “relevance and reliability” of the inputs to the models. Those positions which cannot be valued under the Level 3 criteria then fall into Level 4, which Lehman defines as using “hypothetical market prices replicated using entity inputs as a practical expedient.” PC described several examples of products in each level. In general, PC only price verifies positions over a certain value, e.g., cash positions greater than \$1 million market value for corporate credit. This results in less than total coverage, although OPSRA was told that coverage is generally greater than 90%. Most of the coverage cut-offs are in market value terms, presumably because they are easy to set and implement.<sup>38</sup>

For each product, there is a variance threshold which serves as a trigger for more detailed and documented investigation. For example, the variance threshold for corporate credit is \$250,000 and 5% of market value. Positions which after getting independently priced verified by PC exhibit differences from the traders’ marks greater than the threshold variance get highlighted for further review and potential adjustment. Variances are discussed initially by the product controller and the individual trader. Any issues remaining unresolved are brought to the attention of the desk head, and, if necessary, to the head of PC and the head of the business.

In addition to verifying traders’ marks, PC verifies the actual positions – i.e., makes sure that the positions in a trader’s books, used to generate the risk reports, are the same as the positions in the general ledger. As the aggregate market risk metrics such as VaR are dependent on the position information provided by the front office systems, MRM depends on the accuracy of these numbers.

## ii. Profit and Loss Attribution Process

PC analytically reviews the P&L and positions on a daily basis and provides explanations for large movements. Through this process, they work in partnership with risk management to ensure accurate reporting and analysis of risk. From a market risk control perspective, the P&L explain process provides a way to check the accuracy and robustness of the pricing models and the risk sensitivities which the business units and MRM use to calculate and monitor risk. The central idea behind the P&L explain process is that P&L should be decomposable into discrete components (e.g., commissions versus principal). This permits the desks and risk managers to assess what is driving the P&L. By matching up risk sensitivities with market movements, they can estimate ex-ante the profit or loss for a desk and compare that to the “actual” P&L ex-post. Insofar there are material differences between the two, traders, risk managers, and controllers can focus on this unexplained portion. Unexplained P&L acts as a warning flag to risk managers and trading desk heads, signaling the existence of a problem such as poor capture of data, mismarking of a position by a trader, or model failure.

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<sup>38</sup> PC walked OPSRA through several examples, including the verification of the TIPS inflation book within interest rate derivatives (a Level 1 product). They also gave an example of a bond option for an emerging market sovereign (Level 3). Within equities, they demonstrated how an option considered to be Level 3 is priced, using a volatility, spot price, and dividend test. For Level 4, PC discussed the price verification of a synthetic CDO, using data from MarkIT partners, and the price verification of a single family unit development housed within the real estate group.

Daily P&L on a position by position basis for the cash businesses is calculated by the middle office. For the derivatives business, PC (rather than the middle office) owns the entire P&L process, as they tend to have employees with a skill set better suited to explaining P&L arising from derivatives. Data flows from the front-end source systems into three reporting systems (configured for different types of products): GQuest, PALS, and GEDS. Any adjustments are made in these systems, and the numbers then flow into the general ledger.

The process is divided into three parts: the trade date estimation, the trade date + 1 P&L production which has reconciliation and analysis, and reporting, where results are aggregated and disseminated to senior management.

To perform trade date estimation, traders mark-to-market inventory positions and the front end systems then generate revenue estimates. PC receives these estimates and reviews them for reasonableness relative to market movements. Large items are scrutinized more carefully to ensure that the estimations are valid. Estimates, along with PC commentary, are consolidated and distributed to senior business and finance management. For a relatively straightforward business such as equity cash trading, the estimate will be ready around 4:15 PM and is not likely to change significantly the next day.

For cash products, the trade date +1 process is primarily owned by the middle office. This is very automated, involving high volumes and heavy reliance on systems. The middle office ensures that trades are booked correctly and trader mark-to-markets are processed correctly. They will reconcile within GQuest, and PC will then review the output in order to make any necessary adjustments. Once analysis is completed, PC delivers P&L to the front office, summarizing the results within the Highlights System and distributing them to senior management. As mentioned above, for derivatives PC owns the entire P&L process. For fixed income, PC physically delivers the reports from IRIS (the engine feeding LehmanRisk) by 8:15 AM the next day. Within equities, traders view their risk from the front office systems directly. PC also uses the risk reports from IRIS to calculate spread P&L for fixed income derivatives. The middle office is responsible for the actual position reconciliation of front to back office derivatives systems. When all booking issues have been resolved, PC will make any necessary adjustments. Upon finalizing adjustments, PC compiles and explains the results using PALS and GEDS. Within both of these systems, PC can provide a risk-based explanation of P&L using the greeks (e.g., delta and gamma). PC then reconciles the risk-based P&L explain to the accounting P&L to make sure the actual results can be explained through the risk factors. They resolve any mismatches by speaking with traders, MRM, or quantitative research. As with cash products, upon completing the explain, PC delivers the final P&L (i.e., the actual accounting numbers with risk-based explanation) to the front office, where upon approval, it is input in to the Highlights System.

In addition to PC, the Capital Markets technology group (MIS) has a role in the daily P&L process. They occupy a quality control role in regards to the data, ensuring that P&L results (estimates and actual) have been fully populated by PC, checking to ensure that comment fields are populated, and reconciling estimates to actual results and obtaining explanations from PC. They also aggregate the results (both same-day estimates and trade date +1 final results) from PC and consolidate the information at a division level.<sup>39</sup>

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<sup>39</sup> Lehman PC went over several examples of P&L verification with OPSRA. The first involved a trade date equities recap, which highlighted large P&L movements and contained explanatory comments written by the controllers. PC also walked through a P&L report for municipal cash bonds. Finally, PC discussed a P&L report covering interest rate products, and then a P&L summary, from the same day, for the entire fixed income division. This allowed OPSRA to understand how P&L is aggregated up to the division level.

### iii. Model Control

The model control framework is owned by QRM, where the head of Model Control reports directly to the head of QRM. The framework is a recent initiative at Lehman and leverages off of the business units' model developers in implementing the model control framework, requiring them to perform much of the testing and validation that was previously done within QRM.

As currently structured, model control responsibilities rest with three broad groups: Business units (e.g., Quantitative Research (QR), Analytics and front office technology), QRM, and PC. The business units are central in many respects and bear the most responsibility, as the ultimate "ownership" of a model resides with the business. QR, which reports to a business head but is independent of the trading hierarchy, has the initial responsibilities: developing, implementing, testing and fully documenting the models. QR is also charged with populating and maintaining the model inventory/library and tracking model usage and compiling related statistics, functions that at other firms tend to fall under an independent model validation team such as the one in QRM. QRM stressed the importance of the peer review process, which occurs within QR, in the model control framework. The head of QR described this process as a weekly phone call within defined product areas (e.g., mortgages and interest rates). OPSRA was not able to ascertain the depth of this peer review process, and will follow up with both QR and QRM to understand how exactly the peer review fits into the framework. Most importantly, after its initial responsibilities have been fulfilled, QR has temporary approval authority for both QR-developed models as well as trader-developed bespoke spreadsheet models. In other words, trades cannot be booked on a model which does not have QR-approval. Analytics and technology (within each business) are responsible for model implementation, i.e., maintenance control of the computer code, implementing regression tests, and providing notification of code changes and releases.

A typical sequence within the Model Control framework is as follows. Initial approval comes from QR. This is considered to be "temporary" approval. Along with temporary approval, QR may place restrictions, such as limits on volumes or number of trades to be priced by the model. Additionally, PC may require valuation adjustments on temporarily approved models. A model is considered to be "fully approved" only when they have approvals from the business unit, QRM and PC. Limits may be placed at this stage as well. OPSRA was told that the time taken for a model to graduate from temporary to full approval varies considerably, according to the model's complexity. As a general rule of thumb, equity models tended to be modest variations on already approved models and quickly addressed while fixed income models were more complex and took longer. A standard documentation template is required, so that the documentation for each model must address each of the required elements.

In principle, QRM has a broad range of responsibilities with regards to the framework: model review/validation, providing guidance to PC on model-related matters, and most importantly, ultimate approval authority (along with PC). In practice, QRM's role is expected to be more limited. OPSRA understands that QRM will diligently monitor the flow and pipeline of new models approved by the businesses, and will review developer-supplied documentation for compliance with standards prescribed by the Model Control framework. QRM is unlikely to be doing detailed model review/validation, relying instead on the QR peer review process. QRM does not plan to conduct formal evaluations of each model's theoretical framework or the model assumptions, or the issues arising from the choice of a particular numerical implementation (e.g., stability/error of prices, sensitivities). Rather, it will focus on issues related to calibration and propriety of inputs. It is unclear to what extent QRM will be assessing the suitability

of a model for its intended usage. QRM may develop a metric of model risk based on the sensitivity of a model to unobservable inputs.

PC was also presented as being a key participant in the Model Control framework, via their responsibilities of price verification of model input parameters, reviewing model suitability for transactions as per model documentation and risk management guidance; and assessing and approving model valuation adjustments. PC is well-situated to detect misuses of a model. For example, if a trader chose to mark a trade using a model not approved for that trade, this may be detected when PC price-verifies the trade using the approved model for that trade. Likewise, if the trader marks to an unapproved model, and this model's sensitivities are different from that of the approved model, this may show up in the daily P&L explain.

A Model Control Committee has been formed to provide a forum for discussions of issues related to model control. It does not have approval authority. It is chaired by the business unit and members include senior representatives from QR, Analytics, QRM, PC and Technology; other guests may be invited as appropriate. The committee has scheduled meetings every month and may meet on an "extraordinary" basis as well.

During discussions with OPSRA, QRM focused on valuation models, i.e., those used by traders for marking their books and by PC during the price verification process. Other types of models/methodologies may be subject, in some form or the other, to some components of the Model Control framework. Documentation received by OPSRA indicates that the VaR and MPE methodologies will be reviewed by the model control group.

Currently, the new process is in place only for the equity division. In this area, models tend to be more compact and formulaic, with many bespoke adjustments to basic pricing models. Key aspects of the process include regular monthly Model Control Committee meetings; development of a complete and measurable model inventory and an approval process with automatic notification and full audit trail. The inventory contains details on the approval status, the volumes/risks of each model (weekly report), daily report on lists of models with temporary approval, and PC-required reserves for models with temporary approval. The Model Control Committee uses this inventory report to prioritize reviews and re-reviews. The framework is not yet formally in place for fixed income. Here, the models tend to be much more complex, especially within credit derivatives, and operate within a broader framework. Development time is significantly longer than in equities. The model validation groups are generally involved from the outset when a new fixed income model is developed, and by the time the model is complete QRM should be in a position to readily evaluate the model. In the interim, there exists a set of "primary controls" and "detection controls." The framework is meant to apply globally, consistent across legal entities, geographic regions and trading desks.

Based on OPSRA's assessment of the framework, it appears that QRM is taking a risk-based approach to model validation and that much of the independent model control process resides within PC. The head of QRM observed that the bulk of trades are booked on models that have been extensively time-tested, and associated model risk is quite low. As an example, he cited the Black-Scholes model used within equity derivatives. Lehman asserted that the proportion of "exotic" trades, booked on models where model risk might be higher, is quite low. A risk-based approach would imply that QRM spends the majority of their time on the models generating the greatest amount of calculation risk and linked to the most material exposures, measured either by VaR or RA usage. That said, it is unclear how models that may be less material in terms of generating high measures of risk, but incur significant amounts of model risk (e.g. by incorporating inputs such as correlation skew that are difficult to capture and subsequently validate), are prioritized for review. In addition, there is minimal



documentation formalizing their approach, and there are no measures, such as risk-based model ratings, that would also lend a degree of formality to the process. OPSRA will continue its discussions with QRM about the new model control framework, and its ability to develop a system that ensures models used for pricing products within Equities and Fixed Income are validated in a thorough and timely fashion.

### III. Credit risk management

#### a. Overview of Businesses Generating Credit Risk

This section of the report discusses the risk infrastructure surrounding CRM. This includes two of the more important tools used by CRM, the MPE metric and the Internal Credit Rating (ICR) scorecards; the limit and permissioning procedures; and credit systems. This section also details businesses with significant credit risk. Lehman's credit-risk generating activities include a large and sometimes chunky leveraged lending business, smaller but significant relationship and warehouse lending businesses, a broad OTC derivatives and financing business, and a growing prime brokerage franchise.

The Leveraged Finance business is a significant source of Lehman's overall credit risk. The group offers clients without ratings or with debt ratings at loan closing of BB+ or below financing solutions including high yield bond, leveraged loan, bridge financing and/or mezzanine debt products. In 2004, Lehman was ranked seventh in the league tables for US leveraged loan book runners with a volume of \$13.0 billion on 62 deals. This area commands a significant amount of attention from the CRO and from senior management of the firm due to the large and lumpy nature of the transactions.

More recently, Lehman has moved into the investment grade loan space in response to clients' desires to consolidate investment banking relationships within one firm. They are now a major player in this loan market. One of the products Lehman offers is loans to investment grade clients that are generally unprofitable on a standalone basis in order to perpetuate an existing relationship or to strengthen a growing relationship. These loans typically take the form of commercial paper backstops or general revolvers. Currently, Lehman has 264 loans outstanding to 145 clients with \$10.7 billion committed and \$1.1 billion drawn.

Lehman's warehouse lending business provides short-term secured financing to residential mortgage banking counterparties to finance originations or acquisitions of residential mortgage loans. Although this business is profitable on a standalone basis, these facilities are generally extended in order to promote other activities, namely to ensure a source of underlying whole loans for the securitization business. Lehman currently has warehouse lending facilities with 14 counterparties representing total commitments of \$4.6 billion, with roughly 50-60% of the total commitments funded at any given time.

The OTC Derivatives, Securities Lending, and Repos businesses include a wide breadth of underlying products that generate credit risk. The counterparty current exposure (CE) as of 2/25/05 across products was \$24.4 billion. The largest single product category generating CE was Fixed Income Derivatives, with a CE of \$7.4 billion.<sup>40</sup> Large current exposures were also generated in Equity Finance<sup>41</sup> with a CE of

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<sup>40</sup> This includes Plain Vanilla Swaps, Exotic Swaps, Default Swaps, Fixed Income Options, Corporate Bond Options, Total Return Swaps, FX, EMG Options, and CDO trades.

<sup>41</sup> This includes Stock Borrow vs Stock/Cash Lending trades.

\$6.2 billion, and in Fixed Income Finance<sup>42</sup> with a CE of \$3.2 billion. Other products generating current exposure include Foreign Exchange Derivatives (CE \$1.0 billion), Equity Derivatives (CE \$590 million), and Forward/Outright trades where the underlying can be convertible bonds, corporate bonds, equities, euros, EMG securities, governments, or mortgage backed securities (CE \$410 million).<sup>43</sup> In addition to CE, these products generate significant potential exposure as discussed below.

The prime brokerage businesses, which provides securities lending services and extends secured financing (via margin loans) to hedge funds, is also a material source of credit risk. While these activities are fully collateralized on a daily basis, this business does create potential exposure stemming from the possibility that daily market movements will eat through the equity in the counterparty accounts. The prime brokerage business is currently small relative to other securities firms, but this is an area Lehman plans to grow. As of May 2005, the aggregate gross market value of counterparties' positions was approximately \$83 billion (\$48 million long and \$35 million short), the total loan amount was \$24 billion, and the Net Potential Exposure (defined as VaR minus equity) was \$30 million.

## b. Tools

### i. Potential Exposure Modeling

As a result of its OTC derivatives trading, financing transactions (e.g., repos) and prime brokerage activity, Lehman bears credit risk arising from the possibility that a counterparty will default at a time when the termination value of outstanding trades is in Lehman's favor, or when the collateral held by Lehman is worth less than the amount lent against that collateral. CE is used to represent Lehman's loss were such a counterparty to default today, assuming zero recovery of unsecured exposure. CEs may change substantially over time, not only from new transactions, but purely as a function of movements in markets. For instance, two parties may enter into an interest rate swap today, at the market (expected present discounted value of the floating leg and fixed leg payments are equal), so that the CE to both is zero. However, depending on how rates evolve over time, the contract's value could change substantially so that one party is bearing substantial credit risk with respect to the other. Thus in risk managing derivatives and financing activities, securities firms must concern themselves not only with CE, but with future PE as well. PE models provide probabilistic estimates of how CE may evolve over time as a function of market movements. At Lehman, PE is the primary tool by which counterparty trading risk is managed and also serves as a critical input into the RA usage calculation.

The CE with respect to a particular counterparty is simply the MTM value of the portfolio, or portfolio replacement cost, taking into account netting and collateral. If netting is allowed, positive and negative transaction level MTM values can be added to calculate counterparty level CE. In the absence of netting, the current exposure comprises the sum of only positive marks. Thus without netting the fear is that, in the event of default, Lehman might have to make the defaulting counterparty whole for its

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<sup>42</sup> This includes Bonds Borrow/Lending vs Cash, Dollar Rolls, Bonds Borrow/Lending; Repurchase/Reverse Repurchase Agreements; and Genta Repo trades.

<sup>43</sup> In addition, deposits to banks or investments in Global Money Market funds generate a CE of \$5.6 billion.

(the counterparty's) positively valued trades while separately seeking compensation for the trades that have positive value from Lehman's perspective.<sup>44</sup>

To model PE is essentially to model the forecast distribution of the value of a counterparty's portfolio, taking into account the applicable collateral terms. A single PE metric serves as an estimate or forecast of what the CE for a portfolio will be in the future. However, for each point in time - e.g., three months or six months from today, there is an entire forecast distribution of possible CE outcomes. For instance, there is a three month expected/mean outcome, a 5<sup>th</sup> percentile outcome, a 95<sup>th</sup> percentile outcome, and so on. The primary PE metrics used at Lehman are (in Lehman parlance):

- *Potential Exposure (PE)* – Refers generically to a CE forecast, or to an entire CE forecast distribution, but not to any particular point on the distribution. PE is always modeled to take into account netting terms but not upfront collateral and/or variation margining. Variation margining refers to additional collateral (beyond the upfront collateral) posted in response to decreases in the value of the portfolio, and is discussed further below.
- *Effective Potential Exposure (EPE)* – The PE after accounting for margining.
- *Maximum Potential Exposure (MPE)* – The 95<sup>th</sup> percentile PE. MPE is a curve over time - i.e., there is three month MPE, six month MPE, and so on.
- *Expected Exposure (EE)* – The mean PE. EE is also a curve over time.
- *Peak Potential Exposure (PPE)* – The peak point on the MPE curve. For instance, the two-year MPE might be the greatest MPE, making it the PPE.
- *Effective Peak Potential Exposure (EPPE)* – The PPE after accounting for margining terms.

A robust PE framework should somehow capture the mitigating impacts of margin agreements. With a margin agreement in place, counterparties are required to post additional collateral if, following market movements, the portfolio replacement cost exceeds a specified unsecured threshold.<sup>45</sup> Thus variation margining requires the modeler to consider the fact that the forecasted CEs will be continually pulled back towards this unsecured threshold amount.<sup>46</sup> In other words, if a CE exceeds the unsecured threshold, the risk horizon for which the CE could continue to grow past that excession is limited, since the portfolio would eventually either be re-collateralized or closed-out.<sup>47</sup> For the vast majority of Lehman counterparties, margin calls can occur daily and delivery is the next business day. However, a cure period of two weeks is allowed to reflect a dispute resolution time. Thus the total risk horizon modeled for counterparties with margin agreements is typically two weeks.

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<sup>44</sup> With netting:  $CE = \max(V_1 + V_2 + \dots + V_n), 0$   
Without netting:  $CE = \max(V_1, 0) + \max(V_2, 0) + \dots + \max(V_n, 0)$

<sup>45</sup> For example, if Lehman has an in-the-money swap position with counterparty xzy with a value of \$1 million (meaning xyz would have to pay Lehman \$1 million to walk away from the trade), and xyz has posted \$800,000 in cash collateral to Lehman, the unsecured amount is \$200,000.

<sup>46</sup> Typically with variation margining a minimum transfer amount is specified, which requires some minimum change in value for collateral to be called (which avoids "nuisance" calls).

<sup>47</sup> In order to take variation margin into account, collateral flows must be modeled as the CE drifts across these unsecured threshold (plus minimum transfer amount) boundaries. This causes EPE to become path dependent - i.e., simply knowing the forecasted CE is not sufficient for modeling collateral flows, but also the path by which CE arrived at its forecasted value.

In order to estimate PE distributions, future values for the risk factors that determine the values of the portfolio's instruments must be modeled. This can be accomplished using various broad statistical approaches, and at large banks and securities firms is often achieved through Monte Carlo simulation. This type of framework involves the modeler using market price and/or historical risk factor data, along with certain statistical assumptions, to specify the joint stochastic process that describes the evolution of risk factor movements over time and then using random number generation technology to generate hypothetical future states of the world. Other statistical approaches to modeling risk factor distributions include HistSim and VCV. HistSim involves using actual historical movements in risk factors and applying those movements to the current risk factor values to generate the forecast risk factor and PE distributions. A VCV approach allows the modeler to identify specific points on the PE distributions (e.g., the 95<sup>th</sup> percentiles) without estimating the entire distributions. Such a computationally convenient approach involves reliance on a statistical assumption of the joint normality of the risk factor distributions and thus normality of the PE distribution being modeled. Under such a normality assumption, only estimates for the risk factor volatilities and correlations are required to obtain these PE distribution point estimates. Lehman actually utilizes all of the above statistical approaches, with the approach varying by product type. In addition, for credit derivatives Lehman uses a stress testing approach. Below we briefly describe and assess the PE approach taken by product type.

### *Fixed Income and Foreign Exchange Derivatives*

For over 99% of FX and approximately 90% of fixed income products a Monte Carlo simulation is used for modeling PE. QRM uses 1,000 simulation paths in estimating the PE distributions. While this tends towards the lower range of the typical number of paths used for PE purposes, QRM asserts this specification is appropriate given the additional computational costs that would be incurred versus the amount of benefit (in terms of decreased simulation error) that would be reaped by increasing the number of paths.<sup>48</sup> The PE term structures are modeled out to a 30 year horizon, with all exposures discounted back to current dollars. While not all firms express PEs in terms of current dollars, QRM argues this is desirable from the credit analysts' perspective since they think in terms of current dollars for permissioning trading levels across the exposure maturity term structure. Another advantage in expressing PE in current dollars is that within the context of RA, PE is aggregated with VaR and Event Risk, which are both denominated in current dollars. There are over 100 maturity points modeled with much of the granularity in the first year. Variation margin is dynamically modeled within the simulation to produce EPE. Further, the model captures the aging of portfolio - collateral roll-off, trade expirations, option exercises, etc.

Fixed income and FX risk factors/products are modeled within a single simulation. In doing so, interest and exchange rates are modeled as uncorrelated, where FX rates are assumed to follow a multivariate lognormal distribution (correlated with one another) that is independent from the interest rate generating processes.<sup>49</sup> For interest rates, an arbitrage-free two factor model calibrated to yield-curve, swaption, and cap volatilities is used.

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<sup>48</sup> OPSRA staff will further investigate this issue in the future as progress is made towards developing and implementing PE validation techniques, as discussed below.

<sup>49</sup> With the caveat that the drifts applied to the FX distributions are calibrated to the differential of the interest rates (short rates) of the currencies in question, based on a model of uncovered interest rate parity.

QRM takes a “risk neutral” approach to the parameterization of the risk factor distributions used in the simulation model. In short, this involves applying risk free rates of drifts (or expected values) to the risk factor distributions, rather than calibrating distributions to historical drifts. Such an approach can result in substantially lower exposure estimates, especially for longer maturity transactions in non-margined portfolios, as compared to alternative “econometric” or “real world” modeling approaches. Often risk neutral risk model frameworks involve calibrating additional distributional parameters (namely volatilities) to price curves, such as forward curves and implied volatilities, rather than from historical risk factor data.<sup>50</sup> However, where price data are lacking, historical volatilities, etc. may be used. Furthermore, correlations are typically measured empirically as market implied correlation parameters are not available for most factors.

As there is clearly no consensus amongst practitioners and academics alike as to what the best approach is, OPSRA staff are somewhat agnostic regarding this real world versus risk neutral PE debate. Each approach has its advantages as well as disadvantages. For instance, an argument in favor for the risk neutral approach is that it is more of a forward looking calibration, using the market’s view on distributional parameters rather than simply assuming history will repeat itself. In addition, QRM asserts that using risk neutral scenarios is computationally efficient since the re-pricing of instruments in the face of risk factor movements is performed using risk-neutral distributions. Alternatively, empirical evidence suggests certain risk factors, such as equity returns, exhibit expected values above that of the risk free rate of return, particularly over longer horizons. Going forward, we intend to examine the techniques/processes QRM develops internally, discussed further below, to validate empirically with these PE model outputs.

For the 10% of fixed income and 1% of FX transactions not modeled in the simulation, which are the more exotic/complex transactions, proxy instrument PEs are used or conservative “risk factor add ons” are applied. The add-ons involve the use of a pre-simulated grid of generic trade PPEs. The non-modeled trade is matched to a generic trade based on notional amount, maturity, currency, etc. The PPE of the non-modeled trade is applied to the portfolio. This is conservative in the sense that the highest peak exposure is used to represent the non-modeled trade’s entire MPE curve and add-ons are simply added to other portfolio exposures regardless of potential diversification benefits or long/short offsets.

### *Equity Derivatives*

For equity derivatives, approximately 80% of trades are modeled using a modified version of the historical simulation VaR model. Approximately 20% of trades, including exotic options and baskets are modeled using a VCV VaR model. For less than 1% of the trades, add-ons are used. For non-margined portfolios (30% of trades), the MPE profile is estimated by scaling up the 1-day VaR by the square root of time to the various PE term maturities and adding the current portfolio MTM value. For margined portfolios, the VaR is scaled up according to the risk horizon (again, usually two weeks) and added to the unsecured threshold and minimum transfer amount.

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<sup>50</sup> For instance, if a modeler requires an estimate of the expected volatility of returns for Lehman Brothers common equity, one approach might be to compute and use the historical volatility of returns. Alternatively, one could observe volatilities implied from Lehman equity option prices and use those as the market’s consensus of the expected volatility.

It is important to note that simply scaling up a 1-day VaR metric ignores the aging of the portfolio examined over time. For instance, as equity levels evolve over time, the portfolio greeks (e.g., the deltas and gammas) will change without adding any new positions (thus changing the relationships between risk factor movements and changes in portfolio value), which impacts any subsequent CE forecasts. Further, certain trades may be scheduled to expire or options will likely be exercised under particular scenarios. This static approach of scaling up the VaR implicitly assumes the risk profile does not change over time and captures none of these effects. Obviously, the aging impacts not captured are larger for non-margined accounts, where VaR metrics are scaled out to considerably longer maturities. Consequently, QRM personnel have conveyed a desire to refine the modeling of margin provisions for equity products and possibly move non-margined equity portfolios to a Monte Carlo framework.

The current historical simulation is adopted from the market risk VaR model, and utilizes the same times series and re-pricing technology. The only notable exception with respect to the market risk specification of the model is that, for PE purposes, equal weighting is applied to all historical risk factor data (versus the exponential weighting used for VaR purposes). The VCV model uses a delta-vega (i.e., linear) re-pricing approximation and one year of historical data. The VCV deltas are mapped to single name equity return data and vegas are mapped to historical implied volatility data on one of eight regional indices. Although less material in the context of PE versus VaR models (given that counterparty level risk profiles tend to be more directional in nature and require aggregation across fewer risk types than desk or business unit level profiles), neither a linear VCV approach nor the use of such a limited number of implied volatility series seems ideal for modeling the non-linear price and volatility risks associated with options. However, pending certain front office system enhancements, QRM intends to extend the historical simulation method to cover key exotic positions.

### *Credit Derivatives*

For the credit derivatives business, QRM is currently using a scenario analysis approach to measuring PE, rather than a typical statistical approach. The scenario analysis involves calculating potential exposures resulting from large, contemporaneous trade-by-trade credit spread shocks. These individual transaction level exposures are eventually aggregated by taking the maximum exposure of either all of the long or all of the short positions in a portfolio. In other words, no credit risk factor correlations are explicitly modeled. This ad-hoc aggregation results in conservative PE estimates in the case of a balanced long and short portfolio.

The magnitudes of the credit spread shocks are intended to be 95<sup>th</sup> percentile movements, stressing each position's underlier in the direction that increases Lehman's exposure. These stresses are calibrated either from 1) internally generated market implied credit transition and default probabilities, and corresponding mark-to-market impact matrices, or 2) from Lehman's historical spread data. For non-margined accounts, underlying implied ratings are stressed at a 95% confidence level using the front office transition matrices and corresponding spread and price changes are obtained from the MTM matrices. These transition matrices are annual in periodicity and extend out to 10 year horizons. Thus a metric is produced for the PE one-year out, two-years out, and so on, through the tenth year. While the transition probabilities are initially based on historical data, they are calibrated to market implied survival curves/default probabilities. For margined accounts, a spread risk factor, reflecting a 95<sup>th</sup> percentile

two-week spread move and estimated from the firm's historical data, is used. These risk factors are estimated by rating<sup>51</sup>.

The PE results produced from this scenario analyses are completely insensitive to the existence of legal netting, and the aging of portfolios over time is not captured. Furthermore, this ad-hoc process of adding up the risk from all the longs versus all the shorts and taking the greater of the two resonates as a fair approximation to actual exposure. In other words, using this approach, PEs will not necessarily increase or decrease with increases and decreases in actual risk. Consequently, QRM is planning to implement a Monte Carlo simulation model for credit products in the near future. In the meantime, QRM asserts some comfort with the fact that the current aggregation bears on the side of caution in ignoring diversification effects<sup>52</sup>.

### *Fixed Income and Equity Financing*

For securities financing transactions, a spreadsheet implemented Monte Carlo simulation model based on a VCV matrix is used for measuring PE. For these businesses, all securities are mapped to one of 52 indices/benchmarks. This includes, for example, ten US equity indices by sector. The use of a VCV based simulation and associated normality assumptions does not seem particularly worrisome given the relatively linear nature of the instruments covered by these businesses. However, OPSRA staff note the relatively non-granular benchmark mapping scheme used. While QRM does attempt to compensate for potential concentrated and basis risks not captured by increasing volatilities for concentrated positions, the concern remains that such mappings could result in the inaccurate offset of exposures. However, QRM again notes the relatively directional nature of most counterparty portfolios. Furthermore, QRM plans on transitioning the financing businesses to the historical simulation VaR based methodology by the end of this year.

### *Prime Brokerage*

For prime brokerage clients Net Potential Exposure (NPE), defined as the VaR minus the equity in the account, is the PE metric used. The VaR statistic, like with much of the equities derivatives business, is estimated from the market risk group's historical simulation VaR model. Again, the PE version of the VaR model uses the same specification as used for computing the firm's VaR except for the equal weighting of historical risk factor data. All prime broker accounts are fully collateralized and subject to daily margining.

### *Revaluation Techniques*

As discussed in the VaR section of this report, there are three central steps to constructing a probabilistic risk aggregation model. The above discussion focuses much

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<sup>51</sup> One of these two approaches is taken for the vast majority of Lehman credit derivative transactions, which are mostly single name CDS and CDOs. Some of the more exotic trades, such as credit default swaptions, are not captured since QRM has not developed the re-pricing calculators to quantify the MPEs resulting from the stress shocks. QRM is currently in the process of developing notional based add-ons to capture risk for such transactions.

<sup>52</sup> While one could imagine hypothetical portfolios, such as a concentrated portfolio consisting of several longs and shorts, for which this approach might underestimate risk, OPSRA staff are told that when QRM moves the credit business to a simulation model PEs are expected to fall for essentially all counterparties.

on the modeling of risk factor movements for PE purposes. In terms quantifying the P&L impacts of those movements, QRM uses a combination of front office pricing models, including risk sensitivities and stress matrices, and its own models and calculators which may utilize full revaluation or various re-pricing approximations. While industry standard seems to be to use front office re-pricing technology for VaR models, firms often build their own calculators for PE purposes due to the higher computational demands of these methods, especially when using Monte Carlo techniques. Furthermore, PE models require additional counterparty level information to that stored in front office systems (and more than is needed for VaR), such as collateral terms. However, while OPSRA is open to the use of QRM developed re-pricing calculators (versus front office models), we intend to examine in the future QRM's validation efforts with respect to such models, as discussed below.

### *PE Validation*

Due to the relatively longer time horizon across which PE models are used to project potential risks, as compared to VaR models, empirically validating PE calculations poses additional challenges. Consequently, techniques in addition to pure statistical comparisons of model predictions against actual CE realizations should be considered. Some institutions appear to be moving in the direction of developing techniques that emphasize intuition and risk management practices in assessing model adequacy, as opposed to focusing on a particular statistical test. Further, in addition to empirically validating model outputs, some firms gain comfort in assessing the various components of the overall PE methodology from a sort of bottom-up approach. For instance, separate processes can be established for evaluating the formulas used for repricing instruments (as with front office pricing models) versus the stochastic models used for describing risk factor evolutions over time.

QRM intends to implement a two-stage PE model validation process. The first stage is to validate the re-pricing techniques and calculators one-by-one. OPSRA staff are told this process will be much akin to the model review process for vetting front office pricing models, and will also be carried out by the model validation group in QRM. In addition, various ad-hoc analyses will be performed to evaluate the risk factor forecasts produced by the models. These sorts of processes entail reconciling the risk factor movements leading to large exposures (i.e., drilling down into the MPE simulation path) with intuition as well as with directly observable historical movements in factors. The second stage of the validation effort involves performing a form of backtesting of hypothetical portfolios. The idea is to walk back through time and calculate what the CE history looks for a hypothetical portfolio, were it to have been created at various historical dates, and compare that distribution of CEs to the actual (current) estimated MPE. In other words, suppose one has estimated a two-week MPE of \$1 million for some hypothetical transaction today. The modeler calculates what the realized CE would have been, two weeks after initiation, had that transaction been put on various days in the past. The QRM plan is to implement such tests, starting with more simple portfolios, and to expand it to portfolios with perhaps more complex correlation structures and instruments. The proposed PE validation plan appears reasonable and is consistent with approaches used elsewhere in the industry.



## ii. Internal Credit Ratings

A major component of CRM's function is the analysis of counterparties leading to the assignment of ICRs.<sup>53</sup> Credit analysis begins with a comprehensive review of counterparty information. Included in the review is an analysis of counterparty-specific information such as audited financial statements, prospectuses, external credit rating agency reports, external news reports and company press releases. Credit also relies on due diligence including on-site client visits, particularly for hedge funds. Industry analysis is also performed, including peer analysis and benchmarking particularly for banks and hedge funds. Finally, market data, including credit spreads associated with the counterparty's debt or credit default spreads, are utilized.

ICRs are assigned to all counterparties, except for short dated cash trading and counterparties with an MPE less than \$1 million, by credit analysts within CRM. Lehman uses a scale of eight bands ranging from iAAA to iD. Bands from iA to iB are further defined by the addition of a plus or minus to show relative standing within each rating band.

Lehman has developed a series of industry-based scorecards that are used by analysts to assign ICRs.<sup>54</sup> Each scorecard contains a number of quantitative and qualitative factors germane to the particular industry. Analysts input each quantitative factor and score each qualitative factor from 0 (weak) to 5 (excellent). Each factor is given a predetermined risk weight that cannot be modified by the analyst. Each factor's score and risk weight is combined ( $\sum$ value x weights), leading to a final score which is compared to a pre-calibrated industry specific scale to get the final ICR. Analysts may override the scorecard produced ICR, but must provide a justification for doing so. Ratings are subject to a sovereign cap, and hedge funds are capped at BBB+.

Analysts are required to refresh counterparty ratings at least annually. When new information about a counterparty becomes available, analysts may refresh the ICR more frequently. Analysts are encouraged to downgrade counterparties as soon as negative information is received, whereas they are encouraged only to upgrade counterparties when positive information is backed by evidence of actual improvement.

A comparison of Lehman's ICR with external ratings reflects a conservative bias in Lehman's ICR approach. Approximately 700 counterparties, representing fewer than 20% of the counterparty population, have Moody's and S&P ratings. With Moody's, the ICR matches 45% of the ratings and the ICR is lower in 46%, including 8% where they are more than two notches lower. With S&P, the ICR matches 54% of the ratings and the ICR is lower in 32%, including 4% where they are more than two notches lower. Sovereign ICRs are broadly consistent with rating agency ratings.

Lehman's method of assigning ICRs through the use of scorecards provides consistency and transparency. The same scorecards are used globally, increasing consistency. The scorecards were developed internally by Lehman, not by a third party consultant, and thus there is a sense of "buy-in" among analysts worldwide. Currently only analysts can access the scorecards on Lehman's internal website, but there are

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<sup>53</sup> ICRs directly inform a counterparty's maximum available credit limit, as well as documentation and margin terms.

<sup>54</sup> The major industry classes that are covered by the scorecards include: insurance, banks, hedge funds, sovereigns, corporates, municipals, special purpose vehicles, investment advisors, and broker dealers. In addition, a scorecard may be treated as "miscellaneous" for counterparties outside of the pre-defined industries. OPSRA examined the scorecards for insurance companies, banks, sovereigns, and hedge funds in detail.

plans to allow the businesses to view them once security concerns have been addressed.

### c. Limits and Permissioning

There are multiple layers of credit risk limits at Lehman. The most comprehensive limit is RA, which has a market, credit, and event risk component. The credit component of RA is a statistical measure of potential credit losses over a one year time horizon. Lehman also imposes firmwide country risk estimated loss potential (ELP) limits. The ELP measure is a conservative estimate of the loss Lehman might experience in the event of an instantaneous crisis in a country. It estimates market risk and counterparty credit risk losses across all products at the country level. The CRO sets country limits. In addition to these limits, there are several counterparty credit limits in place at Lehman governing the tenor of exposures in a particular country.

Credit limits are further delimited by family (i.e., all entities within a related group of counterparties) and by counterparty. These limits are set by Credit Analysts in CRM within their delegated authority.<sup>55</sup> There are three applicable classes of limits that are monitored by CRM. First, pre-settlement limits cover pre-settlement credit risk arising from the possibility that Lehman may incur a credit loss if a counterparty defaults at a time when the termination value of outstanding trades is in Lehman's favor and exceeds the proceeds from liquidating any collateral. These limits apply primarily to the OTC derivatives business. Second, settlement limits cover the open delivery risk associated with trades in which Lehman, due to market convention, has free delivery and could be at risk for the full value of the trade being delivered due to non-simultaneous settlement. This is mainly an issue in the FX business. Third, treasury limits cover the credit risk associated with deposits made for liquidity management purposes.

Family and counterparty limit authorities are set by ICR. For pre-settlement risk, limits are further defined by trade tenor, are measured in MPE and take into account enforceable netting agreements and collateral.<sup>56</sup> The family-level authorities for the Global Head of CRM are set forth below, in USD millions.

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<sup>55</sup> There are five levels of authority (in descending order): the Global Head of Credit Risk Management (Jeffrey Glibert), Level 0 Approvers (Steve Simonte in New York and David Oman in London), Level 1 Approvers (6 worldwide), Level 2 Approvers (15 worldwide), Level 3 Approvers (10 worldwide), and Level 4 Approvers (19 worldwide).

<sup>56</sup> The PE metric utilized for hedge fund exposures, both OTC and within prime brokerage, is measured as the Net Potential Exposure (NPE), defined as the VaR minus the equity (surplus collateral or initial margin) in the account. This number is a better metric for dynamic hedge fund portfolios that are subject to daily margining. See the prime brokerage section of the report below.

ICR	Pre-Settlement Risk MPE Limits by Tenor				Settlement Limits	Treasury Limits
	<=1 yr.	<= 5 yrs.	<= 10 yrs.	>10 yrs.		
iAAA	675	375	275	200	1000	925
iAA	675	375	275	200	1000	925
iA+	525	375	275	200	425	925
iA	525	375	275	200	425	925
iA-	525	375	275	200	425	925
iBBB+	275	200	175	150	250	425
iBBB	275	200	175	150	250	425
iBBB-	175	100	100	100	0	225
iBB+	125	75	75	75	0	125
iBB	125	75	75	75	0	125
iBB-	100	75	55	50	0	100
iB+	60	60	50	45	0	75
iB	60	60	50	45	0	75
iB-	50	50	40	35	0	55
iCCC	50	50	40	35	0	55
iD	35	25	25	25	0	35

Limits for lower levels of credit authority are correspondingly more restrictive. For example, the pre-settlement risk MPE limit for a iAAA rated counterparty for exposure with less than one year tenor is \$600 million for Level 0 approvers, \$500 million for Level 1 approvers, \$300 million for Level 2 approvers, \$150 million for Level 3 approvers, and \$15 million for Level 4 approvers.

Limits are further delimited into product limits by Lehman legal entity. These cover specific product areas and are denominated in notional amounts. Limits for repos, FX, and securities lending will be recast product level PE limits in the near future.

Although the credit limit guidelines provide analysts with clear mandates on maximum limits, analysts are still expected to exercise judgment in two ways. First, actual limit recommendations are often less than guidelines. This is primarily due to a lack of business requirements warranting the full amount, and a desire by Lehman not to have “excess credit” to counterparties. Second, the guidelines do not prescribe rules for sub-allocating product-specific limits within a family.

Transactions that are not covered by a credit limit require trade specific review and approval by a credit analyst. Active financial institutions operate under pre-approved limits for all products. Select corporate and insurance clients trade under pre-approved limits for fixed income products, and require trade-by-trade approval for CDS and equity derivatives. All other counterparties, including hedge funds, must have all trades approved individually by credit analysts. Lehman is moving towards having all active counterparties, including hedge funds, operate under pre-approved limits and having infrequent users operate under trade-by-trade approval. From an operational standpoint, this change will alleviate some of workload for the credit analyst.

In addition, the private client business (Private Investment Management) counterparties are provided with pre-approved product lists including notional limits, margin, and haircut requirements and tenors for various client types. This business operates under Reg T and the accounts are all highly margined well in excess of VaR.

#### d. Technology Systems

At Lehman, credit risk staff from all geographic regions use the same global technology platforms containing the same information. The various credit risk reports and applications are accessed from the LehmanRisk CRM Webpage. The primary Credit Risk applications/systems include Credit Work Station (CWS), the MPE System, the Credit Approval System (CAS), Credit Risk Reporting applications, and the Internal Risk Rating Scorecard Application.

##### i. Credit Work Station

CWS is the “downstream” credit system. All important information and tools, from a credit risk management perspective, are brought into CWS. It serves as a repository for counterparty, family hierarchy, credit ratings and trade information, and is used for exposure aggregation and report generation. Within CWS one may view all credit analyst reviews, external credit ratings and various client as well as industry and country data. In addition, all credit lines/limits as well as the current usage of those lines are viewable in CWS. In order to be able to cut data/reports different ways and view exposure at various levels of aggregation, CSW can perform simple MTM (re)calculations. CWS is also used by the analysts to create new credit lines.

##### ii. MPE System

The MPE system calculates counterparty credit exposure for four major purposes: 1) pre-trading analysis and trade approval, 2) reporting of counterparty exposures, 3) calculation of the counterparty risk components of Risk Appetite, and 4) the credit valuation adjustment (CVA). As discussed in the MPE section above, various types of modeling techniques are employed for MPE calculations, varying by product type. However, the same techniques are applied consistently globally within product type. The MPE system produces a standardized set of outputs and reports. For instance, weekly CE and MPE reports showing aggregated exposures to the counterparty level are produced.

In terms of pre-trade analysis, credit analysts and sales personnel can currently estimate the likely portfolio MPE impact of relatively vanilla trades. MPE “risk factor tables” are used to provide conservative estimates of the MPE effects of other new trades on an existing portfolio. The MPE system calculates these impacts for approximately 100 generic proxy trades. However, often, especially for more “sensitive accounts” and more exotic trades, the Credit Risk Analytics team (within QRM) will need to model the impact of a proposed transaction. This may involve either modeling the trade directly, in proxy form, or using an “add-on” (as discussed in the MPE section). In doing so, Credit Risk Analytics has a “generic desktop utility” at its disposal that calculates the effects of adding one or more predefined (generic) trades to portfolios. This calculator offers additional functionality to the risk factor tables – e.g., it allows for variation in margin terms for the marginal simulation. However, QRM is currently developing a “true” MPE calculator that will be available to analyst and business personnel for calculating MPE impacts of actual proposed transactions “on the fly”. This tool should enhance the permissioning processes and reduce the number of transactions that require explicit QRM attention for approval purposes.

### iii. Credit Approval System

The CAS stores pre-approved counterparty credit limits and credit analyst trade approvals. For non-pre-approved counterparts, credit analysts record credit terms for proposed transactions and obtain and assign credit approval numbers for each trade proposal. Transaction management then validates the credit terms in the trade confirmations (front office) with the credit terms in CAS, and a “credit handshake” is performed to ensure the trades that are booked are in fact the trades the credit analysts approve. Within CAS one can view a full history of past trade approvals and can pull up the details on any trade.

### iv. Credit Risk Reporting Applications

The credit risk systems are used to generate a variety of standardized reports, and also provide the capability to generate ad-hoc reports. Types of reports generated include portfolio, country risk, exposure, analyst, and control reports. Again, the CRM webpage is the central depository of risk reports. Daily reports focus on exposure (CE, MPE and settlement). In addition to generating daily current and potential exposure reports, line (limit) utilization and excess reports are created that facilitate limit monitoring. Credit risk managers have the ability to view client activity across all product areas/business lines (e.g., derivatives trading, repos, loans) for a particular counterparty, with the exception of prime brokerage activity. While prime brokerage activity is not currently consolidated with LehmanRisk in an automated matter, OPSRA staff are told this is a project for 2005. In terms of information reviewed by senior management reviews, we are told that every week the Executive Committee receives a package similar to what OPSRA staff review monthly, with an additional cover page highlighting top changes, etc. Furthermore, CRM conveyed an intention to enhance its risk reporting to senior management to provide high level exposure reports with drill down capability and more historical trend analysis.

### v. Risk Rating Scorecard Application

Standardized and automated scorecard applications are used at Lehman to ensure quality control around ICRs. ICRs can only be updated using a scorecard, and when there is an update the changes are stored (each scorecard is date and time stamped). Each counterparty is assigned to an industry and each CWS industry is mapped to a particular Industry Class scorecard (discussed in ICR section). Examples of score card application functionality include automatically applied sovereign ICR caps, mandatory comments in the event of application overrides, definition pop-ups, etc. In the future, Lehman intends to expand the scorecard application to cover internal facility ratings.

### vi. Future Enhancements

Risk management is currently investing resources to enhance credit risk technology in various ways. CRM is continually working to automate processes and integrate systems. For instance, it intends to develop an automated reconciliation between the MPE system and the General Ledger. Furthermore, CRM intends to make improvements to the credit analyst interface, such as by developing a “workflow management tool which will manage the credit review and limit recommendation process, trade approval and reconciliation, and ‘push’ exception reporting to analyst”.

Furthermore, various reporting enhancements, such as improving country risk reporting, are on the CRM agenda.

e. Specific Business Areas

i. Lending Activities

*Leveraged Finance*

The high yield business at Lehman includes a leveraged finance group. This business provides event-driven financing for acquisitions, leveraged buy-outs and refinancings such as dividend recapitalizations. The financing packages typically include multiple instruments. There are often longer term financings such as term loans and revolvers, as well as shorter term bridge loans, which are generally taken out by longer term capital sources such as high yield bond offerings. These pieces can vary in terms of seniority in the capital structure as well as in the probability of being funded.

The approval process for a leveraged loan begins with the deal team conducting due diligence and preparing a detailed transaction memorandum. The deal team is composed of investment bankers, ratings advisory analysts<sup>57</sup>, and credit research analysts. The transaction memo summarizes the transaction, the competitive dynamics and Lehman's role. Also included is a summary of the diligence conducted, historical financials and projections, business and industry overview, an assessment of management and any significant pending litigation or other issues. The credit analysis performed by the deal team places a heavy focus on the prospective cash flows. They consider the robustness of the primary source of repayment, such as cash flows from operations, as well as any secondary sources such as liquidation proceeds. A final recommendation is made by the deal team.

After the deal team has completed its memo, the findings are presented to the divisional commitment committee, the High Yield Commitment Committee (HYCC). The analysts present their opinions, and there is a discussion of the proposed commitment terms, pricing, and syndication. Approval of the proposed terms by the HYCC requires satisfactory diligence, research and ratings opinions, and syndication strategies. Occasionally, the deal team will perform an informal "fly-by." That is, one month before presenting the formal memo to the HYCC, the deal team will discuss the transaction with the HYCC to figure out what the major issues will be and to get a feel for whether the transaction is potentially viable. This is more likely to happen for industries with which the HYCC is not familiar and for large sponsor deals.

Deals approved by the HYCC are then elevated to one or more of the firmwide commitment committees. The two committees relevant to this business are the Investment Banking Commitment Committee and the Bridge Loan Committee.<sup>58</sup> The former has broader representation across risk management and senior management of the firm. These firmwide committees ensure that the transaction fits within Lehman's funding and risk frameworks, and ensures that there is proper coordination across the firm. In addition, they ensure that even in downside scenarios, the transaction will meet minimum return hurdles. They also make sure that the due diligence has been

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<sup>57</sup> The rating advisory analysts are former employees of the rating agencies who advise on the projected ratings that transactions will receive from the rating agencies.

<sup>58</sup> The other two firmwide committees are the Fairness Opinion Committee and the Investment Committee, which approves principal transactions such as private equity, real estate and venture capital.

thorough, that the firm is comfortable doing business with the client, and that the firm is protected from a legal perspective. Transactions above specified thresholds or those with significant reputational or client risk are elevated to the Executive Committee for final approval.

Lehman engages in a number of measures to mitigate risk post-commitment. The primary mechanism by which they mitigate risk is by syndicating the commitment to third parties. They will seek to sell a portion of the loan and bridge commitment through wholesale commitment syndication and general primary syndication. Factors considered in deciding how much to syndicate include agreements with issuer on hold size and syndication timing, length of commitment, overall risk level, and market conditions. Syndication is completed prior to closing of the deal except in Europe where syndication must take place post-closing. Commitment syndications are legally binding and thus constitute risk transference from Lehman to the buyers of syndication pieces. Post-closing of the transaction, the loan trading desk will generally make markets in the loan and will opportunistically seek to reduce Lehman's remaining exposure in accordance with issuer agreements and market conditions.

Post-syndication of deals, the business is often left with exposure to certain pieces of the capital structure, either client-mandated minimum hold levels or allocation that was not sold. The goal of the business is to hedge the entire position. For unfunded positions, they seek to hedge the entire commitment size, recognizing that a counterparty is likely to borrow under the entire revolver prior to default. They hedge by making two sided markets in loan only deliverable CDS (88%), a product Lehman has engineered that eliminates basis risk by requiring the delivery of loans and not bonds in the event of default, and with unsecured bond referenced CDS (12%). Customer demand for hedging products is generally present only when it is newly issued or when there is an event surrounding the name. The business will engage in opportunistic hedging depending on market liquidity to increase the amount of protection. Also, on occasions when the counterparty pays back their commitment and Lehman ends up net short credit, they will look to unwind their existing hedges.

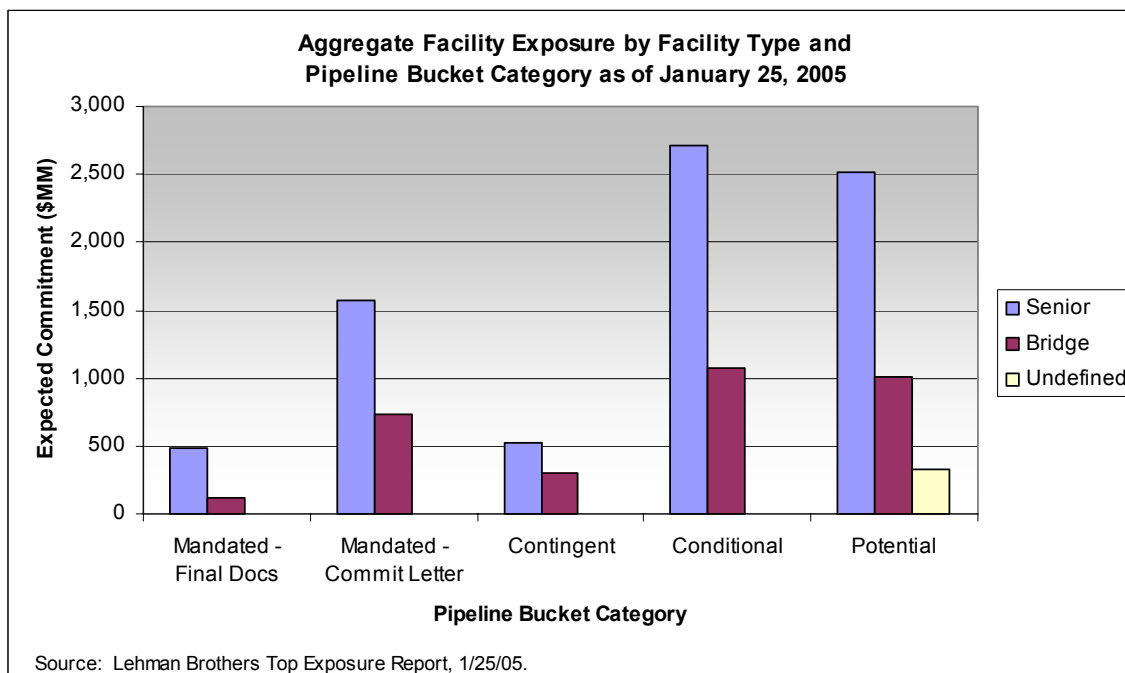
The business is often not able to hedge the entire hold position due to a lack of demand by third party investors. There are currently 29 borrowers with exposures greater than \$10 million after hedges. The largest current position is a \$45 million revolver, none of which was hedged due to a lack of investor demand. Ongoing monitoring of these positions is performed by the Loan Portfolio Management Group, a group within the business.

CRM works actively with the business units to keep informed of developments in the pipeline. For risk analysis purposes, pending transactions are categorized and tracked in five buckets, based on two factors. First, what is the probability of the deal actually happening? Second, when does Lehman legally take on exposure? The five buckets include:

- Syndication Risk Final Documents – Executed final documents. The transaction may have closed but not finalized the syndication process. The deal could be either funded or unfunded.
- Syndication Risk Commitment Letter – Issued a Commitment letter which has been accepted by the client.
- Contingent Transaction – Signed letters with limited outs – Issued a commitment letter with conditions. The letter has not yet been accepted by the client.

- Conditional – Unsigned letters or signed with material outs – Issued an unsigned letter or a letter with significant conditions such as completion of due diligence and committee approvals.
- Potential Transaction – In the process of analysis and prior to presentation to the Committees.

The following chart represents Lehman’s aggregate facility exposure by facility type and by bucket as of 1/25/05.



CRM ensures that transactions can be accommodated within all applicable limits, including RA and Single Transaction Limits.<sup>59</sup> The Marginal Risk Appetite (MRA) is reported on all high yield commitments. MRA represents the incremental contribution of a deal to the high yield business’ total RA usage. The calculation is done broadly in two parts. First, the exposure size over the course of a year needs to be determined. This is complicated by the fact there is uncertainty about whether or not deals in the pipeline actually come to fruition, and by the assumptions necessary to determine what the market conditions will look like in an adverse environment. Second, the standard RA methodology, with two exceptions noted below, is applied to the predicted exposures calculated in the first step.

In the first step, MRA is calculated for deals that have firm, conditional or potential commitments. One hundred percent of the calculated MRA is added in the case of firm commitments, while the conditional or potential commitments are weighted by a deal-specific probability of deal completion assigned by the deal team. The deal size is calculated as Lehman’s share of the total facility. As RA measures potential annualized losses in extreme market conditions, MRA seeks to measure the potential losses from deals in which the syndication process is disrupted due to adverse market conditions. Adverse market conditions, such as high default rates, dramatic spread

<sup>59</sup> See the discussion of Single Transaction Limits in Section I.c.



widenings, demand/supply imbalance, and significant fund outflow, could result in Lehman's holding bridge and loan commitments longer than anticipated. Lehman calculates exposures for three different market scenarios and averages the resulting losses to come up with the final exposure. The three scenarios include a closed market (no syndication, hold 100% of the position for the year), a difficult market (bridge taken out with a high yield issuance in six months and loans close in three months at 25% hold level with further syndication to 10% within a year), and a friendly market (bridge taken out in three months and loans syndicated to 5% final hold level at closing). The average of the three scenarios generally approximates the difficult scenario.

In the second step, MRA incorporates both the market risk and the event risk component of RA. The standard methodology applies with two exceptions. The first exception is that pricing flex mitigates market risk on a one-for-one basis, and full flex completely mitigates market risk, leaving only event risk.<sup>60</sup> Event risk captures the possibility of downgrades or defaults of the bridge and loan positions that Lehman is forced to hold in the adverse market conditions. The second exception to the standard methodology is that Lehman assumes defaults are correlated within sectors and independent across sectors.<sup>61</sup> The loss given default is derived from recovery rates published by Moody and S&P, with a downward adjustment for the first year LBO default rate.<sup>62</sup>

To illustrate how MRA captures risk, consider the Intelsat deal. Lehman was the lead bookrunner in this large acquisition financing deal during the fall of 2004. On 8/16/04, the acquisition agreement was signed and announced. Lehman agreed to provide \$1.107 billion in financing, made up of an \$800 million bridge loan, a \$67 million senior revolver, and a \$150 million term loan. The resulting MRA number was \$106 million. From mid-September through October, the bridge loan was syndicated. Lehman's position was reduced from \$850 to \$314 million, and MRA went from \$46 to \$20 million. Lehman expressed comfort that these numbers reasonably reflected the risk of a loss in a stressed environment on these positions. However, CRM focuses on the total size of the deal, which is the maximum loss Lehman would encounter in the event of default, when approving a deal. From CRM's perspective, RA is a good metric to use to aggregate risk across the portfolio, but their focus is on the total size of the transaction.

CRM plays a number of other roles in the leveraged finance business.<sup>63</sup> They analyze key transaction risks, including key business risk, projected financial plans, proposed capital structure and market views on syndication, and reputation risk. They participate in the Investment Banking Commitment Committee and sign off on all

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<sup>60</sup> "Pricing flex" refers to Lehman's ability to adjust pricing in response to market conditions. For example, 100 bp of flex indicates that Lehman can increase or decrease the spread by up to 100 bps. Full flex allows unmitigated pricing changes.

<sup>61</sup> In other areas of RA where defaults are modeled, Lehman assumes that defaults are uncorrelated. They feed probabilities of default and risk exposures for each counterparty into a "binomial distribution calculator" to obtain the full distribution of credit loss estimates. In the case of correlated defaults within an industry, they utilize the same binomial calculator but treat all counterparties within an industry as one counterparty. This effectively gives the result with perfect correlation. Lehman then interpolates between the uncorrelated and the perfectly correlated results.

<sup>62</sup> The CRO related that the adjustment to the first year LBO default rate was due to conversations between RMD and personnel in the high yield business, illustrating how RA evolved from collaboration between the two groups and thus "buy-in" by the business unit.

<sup>63</sup> Currently, one person responsible for Commitments, Patrick McGarry, reports to Jeff Glibert. Lehman is in the process of hiring one additional person to work in this area.

transactions approved by the committee. They engage in ongoing follow up with the respective deal teams as transactions move from approval to closing, final syndication and target hold level.

Senior management is kept well informed of developments in the pipeline through a series of reports. The Firmwide Risk Snapshot is presented to senior management weekly and, among other items, reports on commitments in each bucket besides Potential Transaction. The report lists the counterparty, the deal probability, the expected amount of the exposure, and the weekly change in exposure. The Top Exposure Report contains information on the full pipeline (i.e., all five buckets) and contains detail on the commitment by facility type. More detail about the deals can be found in the Lehman Expected Commitments reports. This report contains a series of bullet points about each deal, such as the purpose of the financing, acquisition price, total financing package, any MACs and pricing flex, and the current state of the deal.

### *Relationship Lending*

Relationship loans, made to investment grade counterparties, are generally unprofitable on a standalone basis but are made in order to perpetuate an existing relationship or to strengthen a growing relationship. Investment Banking (IB), the business unit responsible for structuring the transactions, performs the risk-reward analysis of the loans. On an ongoing basis, they perform periodic reviews to determine the profitability of the whole relationship. The Credit Facilitation Group, a public side group outside of IB within the fixed income franchise, is responsible for determining the mark-to-market cost of the loans and the cost of the hedges.<sup>64</sup> These costs are then reported to finance, which splits the costs evenly among IB, fixed income, and equities.

Similar to other corporate loan exposures, Lehman seeks to mitigate as much of the committed exposure as possible. They primarily utilize traditional CDS products to hedge, but also use some loan-only CDS and some equity options. They also seek to sell off part of the loan facilities. Hedging is particularly challenging for these investment grade facilities, given that they are generally unfunded.

Before a relationship loan is made, it must first be approved by the Loan Participation Committee. This committee is composed of IB personnel and considers the revenue versus risk tradeoff of the loan over time in making its decision. After approval by this committee, the loan must be approved by the High Grade Credit Committee. This committee is staffed more broadly and considers the credit fundamentals of the counterparty as well as the risk in granting its approval.

Ongoing monitoring of the loans is performed by the High Grade Loan Portfolio Group. The Credit Facilitation Group is responsible for the ongoing hedging decisions, as well as monitoring the exposures on a portfolio, sector, and single name basis.

The current RA limit for this business is \$75 million, broken down geographically in the U.S. and Europe. The business is also subject to a \$4 million VaR limit which is also broken down between the U.S. and Europe. RMD is responsible for monitoring the utilization of RA and VaR by the business.

### *Warehouse Lending*

Warehouse lending facilities are generally 364 day facilities and the majority of the collateral is either alt-A or subprime loans. The warehouse lending business, unlike

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<sup>64</sup> Since financing is provided at rates that are uneconomical from Lehman's perspective, a day one initial markdown/loss is taken on these positions.

relationship lending, is profitable on a stand-alone basis. However, the primary goal of this business is to generate ancillary business, such as a pipeline for the purchase of whole loans for a Lehman securitization or for the agency securitization business. Lehman has either purchased from or securitized loans for 13 of its 14 warehouse lending counterparties over the past year.

The evaluation and management of the risk associated with these secured lines of credit is primarily done within the business area, in that the business area will determine the advance rates, or haircuts<sup>65</sup> and will conduct the ongoing marking and monitoring of the underlying collateral. However, both the Residential Mortgage Risk Department<sup>66</sup> and RMD<sup>67</sup> will be involved in the upfront due diligence and approval process.

The risk management process around this business starts with the due diligence focused on both the counterparty and the underlying collateral. A Deal Manager within Warehouse Lending is charged with the responsibility of coordinating and running both the upfront due diligence process and the post-close monitoring of the counterparty and collateral. In addition to business personnel within Warehouse Lending, CRM, Residential Mortgage Risk, in-house counsel and a mortgage loan underwriting and compliance specialist third party firm are involved in the upfront due diligence process. The due diligence activities include: (1) Corporate review, (2) Business operations review, (3) Financial review, (4) Litigation/regulatory review, (5) Loan-level due diligence review<sup>68</sup>, and (6) Discussion with external auditor of the counterparty. The corporate and business operations reviews are done on-site. CRM<sup>69</sup> is involved in the corporate review, financial review, and auditor discussion.

Once the due diligence has been successfully completed, Warehouse Lending will start the facility structuring process. As with any asset-based lending business, the facilities will be structured to provide protection to the lender on two fronts: (1) covenants<sup>70</sup> with respect to the counterparty and (2) credit terms with respect to advance rates and additional collateral provisions. The facilities are structured so that Lehman has the right to determine the market value of the mortgage loans serving as collateral for the facility at any time and the counterparty is required to cure any deficit in margin

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<sup>65</sup> Typically, the haircuts range from 2 to 3% and generally the value of the securities upon which the haircuts are based is capped at "par".

<sup>66</sup> This department is headed up by Eric Hibbert and creates the credit policies with respect to the mortgage business. Eric's group does not report into Warehouse Lending, however, it is part of the overall Securitized Products business area.

<sup>67</sup> Jeff Goodman, SVP in MRM reporting to Paul Shotton, sits on the Investment Banking Commitment Committee which approves the warehouse lending facilities as well as debt and equity offering transactions.

<sup>68</sup> Loan level due diligence includes running a sample of mortgage loans through a re-underwriting and compliance analysis to evaluate underwriting guidelines and regulatory compliance. This is done by a third party specialist initially when a counterparty is establishing a facility with Lehman. Typically, additional loan level diligence can be conducted by Lehman if the client either sells loans to Lehman or uses Lehman to securitize loans. If neither of these situations occurs, Lehman will again use the third party specialist to conduct additional periodic loan-level diligence reviews.

<sup>69</sup> Currently, Jeff Goodman is performing the due diligence responsibilities that CRM participates in. Historically, these duties have been performed by a credit analyst reporting to Jeff Glibert, Global Head of CRM. However, this position has been vacant and Jeff Goodman has been performing these duties. CRM is currently interviewing for this opening.

<sup>70</sup> Warehouse Lending focuses on having financial covenants concerning the counterparties' cash position, liquidity in general, and leverage. Each facility arrangement requires the counterparty to report monthly, regarding their compliance with the financial covenants.

that may occur based on a market value determination or any other collateral margin call within 24 hours of notice. In addition, the advance rates defined in the facility documents are based upon percentages of the lesser of unpaid principal balance or market value as determined by Lehman in its sole discretion. Finally, there are additional restrictions on the collateral, such as aging/time-on-line, concentration limits, collateral eligibility criteria, etc.

Once the facility structure is completed, then the proposal will go to the Investment Banking Commitment Committee for approval. The committee includes representation from the business area, Residential Mortgage Risk, and the independent RMD. Specifically, Steve Valentino, Eric Hibbert, and Jeff Goodman among others sit on the Committee.

Once a facility commitment has been extended, Warehouse Lending will perform the daily administration and risk management of the warehouse lending facilities. There will be periodic monitoring of the counterparty and more importantly the daily marking and monitoring of collateral. As discussed previously, the Deal Manager is responsible for the ongoing monitoring of the facility. The administration is conducted by the Mortgage Middle Office on a daily basis and includes all fundings, payoffs and interest coming through Lehman's proprietary Whole Loan Tracking System (WLT). They will get a tape of the collateral positions from the third party custodian and match up the collateral with the warehouse line to the client and then calculate the margin requirements. On a daily basis, Warehouse Lending and the Mortgage Middle Office will utilize WLT to monitor the collateral based on the collateral restrictions (e.g., aging, eligibility, concentration limits, etc). If any collateral deficiencies occur, Warehouse Lending will issue a margin call.

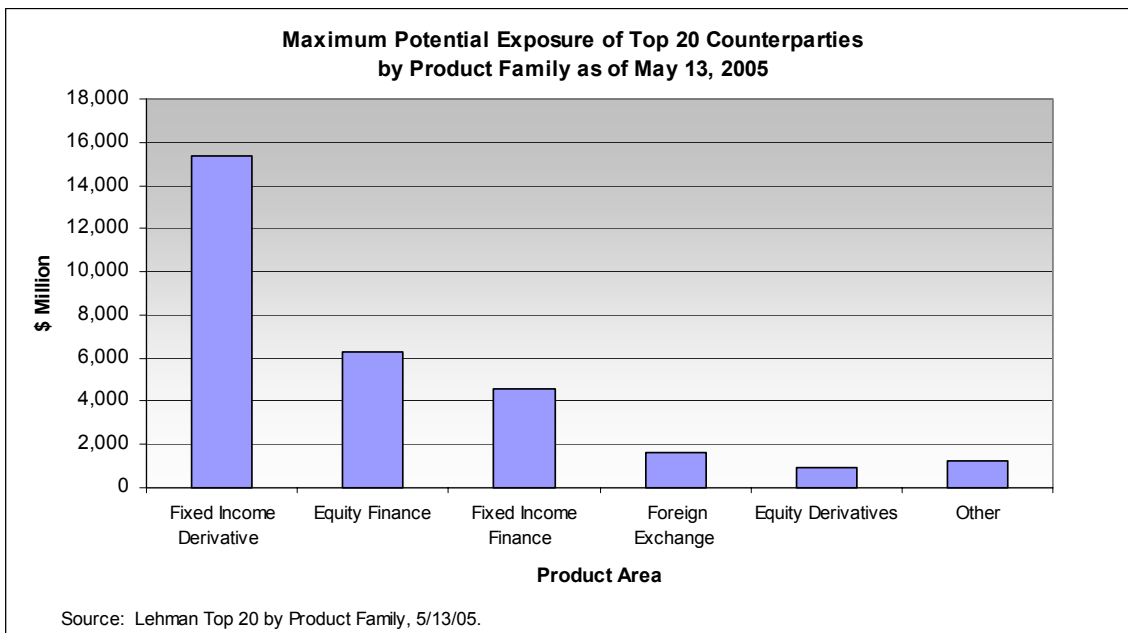
Warehouse lending will calculate the collateral market value for each facility on a weekly basis or more frequently if necessary. Warehouse lending uses the same model used by the whole loan desk to price the whole loan collateral. Each loan is valued on a discounted cash flow basis, with the cash flows generated based on projections of prepayments, defaults, and losses. The projections are a function of loan characteristics, forward rates and projected home price appreciation. In addition, as a reality check, Warehouse Lending will have conversations with the MBS/ABS trading desks as well as with Lehman's own residential home loan origination businesses concerning the portfolio collateral values<sup>71</sup>. Finally, Warehouse Lending will perform ongoing monitoring of financial covenants, loan level due diligence, and an annual on-site corporate due diligence review.

## ii. OTC Derivatives/Securities Lending/Repos

The size of Lehman's OTC derivatives trading, financing (repo/reverse repo), and securities lending businesses is noteworthy. With the exception of commodities, Lehman is active in all of the major product areas, including interest rate and FX derivatives, equity derivatives, and credit derivatives, and trade with a variety of counterparty types - e.g., hedge funds, corporates, sovereigns, municipals, financial institutions, etc. These businesses generate current (unsecured) and well as potential exposures and operate within the firm's counterparty limits framework. The following chart reflects Lehman's largest 20 Potential Exposures by product area as of 5/13/2005:

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<sup>71</sup> The business believes that Lehman's vertical integration in the residential mortgage market provides added value in marking the collateral for the warehouse lines since the business has multiple access to trends and data points for valuing collateral.



Credit analysts are responsible for approving and rating new counterparties, setting counterparty as well as product level limits, approving individual transactions as necessary, determining counterparty and transaction level credit and collateral terms, and monitoring counterparty exposure levels as well as counterparty credit quality and market events. In risk managing these activities, CRM relies upon and interacts with several other groups that facilitate the mitigation/management of risks. The Transaction Management Group (TMG) is primarily responsible for drafting and negotiating Lehman's derivatives and funding documentation, and the Global Margin Group (GMG) is responsible for the daily calculation and collection of collateral requirements.

Credit analysts are organized by counterparty industry. There are distinct groups responsible for covering financial institutions, hedge funds, corporates, investment advisers and mutual funds, insurance companies and municipals, and special purpose investment vehicles (e.g., CDOs)<sup>72</sup>. One analyst covers a single name/counterparty, and monitors and manages risk taking across all product types for that name<sup>73</sup>. Further, the analysts who perform the initial and periodic credit assessments/ratings of counterparties are the same individuals responsible for approving transactions and monitoring counterparty exposures post trade execution.

As described in the Limits section above, Lehman currently specifies counterparty level PE limits and product level notional limits with a plan to migrate to product level PE limits for pre-settlement risk, and notional limits for counterparty level settlement risk. Credit analysts establish these limits for new and existing counterparties within their delegated authority and, for many counterparties, approve all trades pre-execution. At both the counterparty and transaction level, analysts are responsible for mitigating risks by ensuring that the appropriate credit and collateral terms are in place (in the ISDA Master Agreements, etc.). This includes determining acceptable collateral

<sup>72</sup> In addition to this industry based organization, groups are further organized by geography. For instance, there is an Americas as well as a European corporates team.

<sup>73</sup> Although within industry and geographic location there are reporting hierarchies (i.e., there are typically several more junior analysts who report to a more senior analyst).

types, applicable haircuts, and unsecured threshold amounts, as well as establishing termination events such as ratings and NAV triggers. Often CRM will seek and obtain collateral to reduce the magnitude of the unsecured exposures, even for individual transactions that fall within the firm's accepted risk tolerance levels. In addition, prior to approving individual transactions, credit analysts sometimes require risk mitigation via the purchase of CDS protection for investment grade corporate counterparties or through the purchase of options on the transaction underliers for other counterparties.<sup>74</sup>

Credit analysts are also responsible for the ongoing monitoring of existing exposures. CE and PE, including limit excessions, are monitored on a daily basis, and material changes are examined to ensure that the drivers are understood (i.e., new activity versus market movements). For actively traded accounts, which are often hedge fund counterparties, trading activity is reviewed daily. CRM also monitors, in conjunction with the GMG (discussed below), the behavior of counterparties in meeting margin calls. In addition to monitoring exposures, counterparty, industry, and country events are monitored. Credit analysts regularly update their credit views of counterparties based on newly released financial data (including NAV data for hedge funds), press releases, information from industry and investor publications, market data (e.g., credit spreads), etc. Analysts produce for their regional supervisors Daily Credit Summary reports, highlighting major news and events. The Credit Committee, headed by Jeff Glibert, has periodic global credit calls/meetings to discuss trends, exposures, and recent credit reviews. These discussions are often very industry focused. For instance, staff may discuss recent and expected events in the targeted industry, current exposures of big counterparties, credit reviews and scorecard results of those specific counterparties and the resulting limit recommendations.<sup>75</sup>

Obviously, the individual business units take an interest in managing their credit risk as well, given that they are owners of the P&L and thus bear the losses in the event of a default or deterioration in counterparty credit quality. Thus business personnel may pursue hedging should they perceive too much concentrated counterparty risk in their trading book(s). Further, within the Fixed Income Division's derivatives business, a group has been established for dynamically hedging spread risk for corporate counterparties with actively traded CDS and with whom Lehman does not have Collateral Support Agreements (CSA). As credit derivative markets further develop, the hedging of counterparty spread and default risk is expected to increase.<sup>76</sup>

Limit excessions can occur actively through the addition of a new trade or passively by large market movements affecting exposure from existing trades. The latter cause is difficult to address. Once a trade has been executed, there are a limited number of actions CRM can take to reduce exposure. One available tool is to refrain from executing additional trades. The renegotiation of credit terms (e.g. sign a CSA) ex-post, however, can be difficult.

TMG, a part of the Corporate Advisory Division, is primarily responsible for drafting and negotiating Lehman's derivatives and funding documentation. In doing so, it seeks to mitigate transaction and counterparty-specific legal and "documentation" risk

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<sup>74</sup> Such transactions are designed to move into-the-money from Lehman's perspective as Lehman's credit exposure grows. However, the premiums paid for such hedges often make transactions unprofitable, thus this is not a common practice.

<sup>75</sup> OPSRA staff attended (via conference call) a Credit Committee meeting on July 14, 2005 during which the U.S. Life Insurance Industry sector was reviewed.

<sup>76</sup> And as counterparty risk becomes more actively hedged, CRM and QRM may feel pressed to incorporate the capture of purchased protection into the firm's PE calculations.

through the use of industry-standard master agreements and transaction-level documentation governing OTC transactions. TMG negotiates and drafts master agreements for the firm's fixed income and equity OTC derivatives, repurchase and securities lending businesses. In conjunction with the Legal department, TMG is also responsible for legal due diligence for OTC transactions in new jurisdictions<sup>77</sup>.

Specific relationship level documentation produced by TMG include ISDA master agreements and CSAs, BMA/ISMA master agreements for OTC repo transactions and related triparty custody agreements, BMA/SIA/ISLA master agreements for securities lending transactions, and local market master agreements. Prior to sending a draft Master Agreement to a counterparty, TMG incorporates credit terms that are determined by the appropriate credit analyst. Typical terms that CRM may request include determining events of default (e.g., including cross default terms), adding contract termination events such as downgrade or NAV triggers, and determining collateral terms (e.g., deciding unsecured thresholds, collateral types and haircuts.). All changes to credit terms must be approved by CRM. TMG also ensures that all agreements adhere to the firm's Documentation Policy, and have a formal exceptions process in place for addressing deviations.

TMG uses a web-based tool called "Entity Master" to manage the negotiation and execution of ISDA Master Agreements. Entity Master houses master agreement and credit support level information. Collateral terms in Entity Master, which are needed for computing and monitoring margin requirements, feed the margin system CAMEO (discussed below).

GMG, which is part of Operations, is responsible for calculating margin requirements, monitoring margin levels and calls, and noticing margin calls (and otherwise interacting with clients regarding when calls will be met, etc.). Margin requirements are calculated according to government regulations, exchange regulations, and internal requirements, which are defined in the legal documentation governing the transactions. Transaction and position information is received by Margin from various processing and risk management systems. All of this information (e.g., master-level margin terms, deal specific requirements, outstanding transactions and collateral holdings) is brought together in CAMEO, the firm's proprietary margin system, to calculate potential margin calls.<sup>78</sup> Margin calls are tracked and reported using CAMEO.

For derivative counterparties, ISDA documentation, at the master and trade level, govern margin requirements. Settlement of margin calls can be the same day, next day, or longer depending on the terms negotiated with the counterpart. For fixed income financing trades and Treasury and mortgage options and forwards, margin calls are calculated using the economic exposure on open trades plus any haircuts. Settlement of these calls is generally expected the next day. For secured lending, margin is calculated based on greater of regulatory or house margin requirements. Clients have three days or longer to meet margin calls, but accounts can be liquidated at Lehman's discretion if exposure grows beyond comfort. For futures, exchange and house margin requirements dictate the margin calculation, and settlement of margin deficits is same day. Collateral received by counterparties is booked in CAMEO as well as in one of the firm's books and records systems, which are reconciled with CAMEO daily. Collateral is priced daily. Failed collateral is not included in the margin calculations and for securities lending

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<sup>77</sup> TMG also prepares and executes trade confirmations for certain lower volume businesses (Asia, US Equities) and handles closing for fixed income structured transactions.

<sup>78</sup> For securities lending and futures margin is actually calculated outside of CAMEO (in ADP's Brokerage Processing System and Rolf & Nolan's RISC system respectively), but is viewable in CAMEO.

collateral is only credited once received. Differences in margin call calculations with clients are reviewed with Sales, Trading and the Middle Office. GMG prepares and distributes to Sales, Trading, Credit, and Management a daily exposure report showing outstanding calls by counterparty.

GMG works with CRM in several ways. The two groups work together to address any client disputes of a margin call. In the event that a client disagrees with margin requirements, GMG reviews the applicable margin terms with credit. For new clients and businesses, GMG works with the credit analysts and TMG to put actionable margin terms in place. In order to calculate margin requirements, GMG has connectivity with credit systems to obtain information such as internal ratings. And, as mentioned above, GMG provides credit a report detailing margin exposures.

### iii. Prime Brokerage

Lehman is a relatively new entrant into the equity prime brokerage business, which continues to be dominated by the “Big Three” of Morgan Stanley, Goldman Sachs, and Bear Stearns. While it currently has approximately 250 clients (advisors), Lehman’s business goal is to expand its prime brokerage operations across a variety of services, including execution and financing, service and technology, and business solutions. Through the prime brokerage platform, Lehman provides leverage to hedge fund counterparties, allowing them to create market exposure in excess of what could be obtained through cash holdings/assets alone. Leverage is extended through the provision of margin loans and securities lending, which are fully collateralized and margined on a daily basis. Thus financing provided through this business is asset-backed like in nature, where the only credit exposures are potential exposures. Consequently, in risk managing this business, the monitoring and analysis of the collateral - i.e., the positions in the prime brokerage accounts - is equally important as the monitoring and evaluation of the credit quality of the counterparties.

Lehman’s approach to prime brokerage risk management distinguishes it from its peers. While at many firms the risk monitoring and management of counterparty portfolios is performed primarily by quasi-independent groups established within the business units, at Lehman this function is performed by RMD. In particular, a prime brokerage risk management group dubbed Global Clearing Services (GCS) Risk was formed as a joint venture between MRM and CRM to handle the daily monitoring of PB accounts and margin determination process. In addition, CRM exercises certain responsibilities with respect to prime brokerage counterparties. The separation of duties between GCS Risk and CRM can broadly be described in that GCS is more focused on the quantitative market risk type analyses of the funds’ positions/collateral and in assessing margin, whereas CRM is more focused on evaluating and tracking the funds themselves - e.g., assigning internal credit ratings, tracking headline events, receiving and reviewing performance reports, etc. However, the two groups work together quite closely in carrying out the primary risk management processes of counterparty credit evaluation, margin determination, and risk measurement, monitoring, and reporting.<sup>79</sup>

All new prime brokerage accounts must be approved by the New Account Committee. This committee is composed of GCS senior management, sales, financing and client service, and CRM. As part of this process, the CRM hedge fund team performs a credit evaluation and due diligence of new funds, including background

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<sup>79</sup> Matt Bowen and Nachi Das are co-heads of GCS Risk, and dually report to Jeff Glibert, head of CRM, and Paul Shotten, head of MRM. Steve Simonte, head of Hedge Fund Credit, reports to Jeff Glibert and is responsible for the due diligence, etc. on hedge funds completed by credit analysts.



checks of managers, evaluation of historical performance, strategy review, organizational structure and management experience, financial, operational and risk management controls, and investor base and redemption policy. It also assigns internal credit ratings to new funds using CRM's proprietary hedge fund scorecards. Funds are evaluated based on 14 qualitative and quantitative factors. Fund-specific factors considered include total net asset value, track record (years experience), investment strategy risk profile, etc., and manager related factors include assets under management, track record, quality of risk management framework, etc. Each factor is weighted, with fund-specific factors carrying 40% of overall weightings and manager-related factors carrying 60%. The final weighted score corresponds to an industry-specific rating scale, but credit analysts assign the final rating manually and must rationalize any deviations from the Scorecard output. Ratings are capped at BBB+<sup>80</sup>.

When a new account is created, GCS risk managers must determine the applicable margining rates. Margin is generally set on a rules basis and is applied instrument-by-instrument. GCS Risk determines margin for a new fund by considering factors such as internal credit rating, trading strategy, portfolio diversification, leverage diversification, underlying asset volatility and liquidity, and expected P&L volatility. In some cases, a sample portfolio is analyzed. Hedge funds are tiered according to credit worthiness, and the most conservative margins are applied to less credit worthy hedge funds. Margin is set by strategy, country and product type. The margin "rate" generally refers to the percentage of gross market value that is taken as margin on trade-by-trade basis. For instance, for a long-short equity portfolio with concentrated positions, GCS Risk may determine that 15% collateral is taken on each position in the portfolio, long or short. In certain instances, some offset may be awarded for highly correlated positions. For instance, on a particular risk arbitrage trade risk managers may agree with a client to calculate margin for multiple trade legs collectively. Put differently, a smaller per leg margin percentage will be applied for those trades considered jointly. In general, risk management asserts minimal margin benefit is given for risk-reducing exposures. OPSRA staff are told total margin is "almost always" greater than the VaR of the portfolio.<sup>81</sup>

GCS risk managers describe their margining process as completely dynamic, meaning they are constantly evaluating the counterparty's portfolio and re-assessing the adequacy of the margin approach. Typically, Lehman has the right to change margin terms anytime, a powerful risk management tool for responding to market events. Margin lock-up agreements are in place for some accounts that commit Lehman to particular terms, typically for a 90 day horizon.<sup>82</sup> Such agreements are privately negotiated and include covenants and termination events. Lehman includes credit provisions such as minimum NAV and performance decline tests in each of its margin commitments, which give Lehman the right to terminate the lock-up agreement in the

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<sup>80</sup> As a test of their hedge fund scorecard rating system, CRM investigated how it would have rated Long Term Capital Management in 1997 (prior to its initial distress). The assessment/score card yielded LTCM a BB rating, which CRM feels is appropriate ex post.

<sup>81</sup> GCS risk managers provided an illustrative margin determination example for a "Tier 1 Fund" following an equity statistical arbitrage strategy. The fund had very little single name or industry concentrations and was largely market neutral investing in liquid equities. The historical daily P&L volatility was approximately 50 basis points. Given the fund's leverage requirements, GCS was willing to charge as low as 5 percent margin per trade side (long and short). However, should the fund's strategy shift towards more concentrated, directional positioning, the margin rate would quickly need to be reassessed.

<sup>82</sup> There are currently 16 funds with margin lock agreements, ranging in duration from 30 to 180 calendar days. These funds have a Long Market Value of \$14,205 and a Short Market Value of \$11,243 million.

event of a breach. While the offset of economic exposure for positions/hedges held away from Lehman is not given, and GCS focuses primarily on the positions held at Lehman in assessing and determining margin rates, the overall fund strategy (and thus positions held away from Lehman) does affect margin decisions. The degree of transparency and level of comfort with the fund relationship affects the extent to which such information is considered.

For certain hedge funds of high credit worthiness and with liquid strategies, Lehman uses portfolio based margining. Its approach to portfolio margining is to compute margin requirements using VaR along with the P&L impacts of various scenario analyses. Currently, risk managers are working on developing a full suite of scenarios to cover the various products/fund strategies. GCS Risk will also consider using portfolio margining for a sub-set of counterparty trades, rather than going to a full blown portfolio approach. While portfolio based margining is currently used on a limited basis, Lehman expects growth in the future consistent with industry trends.<sup>83</sup> Clearly one incentive for prime brokers to move in this direction is to attract additional business. However, there are also credit related arguments in favor of portfolio margining as well, despite the fact that such approaches typically results in margin requirements that are less than requirements yielded by the rules based approaches for a given portfolio. The argument is made that portfolio margin methodologies capture changes in risk more dynamically, resulting in margin requirements that are more correlated with changes in actual risk taking. Further, Lehman argues that portfolio based margining provides clients with powerful incentives to maintain more balanced/diversified portfolios by bringing offsetting positions, currently held away from the prime broker relationship, into the prime brokerage accounts.<sup>84</sup>

GCS Risk and CRM monitor current and potential exposures to hedge funds on a regular basis and report to senior management. For prime brokerage clients NPE, defined as the 95% 1-day VaR minus the equity in the account, is the PE metric used. Given the more complex nature of hedge fund portfolios relative to other counterparties (e.g., many basis risks stemming from relative value strategies), the rapid pace at which risk profiles may change, and the fact that these accounts are all margined on a daily basis, the use of a scaled-up VaR metric as opposed to the product silo-ed MPE metrics is intuitively appealing. On a daily basis, GCS risk management is very focused on examining portfolios with positive or near positive NPEs and engage in discussions with senior prime brokerage management regarding the status of those accounts.<sup>85</sup> If strategy drift has occurred, causing NPE to creep up, margin requirements are re-assessed. Also, GCS personnel may discuss with clients the possibility of adding hedges to the portfolio to reduce NPE to more comfortable levels.

In addition to NPE, GCS Risk monitors a variety of measures on a daily basis, including gross and net market values, greeks/risk sensitivities (e.g., deltas and credit spread sensitivities), event risk measures, concentration/liquidity measures, and stress

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<sup>83</sup> The GCS risk managers do not feel portfolio margining is appropriate for all strategies, such as credit strategies that involve significant issuer-specific risk.

<sup>84</sup> The risk managers also note one drawback of portfolio margining: it is less transparent to clients. In other words, as opposed to a simple percentage based rule, VaR/scenario margin calculations are rather black-box. Although, counterparties are often willing to forgo such transparency in order to receive the additional diversification benefit provided.

<sup>85</sup> The Equity Risk Management Daily Risk Report lists the top five counterparties sorted by NPE. As of May 30, 2005, the NPEs for these top counterparties ranged from \$21.8 million to \$354,000. The outsized \$21.8 million NPE exposure was to fund with short index trades with whom Lehman did not take any initial margin due to a financial guarantee from the fund's Japanese parent.

and scenario analyses. It also monitors market events, evaluates new positions as they are put on, and reviews outstanding margin calls<sup>86</sup>. As mentioned above, risk managers are currently expanding the host of scenarios used to risk manage this business. OPSRA staff will follow up with GSC Risk as these risk measures are further developed as such techniques are important for assessing collateral adequacy. While the VaR-based NPE metric is certainly useful from a risk monitoring and management perspective, accounts collateralized roughly to one-day VaR levels should be expected to exhibit current (unsecured) exposure resulting from market movements somewhat frequently. Thus understanding risks further out into the tails of the counterparties P&L distributions is important.

Hedge funds seeking leverage can obtain financing at securities firms outside of the prime brokerage relationship. OTC derivatives, such as total return swaps and synthetic CDOs, as well as repurchase agreements, embed financing. For obvious reasons, securities firms wish to ensure that economically equivalent risks receive equal treatment throughout the firm's various business units. Lehman risk managers note steps have been and are being taken to ensure that clients can not arbitrage between different Lehman desks/businesses, and that all risks with respect to fund counterparties are transparent and understood by risk management. As mentioned previously, while prime brokerage activity is not currently consolidated with Lehman Risk in an automated matter, this is a project for 2005. Further, risk is viewed on a consolidated basis for certain counterparties on a periodic basis.

## IV. Risk Appetite

### a. Risk Appetite Components

The event risk component of RA simply reflects the event risk calculations discussed above in the business unit descriptions, e.g., for high yield defaults or equity dividend risk. By design, these event risk parameters are set under a one year, 95<sup>th</sup> percentile loss assumption. For example, the -25% shock applied to principal investments in commercial real estate represents the one year loss likely to occur with a one in twenty probability.<sup>87</sup> Given the one year time horizon and 95<sup>th</sup> percentile loss assumption, no transformations are required to find the point of interest in the distribution.

By contrast, Lehman's VaR must be transformed in order to put it on a comparable basis to event risk and the RA limits. Recall, the firm uses VaR as a risk measure reflecting the 95<sup>th</sup> percentile *daily* loss. To transform this metric into the market risk component in RA, it is simply annualized by using a square root of time scaling adjustment.<sup>88</sup> This puts market risk on equal footing with event risk and the RA limits.

The credit risk component of RA requires a more involved transformation. The counterparty component of risk appetite usage provides an estimate of the potential

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<sup>86</sup> The group directly responsible for monitoring margin calls, distributing call notices and monitoring significant changes in client account balances and cash movements reports into the Operations group. As suggested above, GCS Risk and CRM interact with the Margin group regularly as part of their daily monitoring processes.

<sup>87</sup> Note, for some businesses the specification of event risk parameters appears to be based more on intuition than empirical evidence. For instance, in the example above, whether the -25% shock truly represents a 95<sup>th</sup> percentile event is debatable.

<sup>88</sup> In short, market risk equals VaR x sqrt(252), assuming 252 trading days per year.

losses stemming from defaults of counterparties engaging in derivatives trading as well as financing transactions and prime brokerage activity. As with the rest of the risk appetite components, counterparty risk is a one year statistical measure - i.e., it is a 95<sup>th</sup> percentile statistic measuring potential credit losses over a one year horizon. Further, it is intended to capture the potential credit losses across all of the firm's counterparties. To truly estimate such a "joint loss distribution" requires much data collection and the capture of the correlation structures between many factors. PE, PD, and recovery rate estimates for each counterparty are required. In addition, in order to properly aggregate risk across counterparties, the correlation structures between counterparty defaults as well as between the risk factors driving PEs must be modeled.<sup>89</sup> Obtaining robust results for and/or effectively modeling all of these parameters is an extremely challenging task due to data availability and computational costs. In estimating this ambitious aggregate metric, Lehman relies upon several simplifying assumptions and uses various proxy techniques, as discussed below.

In order to estimate the potential credit losses associated with a particular counterparty, an exposure at default (EAD) is required. To estimate EAD, the EE and MPE curves discussed in the potential credit exposure section above are used. For emerging market and hedge fund counterparties one-year MPEs are used. For all other counterparties the average of the one year MPEs and EEs are used. However, Lehman does not simply use the MPE and EE from the first one year horizon modeled. Rather, a fairly intricate process is used for identifying the maximum one year exposures considering thirty one year intervals across the PE Curve. In other words, the "peak exposure year" for a counterparty is identified by evaluating the curve evolutions from year 0 to 1, year 1 to 2, .....year 29 to 30 as separate one year intervals.

"Risk exposure" is then calculated by multiplying EAD by loss given default (LGD), which is simply 1- the recovery rate. For a single counterparty, the 95<sup>th</sup> percentile loss number could next be estimated simply by multiplying risk exposure by the appropriate PD. However, Risk Appetite requires a joint (across all counterparties) loss estimate. Lehman accomplishes this by modeling each counterparty's default as an independent Bernoulli process. That is, each potential default is treated as completely uncorrelated with each of the other potential defaults. Then, the PDs and risk exposures for each counterparty are fed into a "binomial distribution calculator" to obtain the full distribution of credit loss estimates<sup>90</sup>. The procedure involves calculating the probability of each and every possible combination of counterparty defaults, using several numerical approximations to reduce computational cost<sup>91</sup>.

Lehman computes these counterparty risk results at various levels of aggregation. Ultimately, results are provided at four different business unit levels: the

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<sup>89</sup> Further, it can be argued that the correlation between PE and PD should also be somehow modeled to capture the "right way" versus "wrong way" nature of exposures. For instance, a counterparty that has sold put options on its own stock is more likely to default should those options come into-the-money from the option purchaser's perspective.

<sup>90</sup> A binomial distribution results from repeated trials from a Bernoulli distribution. A random variable that follows a Bernoulli distribution may take on two possible outcomes with some probability of success  $p$ . For instance, the flip of a coin is said to follow a Bernoulli distribution with  $p = 0.50$ . The binomial distribution provides the probability of obtaining some number of successes ( $S$ ) resulting from  $n$  Bernoulli trials. For instance, using the Bernoulli distribution, one could compute the probability of realizing exactly 5 heads outcomes resulting from 5 independent coin flips. Thus, under the Lehman framework, the default of any particular counterparty over a one year horizon is said to follow a Bernoulli distribution. Repeating this experiment for each counterparty yields a binomial distribution.

<sup>91</sup> In short, a full enumeration is performed on the first 13 counterparties. As additional counterparties are added, mass is added to the tail of the distribution through a type of marginal analysis.

firm level, division level, global business level, and regional business level. However, exposures must first be computed for the appropriate counterparty, legal agreement, and legal entity combinations and aggregated up. In doing so, Lehman categorizes counterparties into emerging markets and hedge fund versus all other counterparty types. This binary categorization becomes important for latter aggregation since different assumptions are made regarding the correlation between counterparty and market and event risks for these broad counterparty types. Counterparty risk appetite usage numbers are currently computed monthly. OPSRA staff are told the process is being streamlined to allow for more frequent calculations.

This risk aggregation framework requires PD and recovery rate estimates. Lehman recovery rates are industry based, primarily using Moody's research, and PDs are obtained by mapping ICRs to "modified" historical Moody's PDs. Given the limited number of default data available, obtaining robust results for a large portfolio of counterparties is challenging. OPSRA staff intends to examine closer in the future the internal processes used for determining and validating these RA inputs.<sup>92</sup> In addition, a challenge to aggregating risks across counterparties in this manner lies in capturing all of the appropriate correlations. For instance, three different counterparties trading interest rate, credit, and equity products are unlikely to reach their maximum potential credit exposures simultaneously, due to the imperfect correlation between risk factors. The Lehman potential exposure framework does not model correlations across these product areas, resulting effectively in the addition of inconsistent MPEs (under an assumption of perfect correlation) across product areas for the risk appetite calculation.<sup>93</sup> It could also be argued that the Lehman assumption of treating all defaults as independent events is unrealistic. For instance, one might argue there are common factors affecting the PDs of counterparties in the same industry (e.g., the US auto industry). These assumptions tend to offset one another – the first being conservative and the second aggressive.

#### b. Aggregation Process

After transforming each of the risk components into the same "units", one can aggregate them. To do so requires some specification of the correlation between the component risks: market risk, event risk and credit risk. Simply adding them together would implicitly assume complete correlation between the risk types – i.e., that the realized 95<sup>th</sup> percentile loss due to market factor movements occurs simultaneously with the realized 95<sup>th</sup> percentile loss due to events, as well as with the 95<sup>th</sup> percentile loss due to counterparty defaults. This is unlikely and would overstate the total risk, given that some diversification benefit is achieved across the various businesses. If the diversification benefit is overestimated, however, then the aggregate risk will be understated.

Lehman errs on the side of caution when considering market risk and credit risk exposure to emerging market firms and hedge funds (EMG/HF) by assuming perfect correlation – i.e., for total RA exposure calculation purposes, market risk and credit risk

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<sup>92</sup> Further, an alternative approach to using ratings based PDs is to use the PDs implied from traded credit products, an approach risk management has considered. As Lehman continues to develop and refine its risk aggregation framework, OPSRA staff will of course follow up with regard to any such enhancements.

<sup>93</sup> Although, in addition to performing simple sums across product level exposures, summing such exposures under an assumption of independence or 0 correlation is also feasible. QRM has expressed interest in moving to this approach, asserting this would produce more meaningful aggregate risk metrics and avoid the large investment required to build a full blown PE simulation across all products areas.

to EMG/HFs are simply added together. For the other risk components, however, Lehman assumes “50% correlation”. Technically, QRM takes the average between the RA resulting from a 100% correlation assumption between the remaining components (straight sum) and a 0% correlation assumption (square root of sum of squares). This computationally simple technique yields a result which reflects the intuition behind the diversification benefit. The magnitude of this benefit, however, is not guided by any empirical evidence.

These correlation assumptions explain why the component numbers do not sum “horizontally” to the RA exposure usage for each business unit. Similarly, the component numbers do not sum “vertically” for the market risk and credit risk totals because of the underlying mechanics of VaR and the binomial technique described above. The event risks by business are assumed to occur independent of each other, thus a sum of squares approach is used to arrive at the event risk total.<sup>94</sup>

Risk Appetite is also monitored on a geographic basis between Americas, Europe and Asia. No additional correlation assumptions are implied; rather the data is simply calculated at each regional level and reported accordingly.

### c. Risk Appetite Limitations

The RA framework requires significant amounts of judgment. For instance, In coming up with the firmwide RA limit, subjective determinations must be made regarding revenues in a down year, compensation adequacy, and minimally-acceptable ROTE. Similarly, though historical diversification provides a guide for the allocation of RA sub-limits, the business units essentially negotiate these allocations.

From a practical perspective, the RA exposure metric serves as a useful comprehensive risk tool for senior management. When used in conjunction with the “standard” risk management tools (daily VaR, MPE, etc.), RA may facilitate more active comprehensive risk management than most firms’ tools allow. However, from a statistical and financial theory perspective, the RA metric has some notable limitations. Whether it makes sense to compare one unit of market risk (from an annualized VaR) with one unit of credit risk (from a statistical aggregation technique) with one unit of event risk (from a set of subjectively specified stresses in some instances), is open to debate. Also, the degree of subjective parameterization which is required for the calculation to be made raises some questions. More broadly, while aggregating to a single metric is appealing, the benefits of doing so must be weighed against the risk of having risk measures become less meaningful.

Because of the practical usefulness of RA at the senior decision-making levels, processes and tools to maintain quality control over the metric are important. In this vein, fuller documentation of the assumptions behind the methodologies and theoretical and empirical bases underlying the specifications in the RA framework could help, particularly with regards to event risk. In addition, because RA exposures cannot be statistically backtested, a set of meaningful validation techniques may be warranted to alert RA users of potential weaknesses and/or distortions in the measurement.

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<sup>94</sup> Within each business, e.g., leveraged lending, certain correlation assumptions may be made, as described in the business unit discussions above.

## V. Areas of Focus

During the CSE review process at Lehman, OPSRA did not find any areas of immediate concern. Though our review uncovered no material deficiencies, we note below several areas deserving of ongoing monitoring by senior management and OPSRA. RMD recognizes the importance of these issues and has plans in place to address these concerns.

### a. Energy Trading

Lehman has recently stated, both publicly and in conversations with OPSRA, its intent to begin trading energy. As explained to OPSRA, this decision was not motivated by a desire to take advantage of the strong energy market and place proprietary positions. Rather, Lehman has a strong energy banking group. Many of their energy and gas clients have sought to hedge their exposure with Lehman, exposure that Lehman tends to consider right way.<sup>95</sup> Lehman has done a number of leveraged finance deals in this space, and determined that they would like to offer energy hedging capabilities to their clients. They have already entered into one relatively small position which was immediately back-to-backed with a larger bank, leaving Lehman exposed only to counterparty credit risk. They intend to build a team that could hedge this type of position directly in the energy markets.

At a logistical level, the traders will report to the head of Interest Rate trading. Lehman is in the process of building this group. The CRO indicated that Lehman is looking to hire two market risk managers, and two credit risk managers (possibly more in this area). They are looking to hire managers with a good deal of expertise, as this is not an area where Lehman has any recent experience. In addition, the other control functions, such as legal, TMG, and GMG, are looking to hire employees with industry expertise.

OPSRA spoke with members of the NPC about this business, and they explained that they will be reviewing the energy trading infrastructure prior to going live with the business. Their role will not be to evaluate this from a business perspective, as that decision was made by the Executive Committee when it decided to enter this business. Rather, they have the ability to evaluate the implementation, and slow down the process if necessary (e.g., if a control function is not yet comfortable with actual implementation).

OPSRA will be discussing this new line of business with Lehman in the months going forward, both to understand how the business is developing in terms of its scope and mandate, and to understand how MRM and CRM are getting comfortable with the risks present in the energy business.

### b. Risk Appetite

Lehman has an integrated approach to risk management that is distinctive among its peer firms. By closely aligning the market and credit risk functions, the firm is able to leverage personnel, analytics, systems, and information flows. Reporting to senior management reflects the integrated nature of risk management. Event risk, market risk, and counterparty credit risks are all presented individually to senior

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<sup>95</sup> The CRO described positions where the oil companies looked to hedge their production, and would owe Lehman money when oil prices were rising, a situation that represents right way exposure from a credit perspective.

management, as well as the aggregated RA number. The CRO stressed the importance of RA, in that it provides a number for senior management that exists within the context of the firm's budget, since the RA limit is derived from the overall firm fiscal year budget. In addition, while the absolute RA numbers may only be estimates, senior management can focus on the relative changes in RA usage, which provides a sense of the firm's current risk-taking activities. As for event risk, the CRO stated that without including the metric in some form of limit, it is difficult to get true buy-in across the firm. Capturing event risk in the RA calculation circumvents this potential problem.

RA has existed at the firm level for over five years, but was just rolled down to the business level in the current fiscal year. As Lehman continues to examine and refine the assumptions behind RA, and in particular the calculation of event risk, OPSRA will continue discussions about the both the qualitative and quantitative philosophies underlying this unique approach. The prior discussion on RA mentioned some of its limitations, and those will be addressed in subsequent meetings with RMD. In addition, RA is designed for Lehman's current business model: a firm with an overwhelmingly customer-driven business. At the point in time, Lehman does not have a large proprietary franchise. That said, at least two business heads (high grade credit and equity volatility) indicated their intention to grow the proprietary group within their jurisdiction. If Lehman's proprietary positions begin to grow accordingly, it would be prudent to revisit RA and the assumptions underlying the framework.

### c. Scenario Analysis

Stress testing, including historical or hypothetical scenario analysis, is required by Commission rules as well as Basel II. In the past, RMD has occasionally conducted ad-hoc scenario analysis calculations based on historical events and shared these results with senior management, including the Board of Directors. However, RMD has not previously conducted (or had the ability to conduct) scenario analysis on a periodic or automated basis.

QRM is currently developing the capability to perform automated scenario analysis. The plan is to run a fully-automated weekly calculation of various scenarios. Although the firm has not currently "locked down" the complete list of scenarios they plan to run, the eventual list will most likely include both historical market events of significance as well as hypothetical scenarios. The group expects to have this process completed by the end of the current year.

Once operational, RMD intends to use the automated scenario analysis as another monitoring tool that may help alert the Firm to particular concentrations in risk factors that have proved harmful in the past (i.e., historical scenarios) or alternatively for future concerns (i.e., hypothetical scenarios). However, unlike other aggregated risk factors, such as VaR, which have a statistical probability associated with them, the specifications of the various scenario analyses are so extreme that RMD does not believe there is a meaningful or credible way to assign probabilities to these events occurring. As such, they do not plan on using the automated scenarios for either limit-setting or internal capital allocating purposes.<sup>96</sup> Rather, RMD plans to disclose scenario results to senior management, among others, with the expectation that this will help focus senior management on risk positions, even though no limits are attached to these numbers.<sup>97</sup>

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<sup>96</sup> Some of LB's peer firms do have limits based on scenarios in addition to limits based on VaR and other measures as a way to manage the Firm's exposure to extreme events and to capture "fat tail" risk.

<sup>97</sup> In fact, it is anticipated that any outsized scenario results would result in conversations with senior



OPSRA will continue to monitor the developments in this area and expects to have further discussions with RMD personnel as the automated scenario analyses become operational.

#### d. PE Modeling Changes

QRM is investing in and planning to implement various enhancements to its PE framework. A top priority is to increase the coverage of transactions modeled in the fixed income Monte Carlo simulation model to include more exotic products (e.g., Bermudan swaptions). While QRM feels it will always need to use add-ons for certain trades, the goal is to increase the fixed income coverage to approximately 95% of transactions. Another top enhancement priority is to build a Monte Carlo simulation for credit derivatives. The plan is for the simulation to capture rating transitions and defaults as well as portfolio effects and netting and margining agreements, and will be parameterized from transition and default probability data similar to that discussed above. QRM has expressed that it hopes to have completed both of these projects by the end of 2005.

In addition, QRM is in the process of transitioning its financing simulation and equity derivatives VCV VaR covered products to the historical simulation based VaR approach. Thus, the long-run goal is to use some combination of Monte Carlo simulation and HistSim with limited add-ons to cover the full product spectrum. QRM personnel have also conveyed an interest in refining the modeling of margin provisions for equity derivative products and possibly moving non-margined equity portfolios to a Monte Carlo framework. The projects may be undertaken in 2006. OPSRA staff will continue to follow-up with regard to progress made towards all of these various planned enhancements, and will examine in some detail new methodologies after these are implemented.

#### e. VaR Backtesting and PE Validation

Currently, Lehman does monthly VaR backtesting on actual P&L provided by the controllers, and they have customized backtesting reports at both a divisional and business unit level. They are in the process of implementing automated daily backtesting at the firmwide and divisional levels, with this process going live in fall 2005. This formal backtesting will be done against "clean" P&L (i.e., P&L that has the fees and commissions removed). OPSRA will continue to monitor the backtesting initiatives, and ensure that backtesting approaches are within the guidelines specified by CSE.

CSE guidelines specify that PE models must be validated. OPSRA will continue to work with Lehman and the other CSE firms to develop empirical validation processes for the models. Lehman currently has plans in place to validate their PE model in two parts.<sup>98</sup> OPSRA will discuss with QRM on an ongoing basis validation efforts as they continue to develop and refine its approach to establishing comfort with model results in the context of the risk management uses for these metrics. Further, we intend to examine validation efforts and results on a more granular, product-by-product basis as progress is made.

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management similar to the discussions RMD has with senior management today concerning the top exposures reported.

<sup>98</sup> See Section III.b.i for a complete description of the validation plans.

#### f. Changes to Credit Limit Structure

Several changes are planned in the counterparty credit limit structure. First, Lehman is moving towards having all active counterparties, including hedge funds, operate under pre-approved limits and having infrequent users operate under trade-by-trade approval. In conjunction with this change, an MPE "What-If" analytics tool is being developed for traders and sales personnel. This tool will allow traders, from their desktops, to analyze the impact on MPE of proposed trades. Traders will then be able to determine if a trade will fit under the counterparty's pre-approved limit. Second, counterparty credit limits are delimited into product limits by Lehman legal entity. These cover specific product areas and are denominated in notional amounts. Currently, limits for repos, FX, and securities lending are expressed in notional amounts, but they are moving towards an MPE-based structure. Third, Lehman's firmwide country risk ELP limits are being revised. The ELP measure is a conservative estimation of the loss the Firm might experience in the event of an instantaneous crisis in a country. It estimates market risk and counterparty credit risk losses aggregated across all products at the country level. OPSRA staff will follow up with the changes in limits as they are implemented, and will monitor the impact of limit changes on risk-taking throughout the various businesses in the firm.

#### g. Internal Facility Ratings

Lehman currently assigns ICRs on a counterparty basis using the Scorecard application described in Section III.b.ii. CRM is expanding the scorecard application to assign Internal Facility Ratings. OPSRA will follow developments in this area, and will monitor how these facility ratings are used by CRM in risk governance.

#### h. Prime Brokerage

Given the growing importance of hedge funds as clients to securities firms and large banks, competition in this space is fierce. Commercial banks are attempting to break into the prime brokerage market by offering aggressive credit terms. In order for Lehman to grow its market share, it will be competing with these banks as well as Bear Stearns, Morgan Stanley, and Goldman Sachs, experienced players with larger market shares and longer histories in this space. This raises credit related concerns, given that, in order to expand its market share, Lehman could feel pressure to compete on credit terms. Thus, while the risk management of prime brokerage counterparties and hedge funds appears sufficient at this time, this is an area that warrants special attention going forward.

#### i. Model Control

As mentioned in the discussion on the model control function owned by QRM, it is OPSRA's opinion that Lehman has created a risk-based approach to model validation, implying that QRM spends the majority of their time on the models generating the greatest amount of risk. However, OPSRA has not heard this approach articulated as such by QRM, and the limited documentation does not clarify the philosophy underlying the newly implemented model control framework. We view the process as largely reflecting aspirations at this point in time, not surprisingly given that the policy is new. OPSRA will continue its discussions with QRM to ensure that the firm's models are being validated in a reasonable and timely manner.

## **VI. Conclusion**

Overall, OPSRA finds that the market and credit risk management function at Lehman is robust given their current risk profile. Taking into account planned enhancements such as VaR backtesting and PE validation, Lehman will meet or exceed the minimum CSE standards.

Appendix A: CSE review work papers

<b>Date</b>	<b>Title</b>	<b>Format</b>	<b>Team</b>
April 21, 2005	SEC Risk Review for CSE	Presentation	Market
April 28, 2005	SEC Review of Risk Management	Presentation	Market
May 10, 2005	U.S. Leveraged Loans Overview	Presentation	Market
May 10, 2005	Acquisition Finance	Presentation	Market
May 12, 2005	An Overview of the Mortgage Business	Presentation	Market
May 17, 2005	Fixed Income Finance SEC Risk Review for CSE	Presentation	Market
May 17, 2005	Equity Finance SEC Risk Review for CSE	Presentation	Market
May 17, 2005	Investment Management Division SEC Risk Review for CSE	Presentation	Market
May 17, 2005	Securitized Products SEC Risk Review for CSE	Presentation	Market
May 17, 2005	Equities SEC Risk Review for CSE	Presentation	Market
May 17, 2005	Credit and Municipal Business SEC Risk Review for CSE	Presentation	Market
May 17, 2005	Liquid Markets SEC Risk Review for CSE	Presentation	Market
May 19, 2005	Risk Equity and Risk Appetite Models	Document request	Market
May 19, 2005	General Description of VaR Methodology	Document request	Market
May 19, 2005	Prime Brokerage	Presentation	Market
May 20, 2005	An Overview of the Municipal Markets	Presentation	Market
May 20, 2005	Credit Risk Systems	Presentation	Credit
May 20, 2005	Credit Risk Management	Presentation	Credit
May 20, 2005	General ICR Framework Scorecard Document & Appendices	Document request	Credit
May 23, 2005	Credit Risk Measurement	Presentation	Credit
May 25, 2005	An Overview of the High Grade Credit and CDO Businesses	Presentation	Market
May 25, 2005	An Overview of the Interest Rate Products Business and Liquid Markets Proprietary Trading	Presentation	Market
May 25, 2005	SEC Risk Appetite, Risk Equity Review for CSE	Presentation	Market
June 2, 2005	Capital Markets Product Control	Presentation	Market
June 2, 2005	Risk Management - Acquisition Finance	Presentation	Credit
June 2, 2005	Credit Policy Manual	Document request	Credit
June 2, 2005	Credit Risk Management Product Guidelines	Document request	Credit
June 2, 2005	Risk Management - Prime Brokerage	Presentation	Credit
June 2, 2005	Credit Risk Measurement	Document request	Credit
June 6, 2005	Global Volatility CSE Review	Presentation	Market
June 6, 2005	An Overview of the Global Real Estate Business	Presentation	Market
June 6, 2005	Market Risk Management Limit Policy	Document request	Market
June 6, 2005	Market Risk Management Policies & Procedures Manual	Document request	Market
June 6, 2005	Liquid Markets Proprietary: Risk Management Section of Product Binder	Document request	Market
June 6, 2005	Risk Arbitrage: Risk Management Section of Product Binder	Document request	Market
June 6, 2005	Derivatives Volatility: Risk Management Section of Product Binder	Document request	Market
June 6, 2005	Real Estate: Risk Management Section of Product Binder	Document request	Market

Appendix A: CSE review work papers

June 7, 2005	Risk Arbitrage Business Overview	Presentation	Market
June 7, 2005	Credit Risk Management Credit Review Request	Document request	Credit
June 7, 2005	Firmwide Risk Snapshot (2/25/05)	Document request	Credit
June 7, 2005	Daily Risk Appetite Report (2/28/05)	Document request	Credit
June 7, 2005	95% Daily VaR Usage and Limit (2/28/05)	Document request	Credit
June 7, 2005	Global Current Credit Exposure (CCE) Snpasnot by ... (2/25/05)	Document request	Credit
June 7, 2005	NY Credit's CCE Snapshot by ... (2/25/05)	Document request	Credit
June 7, 2005	London Credit's CCE Snapshot by ... (2/25/05)	Document request	Credit
June 7, 2005	Asia Credit's CCE Snapshot by ... (2/25/05)	Document request	Credit
June 7, 2005	Country Risk Report (2/25/05)	Document request	Credit
June 10, 2005	Global Margin	Presentation	Credit
June 10, 2005	Transaction Management	Presentation	Credit
June 13, 2005	Real Estate: Business Overview Section of Product Binder	Document request	Market
June 13, 2005	Warehouse Lending Business	Presentation	Credit
June 15, 2005	SEC Risk Appetite Review	Presentation	Market
June 16, 2005	Municipals: Daily and Weekly Reports Used by Business	Document request	Market
June 16, 2005	Municipal Derivative Products: Risk Management Section of Product Binder	Document request	Market
June 20, 2005	New Products Committee Overview	Presentation	Market
June 20, 2005	Global Model Control Process	Presentation	Market
June 20, 2005	Equity Derivatives Model Control list	Document request	Market
June 20, 2005	Fixed Income - Interest Rate and Muni Derivatives Model Control list	Document request	Market
June 20, 2005	Sample E-mails from Large and Unusual Transactions	Document request	Market
June 20, 2005	Sample E-mails from Documenting Limit Monitoring	Document request	Market
July 11, 2005	Market Risk Management: Working List of Stress Scenarios	Document request	Market
July 11, 2005	Summary of Price Testing Results: April 2005	Document request	Market
July 11, 2005	Firmwide Risk Snapshot (6/24/05)	Document request	Market
July 12, 2005	Bond & Loan Commitment Committee/Bridge Loan Committee Memo re: Intelsat (7/7/04)	Document request	Credit
July 12, 2005	Commitments Reports highlighting Intelsat deal (8/03/04, 8/10/04, 8/17/04, 8/31/04, 9/7/04, 9/22/04, 10/12/04, 1/25/05)	Document request	Credit
July 12, 2005	Firmwide Risk Snapshot Report highlighting Intelsat deal (7/30/04, 8/6/04, 8/13/04, 8/27/04, 9/2/04, 9/17/04, 10/8/04)	Document request	Credit
July 12, 2005	Top Exposure Report highlighting Intelsat deal (8/10/04, 8/17/04, 8/31/04, 9/7/04, 9/22/04, 10/12/04, 1/25/05)	Document request	Credit
July 12, 2005	Intelsat Event Timeline with Marginal Risk Appetite Numbers	Document request	Credit
July 12, 2005	Equity Prime Brokerage description	Document request	Credit
July 12, 2005	Equity Finance Risk Management Daily Risk Report (5/30/05)	Document request	Credit
July 12, 2005	Prime Brokerage sample Margin Requirements agreement	Document request	Credit
July 12, 2005	List of prime broker accounts with lock up agreements for margin terms	Document request	Credit

Appendix A: CSE review work papers

July 12, 2005	Description of the stress testing/scenarios used by risk management in prime broker business	Document request	Credit
July 12, 2005	Statement of risk measures monitored by risk management in prime broker business	Document request	Credit
July 12, 2005	Statement of systems monitoring in prime broker business	Document request	Credit
July 14, 2005	Uses of Pre-Approved Limits in Credit Process (Current State)	Document request	Credit
July 14, 2005	U.S. Life Insurance Industry Sector Review (used in Credit Committee meeting)	Presentation	Credit
July 20, 2005	Historical Market Database - Overview	Document request	Market
July 20, 2005	Large Exposures Summary	Document request	Market
July 26, 2005	VaR Technical Specifications by Product	Document request	Market
August 1, 2005	MPEs by Counterparty, Product Group, Credit Rating, Industry	Document request	Credit
August 3, 2005	Credit Derivatives MPE Model	Document request	Credit
August 11, 2005	Estimated Loan Hedging Costs, Credit Facilitation Group	Document request	Credit
August 11, 2005	Building an Energy Trading Business	Document request	Market
August 22, 2005	Loan Participation Committee Memo (8/22/05)	Document request	Credit

**Meeting Attendee List (provided by Lehman)**

Tuesday, May 10<sup>th</sup>, 2005

- Leveraged Lending
  - Alex Kirk
  - Madelyn Antoncic

Thursday, May 12<sup>th</sup>, 2005

- Mortgages
  - Dave Sher
  - Madelyn Antoncic
  - Jeff Goodman
  - Edward Grieb
  - Gerard Reilly
  - Paul Shotton
  - Robyn Grew
  - Danielle McGraw
  - Lisa Rathgeber
  - Laura Vecchio
  - Anthony Stucchio
  - Louise Ratheram-Browne
  - Scott Simon
  - Scott Kimmel
  - Eduardo Canabarro
  - Beth Rudofker

Tuesday, May 17<sup>th</sup>, 2005

- Market Risk
  - Madelyn Antoncic
  - Paul Shotton
  - Anthony Stucchio
  - Laura Vecchio
  - Clelia Stegnjajic
  - Madelyn Antoncic

Thursday, May 19<sup>th</sup>, 2005

- Prime Brokerage Meeting
  - Ed Grieb
  - John Wickham
  - Richard Story
  - John McBryan
  - Marlisa Vinciguerra
  - Gerard Reilly
  - Jeffrey Glibert
  - Matthew Bowen
  - Madelyn Antoncic
  - Anthony Stucchio
  - Paul Shotton
  - Jeff Fernandez
  - Eduardo Canabarro
  - Beth Rudofker

Appendix B: Lehman staff consulted during CSE review

Friday, May 20<sup>th</sup>, 2005

- Credit Analysis Meeting
  - Madelyn Antoncic
  - Jeff Glibert
  - Eduardo Canabarro
  - Steven Domenicucci
  - Steve Simonte
  - Eric Spray
  - Scott Burton
  - Anthony Stucchio
  - Robert Lutey
  - Martin Roberts
  
- Municipals Meeting
  - Paul Shotton
  - Joe Li
  - Madelyn Antoncic
  - Gary Killian
  - James Lister
  - Mike Bade
  - Scott Simon
  - Scott Kimmel
  - Robyn Grew
  - Beth Rudofker
  - Ed Grieb
  - Eduardo Canabarro
  - Anthony Stucchio
  - Gary Rosen
  - Laura Vecchio

Monday, May 23<sup>rd</sup>, 2005

- Credit Analytics Meeting
  - Jeff Glibert
  - Eduardo Canabarro

Tuesday, May 24<sup>th</sup>, 2005

- Quantitative Risk Meeting
  - Madelyn Antoncic
  - Eduardo Canabarro
  - Manhua Leng
  - Laura Vecchio
  - Anthony Stucchio
  - Paul Shotton

Wednesday, May 25<sup>th</sup>, 2005

- Interest Rate Products & Liquid Market Prop Meeting
  - Kaushik Amin
  - Madelyn Antoncic
  - Browning, James;
  - Simon, Scott A;
  - Paul Shotton
  - Melda Elagoz



Appendix B: Lehman staff consulted during CSE review

- Thomas Hawkins
- Gary Rosen
- Edward Grieb
- Beth Rudofker
- Eduardo Canabarro
- Anthony Stucchio
  
- Credit Products Meeting
  - Rick Reider
  - Jim Ballentine
  - Madelyn Antoncic
  - Paul Shotton
  - Joe Li
  - Shane Flatman
  - Gary Rosen
  - Ed Grieb
  - Beth Rudofker
  - Eduardo Canabarro
  - Anthony Stucchio
  - Laura Vecchio

Thursday, June 2<sup>nd</sup>, 2005

- Product Control Meeting
  - Gerard Reilly
  - Ed Grieb
  - Beth Rudofker
  - Scott Simon
  - Neerag Chopra
  - Anthony Stucchio
  - Laura Vecchio

Monday, June 6<sup>th</sup>, 2005

- Real Estate Meeting
  - Madelyn Antoncic
  - Mark Walsh
  - Kenneth Cohen
  - Jeffrey Goodman
  - Jonathan Cohen
  - Zev Klasewitz
  - Paul Shotton
  - Eduardo Canabarro
  - Lynn Gray
  - Paul Puskuldjian
  - Gary Rosen
  - Beth Rudofker
  - Ed Grieb
  - Laura Vecchio
  - Anthony Stucchio
  - Robyn Grew
  
- Volatility Business Meeting
  - Jon Neave

Appendix B: Lehman staff consulted during CSE review

- Jim Throsby
- Amit Airen
- Paul Shotton
- Madelyn Antoncic
- Spyros Papadakis
- Laura Vecchio
- Kenneth MacHarg
- Gerald Donini
- Anthony Stucchio
- Ed Grieb
- Jennifer Connors
- Robyn Grew

Tuesday, June 7<sup>th</sup>, 2005

- Risk Arbitrage Meeting
  - Madelyn Antoncic
  - Paul Shotton
  - Marc Paley
  - Manhua Leng
  - James Emmert
  - Beth Rudofker
  - Anthony Stucchio
  - Laura Vecchio
  - Ed Grieb
  - John Crowe
  - Robyn Grew

Friday, June 10<sup>th</sup>, 2005

- TMG Meeting
  - Scott Willoughby
  - Zdenka Griswold
  - Allyson Carine
  - Robert Guglielmo
  - Anthony Stucchio
  - Laura Vecchio
  - Ed Grieb
  - Beth Rudofker
  - Jeffrey Glibert
  - Stephen Vena
  - Alex Crepeau
  - Stewart Nineham
  
- Margin Group Meeting
  - Mark Malin
  - Stewart Nineham
  - Stephen Vena
  - Kendall McLaughlin
  - Alex Crepeau
  - Beth Rufoker
  - Ed Grieb
  - Anthony Stucchio

Appendix B: Lehman staff consulted during CSE review

- Laura Vecchio
- Jeffrey Glibert
- Joseph Lodato
- Robyn Grew
- Scott Willoughby

Monday, June 13<sup>th</sup>, 2005

- Warehouse Lending Meeting
  - Jeffrey Goodman
  - Steve Valentino
  - Errington Hibbert
  - Fred Madonna
  - Gordon Sweely
  - David Sherr
  - Paul Shotton
  - Jeffrey Glibert

Monday, June 20<sup>th</sup>, 2005

- Model Validation Meeting
  - Eduardo Canabarro
  - Jerry Rielly
  - Ed Grieb
  - Manhua Leng
  - Neeraj Chopra
  - Anthony Stucchio
  - Madelyn Antoncic
  - Beth Rudofker
  - Laura Vecchio

Thursday, June 23<sup>rd</sup>, 2005

- Hedging Discussion - Conference Call
  - Alex Kirk
  - Ed Grieb
  - Gary Rosen
  - Peter Chase
  - Jeff Glibert
  - Scott Kimmel
  - James Seery
  - Janice Meregla

Tuesday, July 19<sup>th</sup>, 2005

- FRL's and Hedging Discussion Meeting
  - Rick Rieder
  - Raymond Kahn
  - Ed Grieb
  - Peter Chase
  - Gary Rosen
  - Scott Kimmel Peter Chase
  - Bari Wolfe
  - Jeffrey Glibert
  - Patrick McGarry
  - Joe Li

Appendix B: Lehman staff consulted during CSE review

- Greg Smith
- Laura Vecchio

Wednesday, July 20<sup>th</sup>, 2005

- Commitment Committee
  - Steven Berkenfeld
  - Kevin Genirs
  - Ed Grieb

**LEHMAN BROTHERS HOLDINGS, INC.**

**REPORT ON LIQUIDITY & FUNDING RISK  
MANAGEMENT**

**July 26, 2005**

version 07262005.6

**LEHMAN BROTHERS HOLDINGS, INC.**  
**LIQUIDITY AND FUNDING RISK MANAGEMENT**

**I. EXECUTIVE SUMMARY**

LEHMAN BROTHERS HOLDINGS, INC., (“Lehman Brothers” or the “firm”) has submitted an application to become a Consolidated Supervised Entity (“CSE”) subject to the requirements set forth in Rule 15c3-1 (and related appendices thereto) under the Securities Exchange Act of 1934.

Staff from the Division of Market Regulation reviewed Lehman Brothers’ liquidity and funding risk management primarily to evaluate the firm’s policies and ability to assure adequate liquidity and funding at all times, including periods of significant market fluctuations and financial stress. Discussions and planning of the work began in March 2005 with management of the Lehman Brothers Global Treasury function. The majority of the field work was conducted at the firm in May and June 2005. Follow-up questions were addressed by telephone and email. The staff’s report was drafted during June and July 2005.

The scope of the review included the funding framework, governance structure, organization structure, lines of authority, policies and procedures, internal management reports, and various other documents and models including the liquidity and funding models and the liquidity crisis plan. Treasury’s policies, procedures, and controls with regard to liquidity, sources of funding, and management of the balance sheet including capital, leverage, and asset and debt levels were also considered. The Corporate Audit staff, the firm’s internal auditors, was also consulted.

The review of the liquidity and funding risk management functions of Lehman Brothers found no material deficiencies. There are some enhancements that have been discussed with the firm, described under “Planned Enhancements”. As of this date, these enhancements are works in process and will be reviewed with the firm by the staff as part of the ongoing supervisory program.

Lehman Brothers currently has adequate liquidity and sufficient capital to fund its current business in the staff’s opinion.

Overall, with respect to liquidity and funding risk management, Lehman Brothers has an adequate liquidity and funding risk management to become a CSE, and accordingly, it is recommended that the application by Lehman Brothers to become a CSE, as it pertains to the liquidity and funding risk management function, be approved.

## **II. REVIEW PURPOSE AND SCOPE**

The primary purpose of the SEC's review of Lehman Brothers' liquidity and funding risk management was to evaluate the firm's policies and ability to assure adequate liquidity and funding at all times, including periods of significant market events and financial stress. Most failures of financial institutions have occurred in large part due to a lack of adequate liquidity, which has amplified the impact of other events. The review evaluated the adequacy of current policies, procedures and controls with respect to their effectiveness in managing liquidity and funding risk on a global, consolidated basis. The staff, in developing its review process, identified certain core elements of an effective liquidity and funding risk management framework to be considered as part of the application review. These elements are summarized below.

### **Governance structure**

A well-defined and documented governance structure for the management of liquidity and funding risk should exist. This would include the organizational structure and established oversight executive committees with clearly delineated mandates covering their membership, responsibilities, lines of reporting, and frequency of meetings. A global treasury function to manage the liquidity and funding processes should exist under independent oversight of appropriate committees, such as the Finance Committee.

### **Liquidity and funding management policies and procedures**

Detailed and documented liquidity and funding policies and procedures established by global treasury and approved by independent oversight committee(s) should exist. The firm's policies and objectives should be clearly delineated and accompanied by appropriate procedures. All significant liquidity and funding risk management areas of responsibility of the global treasury function should be described.

### **Management internal reporting system**

Global treasury should have a formal management reporting system that conveys to senior management and oversight committees on a regular basis the relevant qualitative and quantitative information needed to make informed liquidity and funding decisions, as well as related risk management and business decisions. The content of the reporting package may vary by firm, but should include relevant information regarding funding sources and uses, liquidity and leverage ratios, limits and excession reporting, liquidity portfolio, credit facilities, collateral and unencumbered collateral, new issuances and term structure of debt.

### **Stable and diverse funding sources**

Each firm should have established stable and diverse sources of funding to limit dependencies on any one investor group or region. The focus should be to continually

expand and globally diversify the firm's funding programs and activities across debt markets, and investor and creditor base to minimize dependence on any one investor group or region. Diversification may be achieved through the use of limits, for example, a limit on the amount of debt concentrated with a single investor.

### **Borrowing capacity of unencumbered assets**

The firm should continually monitor the borrowing capacity of its portfolio of unencumbered assets and related liquidity ratio (ratio of borrowing capacity to amounts due within one year) and establish a target minimum ratio.

### **Less liquid and illiquid assets**

Policies and procedures for identifying, monitoring, and managing less liquid and illiquid assets should be in place. Less liquid assets should be funded by long term debt or equity to the extent that they cannot be funded on a secured basis and illiquid assets should generally be funded with long term debt or equity. Less liquid assets are frequently referred to as "hard to fund" assets at Lehman Brothers.

### **Limits**

A formal limit setting and monitoring process should be established and documented by the global treasury function and be approved by the appropriate oversight management committees. Limits on balance sheet assets and limits by borrowing type and maturity should be established. A formal system of limit excession reporting and resolution should be established.

### **Liquidity Portfolio**

Each firm should maintain cash and/or a liquidity portfolio of segregated and unencumbered securities consisting of highly liquid and highly rated securities, such as U.S Government and agency obligations, and asset-backed securities. These assets may be sold or pledged to provide immediate liquidity to repay maturing debt, satisfy collateral calls or meet other obligations. The ability to hypothecate these securities without market impact should be tested regularly.

### **Committed credit facilities**

Firms should maintain an appropriate mix of unsecured and secured committed credit facilities in order to have sources of committed funding in place should a liquidity funding stress event occur. Committed secured credit facilities to fund various assets classes, including less liquid assets, with reliable banks and other counterparties are increasingly common. Committed secured credit facilities are regularly drawn and repaid in the normal course of funding secured financing transactions. The unsecured and secured committed credit facilities continue to be an area of focus for credit rating agencies. Although firms are aware of the possible signaling effect of draws under the



unsecured facilities, many firms have attempted to mitigate the signaling by negotiating with the banks that the facilities will be regularly drawn and repaid. In some instances however, committed unsecured facilities may only be drawn upon in extreme liquidity events, and doing so may result in signaling a liquidity issue and significant reputational damage to the firm.

### **Liquidity crisis plan**

Each firm should maintain a documented and approved (by independent oversight committee(s)) contingency funding plan which sets out a detailed plan of action to manage a liquidity stress event within the firm. The goal of the contingency funding plan is to manage liquidity risk and communicate effectively with creditors, investors and customers during a funding crisis or market stress event.

### **Stress testing**

Liquidity and funding stress testing should be performed on a periodic basis, with results reported to senior management. While such stress testing should satisfy the requirements of Rule 15c3-1g(c), which stipulates at least once a quarter, it is the position of the staff that prudent risk management would require stress testing on a more frequent basis. The assumptions and methodologies of the stress testing should be clearly defined and documented.

### **Internal audit**

The Corporate Audit review should include all significant elements of the global treasury function in its risk-based audit program.

To evaluate Lehman Brothers' liquidity management process against these benchmarks, interviews were conducted with senior management, liquidity and funding risk management policies and procedures were reviewed, and management reports were analyzed and discussed with management. Various other documents and reports, including findings from the latest corporate audit reports, were reviewed. The SEC staff also had discussions with the Corporate Audit concerning their coverage of Treasury and related functions. The SEC staff reviewed documented policies and procedures. Additional information and content was obtained from the application, discussions, and presentations to the staff.

### **III. LIQUIDITY AND FUNDING RISK MANAGEMENT**

#### **ADEQUACY OF LIQUIDITY**

Lehman Brothers currently has adequate liquidity and sufficient capital to fund its current business.

Lehman Brothers appears prepared to face both a market liquidity event, some broad disruption to the marketplace leading to a global liquidity squeeze, and a Lehman specific liquidity event. The firm has been through a number of stress events, including the 1998 market event and September 11, 2001. Management believes that the lessons from such experiences have been incorporated into the firm's current liquidity and funding process.

Lehman Brothers funding strategy seeks to ensure that the firm maintains sufficient liquid financial resources to continually fund its balance sheet and to meet all of its funding obligations in all market environments based upon the following principles:

- The firm must remain in a constant state of liquidity readiness, as liquidity providers are credit and market sensitive and quick to react to any perceived market or firm-specific risks. This requires maintaining a large cash position and/or liquidity pool in the holding company chain sufficient to absorb the impact of a very severe liquidity event.
- Reliance is placed on secured funding only to the extent that the firm believes it would be available in all market circumstances, including a stress event. This requires establishing reliable secured funding levels by asset category by counterparty. During a liquidity stress event, certain lenders will require higher quality collateral, resulting in lower availability of secured funding for less liquid or hard to fund asset classes.
- The firm does not assume that, in a liquidity crisis, assets can be sold to generate cash, unsecured debt can be issued or any cash and unencumbered liquid collateral outside of the liquidity pool can be used to support the liquidity of the holding company or its unrestricted subsidiaries. The plan is not to be forced to reduce the balance sheet for liquidity reasons in a liquidity event (although it may be reduced for risk reasons).
- Since the legal entity structure may constrain the movement of liquid assets, the firm must ensure that there is sufficient stand alone liquidity in each of (1) the holding company and its unrestricted subsidiaries and (2) the restricted or regulated subsidiaries. The firm treats all excess cash in restricted or regulated entities as "trapped".

When managing liquidity, Lehman Brothers pays particularly close attention to the following, which are referred to as the Four Pillars of the Funding Framework.

- Liquidity Pool - sized to cover all expected cash outflows for one year in a liquidity stress event
- Cash Capital – sufficient given long-term funding sources and requirements
- Reliable Secured Funding Capacity – relied upon only to the extent that the secured funding is reliable in all market environments, which is measured by The Reliable Secured Funding Model that seeks to conservatively assess reliable secured funding by asset class.
- Contingency Funding Plan

A more detailed discussion of each of the Four Pillars of the Funding Framework is contained on the following pages.

## **LIQUIDITY POOL**

The Firm's policy is to maintain a liquidity pool for the holding company and its unrestricted subsidiaries that would cover all expected cash outflows for one year in a stressed liquidity environment. The liquidity pool is intended to cover the roll-off of unsecured debt for one year, fund additional requirements during liquidity events such as additional collateralization of derivatives and the drawing down of unfunded commitments, and to fund the buyback of equity and debt if the firm chooses to do so. The liquidity pool totaled \$18.7 billion at the fiscal year ended November 30, 2004 and \$18.8 billion at the end of February 2005. The liquidity pool as viewed by Lehman Brothers includes the undrawn portion of the holding company's \$1.5 billion committed working capital credit facility. While the firm clearly believes that the funds from this facility would be readily available in a stress event, the SEC staff's view is that such facilities are distinct from cash and unencumbered liquid securities that can be readily hypothecated and thus should not be considered as a part of the liquidity pool. The amount of the liquidity pool, without considering the \$1.5 billion committed credit facility, would be \$17.2 billion at the year end November 30, 2004 and \$17.3 billion at the end of February 2005.

The liquidity pool is invested in cash and unencumbered, investment grade liquid collateral that can be monetized at short notice in all market environments to provide liquidity to the holding company, which issues most of the unsecured debt. The cash raised by financing the collateral in the liquidity pool can be upstreamed to the holding company in all market environments, if it is not already at the holding company. For example, in the case of unencumbered collateral owned by Lehman Brothers Inc., the U.S. broker dealer, Treasury reverses this collateral into the holding company through a triparty repo agreement. The pool includes Treasuries, G7 Governments, Agencies,

investment grade asset-backed and corporate fixed income securities, S&P 500 equities and other large, liquid stocks with sizeable secured funding markets. The firm requires that there be a deep, liquid and reliable funding market for this collateral in all market environments. The majority of the investments are done on an overnight basis. The liquidity pool is actively managed by Treasury.

The liquidity pool value of \$18.8 billion at the end of February 2005 was comprised of cash of \$2.1 billion, investment grade securities with an estimated pledge value of \$15.2 billion and the undrawn portion of the holding company committed credit facility of \$1.5 billion. The \$15.2 billion of investment grade securities include U.S. Treasuries and G-7 government securities of \$7.4 billion, FHLB eligible residential mortgages of \$3.3 billion, repoable preferred shares of \$2 billion with Lloyds TSB (AA rated) and \$400 million with National Australia Bank (AA rated) both of which include put options whereby funds would be received within five days, and private label investment grade CMOs in the amount of \$1.4 billion. As stated above, the liquidity pool value without considering the committed credit facility was \$17.2 billion and \$17.3 billion at November 30, 2004 and February 28, 2005 respectively.

The size requirement for the liquidity pool is reassessed weekly based upon expected cash outflows for one year in a stressed environment. The weekly reassessment of the size of the liquidity pool is performed by the Management Finance Committee. The expected cash outflows are measured using the Maximum Cumulative Outflow (MCO) model. The MCO calculates expected cash outflows in a stressed environment by including outflows for items such as the repayment of all unsecured debt of the holding company and its unrestricted subsidiaries maturing within twelve months, the drawdown of commitments to extend credit based on an analysis of the probability of such drawdowns, the widening of haircuts due to stressed market conditions, additional collateralization of derivative contracts that would be required following a credit ratings downgrade, funding of debt and equity repurchases, and the outflow of short term or "hot" money to customers like hedge funds. The actual amount of the liquidity pool always includes a surplus in excess of the MCO size requirement. The target amount of the surplus is at least \$2 billion although the surplus has been consistently higher than that in recent months. For example, the surplus was \$7.1 billion at the year ended November 30, 2004; \$5.3 billion at the quarter ended February 28, 2005; and \$3.8 billion at the quarter ended May 31, 2005.

The liquidity pool at the holding company is distinct from cash and unencumbered liquid assets held in the broker dealers, Lehman Brothers Bank and Lehman Brothers Bankhaus, which are referred to as restricted or regulated subsidiaries. This additional liquidity in the restricted or regulated subsidiaries is provided by unencumbered assets as a result of their business activities. However, the parent's ability to access these funds may be restricted by legal and regulatory requirements including capital requirements applicable to regulated subsidiaries including the banks and broker-dealers. At the end of February 2005, the estimated pledge value of these unencumbered assets totaled \$39.6 billion, of which \$37.7 billion was held by restricted or regulated subsidiaries. While these additional unencumbered assets could in theory be pledged to

raise liquidity to the extent that they are liquid, the firm does not rely on them in their liquidity planning. The firm believes this is a conservative and prudent approach to liquidity management.

The \$1.5 billion committed, multi-currency, unsecured bank credit facility is a source of liquidity for the holding company. Lehman Brothers considers the facility as a part of the liquidity pool. Although the SEC staff does not consider the facility as a part of the liquidity pool, the staff does recognize that it is a source of funding that may appropriately be considered in overall liquidity planning. In the view of the staff, the committed credit facility is distinct from and does not have the same liquidity as cash and unencumbered securities in the liquidity pool. The staff does recognize that this committed credit facility is a working capital facility that is regularly drawn upon in the normal course of business and is fully drawn from time to time. The firm believes that this eliminates the signaling effects of drawing on the facility, and differentiates it from some other firms where the credit facility is a back stop facility and is not drawn or seldom drawn in full. The facility is described later in this report.

## **CASH CAPITAL**

Cash capital, which Lehman Brothers rather uniquely defines as including stockholder's equity and long-term debt, excluding the current portion, plus the undrawn portion of unsecured committed facilities and other long-term secured obligations with remaining terms greater than one year, is used to measure long-term funding sources and requirements. Core deposit liabilities at the Lehman Brothers banks are an additional source of cash capital for these regulated entities. What makes the Lehman Brothers approach different from that used by many other firms is that committed unsecured and secured facilities with remaining terms of over one year are included as a source of cash capital at the holding company. Lehman Brother's general policy is to operate with an excess of long-term funding sources over long-term funding requirements of at least \$2 billion at the holding company. Most of the time, the cash capital surplus is significantly in excess of the \$2 billion target. At both February 28, 2005 and November 30, 2004, the firm had \$10 billion of cash capital surplus across all legal entities with \$6 billion and \$7 billion respectively available at the holding company and its unrestricted subsidiaries.

Long term debt with a remaining term greater than one year is the largest source of cash capital for the firm. Of the cash capital sources totaling \$79 billion at the year ended November 30, 2004, about 62% or \$49 billion came from long term debt. The major challenge in managing long term debt is to minimize the refinancing risk by spreading the maturities of the long term debt. The firm sets limits for the amount of outstanding long term debt maturing for three, six and twelve month time horizons. These limits are set by Treasury and the syndicate desk based on what is believed to be a conservative assessment of the market's short term appetite for Lehman's debt. Additionally, the debt holder base is diversified by issuing across different markets, i.e. U.S., U.K., Continental Europe, and Asia. During the past year approximately 60% of

the debt issuance was in the U.S. and 40% was international with Europe showing very strong demand the last two years.

Stockholders' equity is the second largest source of cash capital. At November 30, 2004, stockholders' equity provided approximately \$15 billion or 19% of the firm's cash capital sources.

In the Lehman Brothers approach to cash capital, remaining sources of cash capital amounting to approximately \$5 billion to \$6 billion include the undrawn portion of unsecured and secured committed facilities with a remaining life greater than one year, including both bilateral bank structures and syndicated committed facilities. The holding company unsecured committed working capital facility generally represents \$1.5 billion of the total with the committed secured facilities representing the balance. Inclusion of such committed secured and unsecured facilities as cash capital by Lehman is different from the traditional view that cash capital consists of equity plus long-term debt with a maturity greater than one year. The secured and unsecured bilateral bank structures are committed. In addition to the bilateral bank structures, the two syndicated committed facilities are included in cash capital and are drawn from time to time. The two syndicated, committed unsecured facilities consist of a \$1.5 billion facility through April 2007 at the holding company and a \$1.0 billion multi-currency facility at Lehman Brothers Bankhaus AG expiring on April 26, 2008.

Core deposit liabilities at the firm's banking institutions, Lehman Brothers Bank, FSB and Lehman Brothers Bankhaus AG, provided an additional \$10 billion or 13% of cash capital. The regulated bank entities operate in a deposit-protected environment and are able to source low-cost funds that are generally insulated from a firm specific or market liquidity event. These are reliable funding sources for the mortgage products and selected loan assets that they fund.

Cash capital is used to fund long term funding requirements. Lehman's cash capital funding requirements include less liquid or illiquid assets such as fixed assets and goodwill, less liquid inventory, unencumbered inventory that is not in the liquidity pool irrespective of the collateral quality, secured funding "haircuts" (the difference between the market value of the available inventory and the pledge value, the value of cash advanced by counterparties against that inventory), operational cash deposited at banks, and liquid investments held to fund certain projected cash outflows. These liquid investments are managed as part of the liquidity pool.

Illiquid assets such as fixed assets and goodwill are fully funded by cash capital. Less liquid inventory positions are also completely funded if it is determined that the position would be illiquid in a stress liquidity event. For example, corporate loans and commercial mortgages are fundable on a secured basis in a normal liquidity environment, but both asset classes are funded with cash capital because the funding is not considered reliable in a stress liquidity environment. This reliable fundability assessment in a stress environment, which is performed by Treasury, is done by asset class and by geographical region in determining cash capital requirements.

Unencumbered inventory, irrespective of collateral quality, that is outside of the restricted subsidiaries is cash capitalized unless it is held as a part of the liquidity pool. The firm conservatively assumes that this unencumbered inventory is unfundable on a secured basis, presumably due to operational inefficiencies. Since this unencumbered inventory is currently not part of a secured funding transaction in normal times, the firm does not assume that it could improve operational efficiency in a stress event and use this unencumbered inventory as a source of funding. Therefore, cash capital is required to provide funding for these unencumbered assets outside of the liquidity pool. The unencumbered assets in the liquidity pool are not 100% cash capitalized.

Cash capital is required to fund operational cash. Cash at banks required to conduct the business operations of the firm. This operational cash deposited at banks for is not included in the cash balances in the liquidity pool.

Cash capital is required to fund the excess of regulatory capital requirements over the “unregulated” cash capital requirements of the businesses.

Liquid investments held to fund certain projected cash flows or prefunding used to mitigate contingent liquidity risk are funded with cash capital. These liquid investments are managed as a part of the liquidity pool.

## **RELIABLE SECURED FUNDING CAPACITY**

Secured funding represents the majority of the funding for the firm. Since the majority of the balance sheet of Lehman Brothers, like other securities firms, is liquid, most of the funding is done on a secured basis, primarily in the deep, liquid and well established triparty repo market. Secured funding is seen as safer and more reliable than unsecured funding because of the intrinsic value of the collateral pledged and of the conservative haircuts used by market participants. Additionally, the triparty repo market adds another layer of safety from a counterparty’s perspective as the firm’s collateral is held by a third party bank (JP MorganChase) and is valued by the third party bank.

Management has adopted what they believe is a conservative approach to secured funding by depending on it only to the extent that it is deemed reliable in all market environments. A detailed assessment is regularly performed of secured funding capacity by asset class and by counterparty to determine how much is reliable in a stressed liquidity environment. Reliable secured funding capacity usually is set at a significant discount to normal funding capacity. Inventory that is less liquid and not deemed reliable in stress market conditions, such as high yield loans and commercial mortgages, is funded entirely with cash capital. Any short term funding that might exist for these asset classes in a normal market environment is not considered to be reliable.

In a secured funding stress liquidity event, the liquidity risks are primarily haircut widening and loss of secured funding capacity. These two risks are not additive. If some

counterparties require wider haircuts to fund collateral, the firm can redirect collateral that used to be funded with those counterparts that stopped funding Lehman to other counterparts that continue to fund the firm. Some counterparts do not widen haircuts in a liquidity stress event. Instead, they may withdraw either from funding certain classes of less liquid assets, such as corporate bonds or commercial mortgages, or from providing secured funding to the firm if they are uncomfortable with the specific firm name. Highly liquid asset classes, including U.S. Treasuries, are unlikely to be impacted.

To mitigate the primary liquidity risks of haircut widening and loss of secured funding capacity, the firm has adopted what management believes is a conservative approach to secured funding by depending on it only to the extent it is deemed reliable in all market environments. The firm seeks to ascertain the trading line that the counterpart would be willing to extend to Lehman during a liquidity event. The Creditor Relations Group of the firm's Global Treasury Department conducts regular detailed reliability assessments of the firm's secured funding capacity by asset class and by counterparty to determine how much is reliable in a stressed liquidity environment. The assessments, which are mostly qualitative in nature, seek to ascertain the depth and breadth of the relationship between Lehman and the counterpart, whether the counterpart is comfortable with the asset class, meaning that the counterpart is willing to take possession of the assets if necessary, and the trading line that the counterpart would be willing to extend during a liquidity stress event. The reliable secured funding capacity as measured for each asset class is equal to the sum of the trading lines of each reliable counterpart for that asset class plus the amount of evergreen funding structures in place for that asset class. Evergreen funding structures frequently are thirteen month facilities which at twelve months of remaining life automatically extend back to thirteen month, unless the lender explicitly refuses the extension in which case the facility rolls down over twelve months. Some evergreen extendible structures have similar terms with longer durations. Reliable secured funding capacity usually is set at a significant discount to normal funding capacity.

Global Treasury has established the Reliable Secured Funding Model (RSFM) for mitigating the liquidity risk of secured funding. The RSFM operates under the following modeling assumptions. The balance sheet does not have to be reduced in size for liquidity reasons in a stress event, although it may be reduced for other risk reasons. The first three months of a secured liquidity event are the most critical and have to be carefully modeled. Past the three months, it is assumed that the market returns to "normal", as in 1998, or that the market permanently adjusts to the new conditions. The model conservatively assesses the stressed haircut level and quantitatively measures the funding requirements if haircuts widen to the stressed levels and includes the short term funding requirement of the firm.

Stressed haircuts are estimated based on discussions with market participants, both inside and outside of the firm. In most cases the stressed haircuts are significantly wider than normal haircuts, for example 12% vs. 5% for index equities.

The firm is implementing thorough revisions to the model in 2005. The revisions primarily focus on the loss of secured funding capacity and seek to complement what is



essentially a qualitative process by a more quantitative assessment. These are discussed further under “Planned Enhancements” later in this report.

## **CONTINGENCY FUNDING PLAN**

Lehman has developed and regularly updates a Contingency Funding Plan (“CFP”) or Funding Action Plan in the firm’s terminology, which represents a detailed action plan to manage a stress liquidity event, including a communication plan for creditors, investors and clients. The CFP projects potential funds erosion in a crisis situation, and forces involvement in analysis and decision-making by senior managers who under normal conditions would delegate those responsibilities. While the main focus of the plan is to provide tools to manage and generate liquidity, it also highlights the importance of communication, both internally and externally, and the ability of the firm to quickly mobilize resources and information to optimize reaction to a crisis. The plan provides guidance on addressing various potential contingencies by clearly defining what actions need to be carried out, who is responsible for these actions, and what outcome should be expected.

The contingency plan considers two types of liquidity stress events; a firm-specific event, where there are no issues with overall market liquidity, and a broader market-wide event, which affects not just Lehman but the entire market.

In a firm-specific event, the firm assumes that there is no access to the unsecured funding market for a full year with full reliance on the liquidity pool being available to the holding company and its unrestricted subsidiaries to continue to fund the balance sheet. Minimizing refinancing risk in the debt portfolio by limiting maturity and investor concentration is the principal liquidity risk mitigants in these circumstances.

In a market liquidity event, in addition to the firm-specific pressure, Lehman assumes that counterparties to whom the firm has extended liquidity facilities draw on these facilities. To mitigate the effect of a market liquidity event, the firm has developed access to additional liquidity sources beyond the liquidity pool at Holdings. These sources include unutilized funding capacity in bank subsidiaries, LBB and LBBAG, and unutilized capacity in bilateral bank facilities.

## **GOVERNANCE**

### **Corporate Governance of Liquidity and Funding for the Firm**

Governance of liquidity and funding is an integral part of the overall governance framework of the firm. Governance around liquidity and funding is affected at three levels: (1) the Board of Directors, (2) senior management and firm-wide committees, and (3) Global Treasury.

The Board of Directors reviews the annual capital plan and approves the dividend and stock repurchase policies. The Board of Directors are updated on liquidity and funding by the Chief Administrative Officer and the Chief Financial Officer as a part of their regular briefings. The Finance Committee of the Board also reviews risk, including liquidity risk, in January and at its mid-year meeting. The Board has delegated most liquidity and funding decisions to the firm's senior management and to several high-level governance committees. The delegation of most liquidity and funding decisions to the firm's senior management is generally consistent with the approach of other securities firms.

The Finance Committee of the Board, chaired by Dr. Henry Kaufman, reviews and advises the Board on the financial policies and practices of the firm, including liquidity, capital, balance sheet and risk. Its responsibilities also include annually recommending to the Board the firm's dividend policy and stock repurchase plan. Lehman's Finance Committee of the Board is not as closely involved in many liquidity and funding decisions as the finance committees at many other firms. Much of this responsibility has been delegated to senior management, the Management Finance Committee, and Global Treasury.

Senior management and the Management Finance Committee, a completely separate committee from the Finance Committee of the Board, are responsible for developing, implementing and enforcing the liquidity, funding, and capital policies. The CFO is chairman of the Management Finance Committee and its members include the Treasurer, Financial Controller, Capital Markets Controller and Co-heads of International Finance, as well as other senior employees across the global finance department including Treasury, Product Control and Financial Control. This committee is responsible for policies relating to cash capital, liquidity, and balance sheet size as well as capital allocations to business units. The responsibilities also include establishment and enforcement of capital and funding limits which ensure that the firm is not exposed to undue funding or liquidity risk. The Management Finance Committee responsibilities include oversight and implementation of policies including capital and funding limits setting.

In addition to the Management Finance Committee's policies responsibilities, it reviews the firm's liquidity, funding, and capital positions weekly. Among the weekly tasks of the Management Finance Committee is reviewing the 90-day forward and one year forward liquidity position for the holding company and each of the broker dealers including explanations for week over week changes. The cash capital positions of all businesses are reviewed along with explanations of changes and forecasted usage. The investment performance of the liquidity pool is reviewed. Lehman debt issuance and spreads are reviewed. The financial position and pipeline for the Lehman Brothers Bank and Lehman Brothers Bankhaus are reviewed. Balance sheet targets for month-end and quarter-end are reviewed by division among the other responsibilities performed by this committee.

Global Treasury administers the development and implementation of the Funding Framework and advises senior management on major capital funding decisions. Treasury has the delegated authority to implement capital funding decisions other than “major funding decisions”, but as a practical matter the firm states that capital funding decisions are reviewed with senior management of the firm regardless of size before going forward.

Global Treasury senior management performs the analysis and recommends limits at the firm and division levels to the management finance committee as a part of the annual budgeting process after consulting with various members of senior management, including the business units.

Additionally, certain liquidity and funding issues are also handled elsewhere including the Asset Liability Committee (ALCO) which coordinates the firm’s strategy around secured funding, debt issuance and liquidity management. The committee meets weekly and is comprised of members from Treasury, the Fixed Income and Equities funding desk and selected product controllers.

There is a weekly meeting between Treasury and the Syndicate Desk that focuses on recent trends in the debt markets and issuance opportunities for Treasury in the U.S., Europe and Asia. More frequent meetings are held near issuance times to refine details of the issuance such as syndication strategy and issuance amount. The Board of Directors has authorized the Global Treasurer and the Global Head of the Asset Liability Management function within Global Treasury to issue debt. In practice, all recommendations are reviewed with the CAO and CFO for their approval.

There is also a daily morning conference call providing one of the main forums within Treasury to discuss liquidity and funding issues. Every day, the liquidity of the firm and its major broker dealers is reviewed, and changes in liquidity numbers are explained. Investment decisions for the liquidity pool and recent market trends are discussed.

### **Governance Relating to Capital Planning Policies**

Capital planning policies governance relates to the following:

- Balance sheet and capital plan allocation
- Common stock dividend and stock repurchase
- Capital infusion and distribution
- Guarantees

Capital planning is a critical aspect of the firm’s overall management. This responsibility is administered by the Financial Planning & Analysis function within Treasury at Lehman Brothers. During the fourth quarter of each year, the Business Planning and Analysis Group in Finance leads the global budget process for the firm, in which Treasury and the Financial Planning & Analysis are actively involved. Treasury’s role in the budget process is to recommend a comprehensive capital plan with policies on common stock dividend, stock repurchase, balance sheet management, and debt issuance.

The goal of the capital plan is to balance the business units' requests for financial resources against the firm's capital availability, while addressing competing factors such as a need to support business growth, maintain a track record of steady and sizeable percentage increases in dividends, offset compensation-related equity award dilution and maintain a capital structure consistent with a credit ratings profile of at least a strong "A".

Treasury maintains the capital plan on a continuous basis and monitors all of the variables which affect the plan. Any material changes are brought to the attention of the Global Treasurer and CFO for review and approval.

Additionally, the Firm's funding, capital and balance sheet positions are reviewed weekly by the Management Finance Committee, which is responsible for developing, implementing and enforcing these financial policies.

### **Funding Framework Governance**

The governance of the Funding Framework, which is discussed above under "Adequacy of Liquidity", is a key part of the liquidity and funding governance. As stated above, the Funding Framework is defined by the four pillars of liquidity management. The models, policies, procedures, and plans that are associated with the funding framework have been documented, widely distributed, approved by senior finance management and are reported against on a monthly, weekly, and, in some cases, daily basis. This set of policies and models has already pre-determined much of the decision making process around liquidity risk management. Therefore, the governance is required to be both simplified and transparent. Among the decision making that takes place based upon the results of these models is when to raise funds and how to invest funds.

This framework and these policies and models define a set of tangible and quantifiable policies for managing liquidity and funding risk. Any proposed changes to these policies are reviewed by the global treasurer, presented to the management finance committee, communicated to relevant front office businesses and, depending on the materiality, signed off by the global CFO.

### **BALANCE SHEET MANAGEMENT**

Balance sheet management is integrated with the budget and capital plan. The budget and capital plan are presented annually to the Finance Committee of the Board of Directors. The annual budget and capital plan of the firm establish budgets for operating the business, as well as financial and risk objectives including the firm's risk appetite, capital, leverage, and balance sheet size for the upcoming year. Development of the budget takes several months with input from all functions in the firm. Execution of the budget is management's responsibility, including management and control of the balance sheet. Finance under the management of the Finance Controller, Ed Grieb, is responsible for balance sheet control and works closely with the businesses and other responsible

organizational functions. Product control “owns” month end inventory balance management. They work closely with the business units which manage to leverage targets as well as asset and product limits.

The size of the balance sheet is determined primarily by the firm’s risk appetite, acceptable levels of leverage, and capital, which are all established in the budgeting process, reported against and actively managed. Balance sheet growth is permitted as long as it can be justified and is within the firm’s risk appetite and levels of leverage. The credit rating agencies are very concerned about leverage. Leverage is a key consideration at Lehman, and there is emphasis on management of leverage, balance sheet size, liquidity, financial strength, and improving the credit rating.

### **Highly Liquid Balance Sheet**

Lehman Brothers maintains a highly liquid balance sheet and marks to market nearly all of its assets daily. A significant part of the firm’s assets are readily funded in the secured financing markets, predominantly through repurchase agreements and securities lending.

Total assets for Lehman Brothers Holdings, Inc. were \$357 billion and \$364 billion at November 30, 2004 and February 28, 2005 respectively. The firm’s Fixed Income Division is the largest user of balance sheet assets and has the largest funding needs on both a secured and unsecured basis.

### **Balance Sheet Targets**

Balance sheet targets are developed for the firm and its divisions each year as a part of the capital plan. The balance sheet capacity is a function of target leverage ratios, equity, business opportunities and risk appetite. During the capital planning and budgeting process, the divisions submit to Treasury their requests for monthly balance sheet levels based on their revenue budget. Treasury recommends divisional targets. The balance sheet targets are reviewed and approved by the CFO and the Management Finance Committee. Once approved, the divisional CFO is responsible for allocating the monthly balance sheet limits on a regional and product level.

Leverage and the leverage ratio are key metrics used to manage the balance sheet for the total firm and for divisions, including the fixed income and equities divisions. The leverage ratios are considered critical to balance sheet management because one of the firm’s primary goals is to improve its credit ratings. Having a capital structure and leverage ratios consistent with ratings agency requirements is critical to improving the firm’s credit ratings. While Lehman has made some progress recently, their credit ratings are still not as high as those of Merrill Lynch, Goldman Sachs, and Morgan Stanley. Yet, much of their debt trades with similar spreads in the secondary markets. Lehman Brothers has been working persistently with the credit rating agencies to get upgraded.

The leverage ratio has been receiving special focus in the budgeting and management process. Management also believes that the leverage ratio is an excellent tool for managing the balance sheet and assuring profitable operations. Assets, which are in the numerator, are not allowed to increase unless equity, which is in the denominator, also increases.

### **Less Liquid Assets**

The liquidity of the balance sheet is closely analyzed as part of the analysis of cash capital requirements. The firm's definition of illiquid assets not only includes non trading assets such as fixed assets, goodwill, deferred tax assets, and private equity investments, but also assets that lack liquidity in a stressed event and are 100% cash capitalized by Lehman Brothers. These include trading assets such as commercial whole loans and mortgages as well as both rated and not rated corporate loans. Derivatives, haircuts on liquid assets and certain other assets including unencumbered assets left in the box are 100% cash capitalized by the firm, which is viewed as a conservative approach.

Less liquid assets at February 28, 2005 amounted to \$26.6 billion. Significant categories of trading assets included commercial whole loans and mortgages of \$14.4 billion, corporate loans of \$5.1 billion, and derivatives of \$1.8 billion. Illiquid assets, including fixed assets of \$1.8 billion, goodwill of \$3.3 billion, operational cash at banks of \$2.1 billion and deferred tax assets of \$2 billion, totaled \$12.2 billion at February 28, 2005.

The amounts of illiquid and less liquid assets are monitored by Global Treasury. Increases in these assets increase the amount of cash capital required by the firm. The information is reported and reviewed weekly at the Management Finance Committee meeting.

### **TOTAL CAPITAL – FUNDING AND CAPITAL RESOURCES**

Total capital, which is long term debt plus stockholders' equity, is a measure of financial strength because it aggregates long term funding sources. Total capital for Lehman Brothers Holdings, Inc. was \$75.1 billion and \$71.4 billion for the quarter ended February 28, 2005 and the year ended November 30, 2004, respectively. Total capital of \$75.1 billion at February 28, 2005 was composed of \$59.3 billion of long term debt and \$15.8 billion of stockholders' equity. Total capital of \$71.4 billion at the year end was composed of \$56.5 billion of long term debt and \$14.9 billion of stockholders' equity. The firm's total capital is substantially higher than the \$58.0 billion at the prior year ended November 30, 2003 because of a significant increase in long term debt from \$45.5 billion as well as the growth in stockholders' equity. Long term debt includes \$1.0 billion of junior subordinated debt with a 49 year maturity and provisions that allow the firm to defer interest payments for up to 20 quarters. The firm and a leading rating agency tend to view these securities as equity capital.

In terms of unsecured funding, as of February 28, 2005, Lehman had outstanding \$56.2 billion in long-term debt and \$3 billion in short-term debt, including \$1.7 billion in commercial paper. Lehman diversifies the sourcing for its long-term debt by issuing both fixed and floating rate securities denominated in US dollars, Euros and the Japanese Yen, all of which are generally swapped into U.S. dollar LIBOR. As of November 30, 2004, the \$56 billion in outstanding long-term debt issued by Lehman fell into the following buckets:

US fixed-rate	\$21 billion (37%)
US floating-rate	\$15 billion (26%)
Non-US fixed-rate	\$7 billion (12%)
Non-US floating-rate	\$14 billion (24%)

Typically, Lehman’s long-term debt issuances are sized to qualify for the Lehman Bond Index (\$250 million for fixed-rate; \$300 million for floating-rate). Lehman further seeks, with respect to size, timing and maturity, to minimize the impact of an issuance on the yields of its previously issued bonds. This reduces the volatility risk of the existing bondholders.

Lehman further diversifies its long-term debt issuances by offering different types of products. For example, in addition to “plain vanilla” senior notes, it issues structured notes of various types in the US, Europe and Asia. For example, in 2004, it issued \$7.1 billion in structured notes across the following product types and jurisdictions:

	<u>US</u>	<u>London</u>	<u>Asia</u> (Millions)
Credit Linked	\$18	\$385	\$432
Equity Linked	\$1,488	\$1,636	\$992
Interest Rate	\$798	\$886	\$48
Other	\$80	\$183	\$225

The purchasers of Lehman’s structured notes tend to be different than the purchasers of its senior notes. In fact, the structured note purchasers frequently approach Lehman because they need a security with a particular type of characteristic to meet a specific need (e.g., hedging). That is, the credit spread component of the note is not the primary motivation behind the purchase. Generally, the embedded derivatives in the bonds are hedged by Lehman’s trading desks.

The firm seeks to diversify the creditor base when issuing unsecured debt, preferring investors who are expected to hold the investments rather than those who would trade quickly in stress situations.

Lehman monitors the buyers of its long-term debt at issuance. Of its outstanding US debt, there were 92 investors who purchased more than \$50 million at issuance. The largest purchase by an investor was \$1.1 billion. Of its outstanding European issuances, there were 90 investors who purchased more than \$50 million at issuance. The largest purchase by an investor was \$1.2 billion.

Secured funding represents a significant part of the funding for the firm. The firm uses the Reliable Secured Funding Model (“RSFM”), which is discussed above, in managing liquidity risk relating to secured funding availability.

Lehman funds its prime broker customer lending on a secured basis by using customer collateral. This raises the risk that, in a stress event, Lehman would have to restrict its prime brokerage activities because it could not use customer collateral to re-fund an existing financing or enter into a new financing. To mitigate this risk, customer financings are funded through term transactions where the tenor of the funding transaction is at least as long as the term of the customer financing.

**TOTAL FUNDING (\$ in millions)**

	February 28, <u>2005</u>	November 30, <u>2004</u>
<b>Short-term borrowings:</b>		
Commercial paper & short term debt	\$ 3,079	\$ 2,857
Securities sold under agreements to repurchase	104,951	105,956
Securities and other inventory positions sold but not yet purchased	97,209	96,281
<b>Long-term borrowings:</b>	59,366	56,486
<b>Stockholders' equity:</b>	<u>15,754</u>	<u>14,920</u>
	75,120	70,406

Note that bank customer deposits are a source of funding but are included in customer payables and are not separately disclosed by the firm.

**CREDIT FACILITIES**

The firm maintains two committed revolving unsecured credit facilities. First, the holding company maintains a \$1.5 billion revolving credit agreement with a syndicate of banks whose term runs through April 2007. This committed credit facility is a working capital facility that is regularly drawn upon in the normal course of business and is fully drawn from time to time. The firm believes that this eliminates the signaling effects of drawing on the facility, and differentiates it from some other firms where the credit facility is a back stop facility and not drawn or seldom drawn in full. This credit facility



contains covenants that require the firm to maintain a specified level of tangible net worth. There is a second multi-currency unsecured committed revolving credit facility of \$1.0 billion with a syndicate of banks for Lehman Brothers Bankhaus AG, the European bank affiliate. This facility has a term of three and a half years expiring on April 26, 2008. In the firm's view, any amounts drawn on the facilities would qualify as cash capital (i.e., debt with a maturity greater than one year). The facilities do not contain provisions that would permit the lenders to cancel them if Lehman suffered a material adverse event other than requiring the firm to maintain tangible net worth of \$7 billion (currently the firm has \$11.6 billion) and meet all subsidiary broker-dealer capital requirements. They also contain pricing provisions under which interest on drawn amounts increases if Lehman's credit rating falls. Lehman's intent is to regularly draw down 25-30% of each facility's capacity. This mitigates the possibility that drawing on the facility would send an adverse signal to Lehman's creditors and the marketplace. Lehman intends to use the drawn amounts for general corporate purposes. Lehman believes the advantages to using the facilities include that they, (1) are cheaper than issuing long-term debt, (2) provide greater flexibility than is obtained through issuing long-term debt, and (3) strengthen Lehman's relationships with the banks involved. There were no borrowings under either credit facility at either February 28, 2005 or at November 30, 2004.

The firm also maintains several billion dollars of committed secured bilateral bank facilities, which increase the funding flexibility. The funding flexibility in these facilities is increased because they are cross currency, cross entity, and cross product facilities that are regularly used.

## **CREDITOR RELATIONS GROUP**

Lehman's Global Treasury organization includes a group responsible for creditor relations. Heidemarie Echtermann, a managing director, heads the group and reports directly to Lehman's Global Treasurer. The group has a global staff of 18. The group's core mission is to source unsecured credit for Lehman. In the last four years, however, its mandate has expanded to "creating partnerships" with creditor banks. For example, creditor relations seeks to identify products offered by its banks that Lehman could assist in distributing. The goal is to develop lasting and mutually beneficial relationships with the banks in order to maintain access to unsecured credit and avoid a situation where a bank walks away from Lehman based on a lack of information and trust (as occurred in 1998). The creditor relations personnel stay in close contact with the bank personnel and seek to develop relationships throughout a given bank's chain of command. The group holds annual creditor meetings in which Lehman's business strategies, liquidity management, and credit and market risk policies are reviewed. Lehman's intent is to make these policies sufficiently transparent to the creditors and, thereby, instill confidence in how the firm is managed. Currently, Lehman has relationships with 55 banks of which 41% are in the US, 48% in Europe, and 10% in Asia.

## PROPOSED ENHANCEMENTS

The enhancements generally fall into three categories. First, there are improvements to the Funding Framework, which offer better ways to access and mitigate the liquidity risk faced by the firm. Secondly the firm is developing new funding vehicles, which are more reliable and less expensive than the existing sources. Third, the firm is seeking to improve its operational effectiveness of secured funding.

The major enhancements for 2005 relating to liquidity and funding include a new framework to access and mitigate liquidity risk for secured funding. The Reliable Secured Funding Model, which sets the rules around secured funding, will be updated and expanded. The current model was built primarily around the Lehman-specific events that occurred in the Fall of 1998. The primary revision focuses on the loss of secured funding capacity and attempts to compliment what is essentially a qualitative process by a more quantitative assessment of how secured funding availability could diminish. The loss of secured funding would be a major event that may have far reaching implications, many of which would be outside of the firm's control. Yet, management wants to prepare as best they can for such an occurrence.

The policy and procedures on structured notes is being reviewed with the objective of more effectively accessing the funding benefit of structured notes.

New and expanded banking opportunities are being analyzed in several areas including industrial loan corporations, commercial banks, and a new conduit structure to mitigate contingent liquidity risk for high grade unfunded loan commitments. The firm is working on an on-balance sheet conduit structure that would provide prefunding to mitigate liquidity risk of the unfunded loan commitment portfolio. The conduit would be fronted by a highly rated European bank and would be able to issue structured liquidity notes even in the case of a Lehman specific liquidity event. The industrial loan corporations are subject to the same regulations as state-chartered commercial banks but do not require that the parent company be regulated as a Bank Holding Company by the Federal Reserve Board. The main benefit of a commercial bank would be to provide an additional reliable funding source that is less expensive and would have access to the discount window of the Federal Reserve, which could be useful in a major liquidity event.

There is interest in improving secured funding operational effectiveness. That is the focus of the "Triventure" initiative, which is a joint venture between Treasury and the Fixed Income and Equities repo desks. This is a firm wide effort also involving the front office, information technology and operations. Lehman funds an average of \$450 billion of collateral on a secured basis each day and recognizes that even small improvements can result in risk reduction and increased efficiencies. The firm has found that the coordinated effort during the last two years to improve the overall funding process has yielded a series of initiatives to make improvements, some of which are in progress. Continued improvements are being pursued. They include strengthening the reliability of

secured funding by structuring transactions to support certain businesses and related transactions while optimizing customer and triparty providers synchronization, real time intraday stock record, one global funding platform, leverage equities platform to fund certain fixed assets reducing box positions, boxed positions analysis to reduce the amount of unintentionally boxed collateral that is funded by cash capital, cross entity clearance consolidation, stock loan depot consolidation.

## **STOCK REPURCHASE PROGRAM**

The determination of the appropriate amount of equity is affected by a number of factors, including the amount of "risk equity" the businesses require, rating agency considerations, balance sheet leverage and the dilutive effect of equity-based employee incentive programs. Equity requirements are constantly changing, and Lehman actively monitors its requirements.

The principal purposes of Lehman's stock repurchase program were historically to manage the company's equity capital relative to the growth of its business and risk requirements, and to offset the dilutive effect of equity-based employee incentive programs. The repurchase program is implemented through regular open-market purchases as well as through the acquisition of mature shares from employees upon stock option exercises and the withholding of shares for required tax withholding upon option exercises and conversion of restricted stock units to freely-tradable common stock. During 2004, Lehman repurchased approximately 29.0 million shares of its common stock at an aggregate cost of approximately \$2.3 billion, or \$78.12 per share, as authorized by the Board of Director. During the first quarter of 2005, Lehman repurchased approximately 8.6 million shares of its common stock at an aggregate cost of approximately \$771 million, or \$89.15 per share, as authorized by the Board of Directors.

Stock repurchases are undertaken to offset the dilutive effect of equity-based employee incentive programs on earnings per share over time. When evaluating the net funding requirements of stock repurchases, the firm considers the cash outflows net of the proceeds received from employees upon the exercise of stock options, the incremental tax benefits from the issuance of stock-based awards and the value of employee services received—as represented by the amortization of deferred stock compensation—that will be settled by delivering shares of common stock instead of by paying cash.

For 2005, Lehman's Board of Directors has authorized the repurchase of up to approximately 65 million shares of common stock principally to offset dilution due to employee stock plans. Of this amount, approximately 35 million shares were authorized for repurchase in 2005, and up to an additional 30 million shares were authorized for repurchase in fiscal 2005, subject to market conditions, to meet 2006 requirements.

## CREDIT RATINGS

Like other companies in the securities industry, Lehman relies on external sources to finance a significant portion of day today operations. The cost and availability of unsecured financing generally are dependent on short term and long term credit ratings. Factors that may be significant to the determination of the firm's credit ratings or otherwise affect the ability to raise short term or long term financing include earnings trends and volatility, profit margins, cash liquidity and liquidity management, capital structure, risk levels and risk management, geographic and business diversification, and the firm's relative position in the markets in which it operates. A deterioration in any of the above factors or a combination of these factors may lead rating agencies to downgrade the credit ratings, which would increase the cost of certain types of unsecured financings and triggering additional collateral requirements in derivative contracts and other secured funding arrangements. In addition, debt ratings can affect certain capital market revenues, particularly in businesses where longer term counterparty performance is critical, such as OTC derivative transactions, including credit derivatives and interest rate swaps. At February 28, 2005, the firm would have been required to post additional collateral pursuant to derivative contracts and other secured funding arrangements of \$228 million in the event of a one notch downgrade of the senior debt and \$610 million in the event of a two notch downgrade.

Lehman Brothers Holdings, Inc. (Holdings) and Lehman Brothers, Inc. (LBI) short term and long term credit ratings as of February 28, 2005 were as follows:

	<u>Holdings</u>		<u>LBI</u>	
	<u>Short-term</u>	<u>Long-term</u>	<u>Short-term</u>	<u>Long-term</u>
Dominion Bond Rating Svc	R-1(middle)	A(high)	R-1(middle)	A(high)
Fitch Ratings	F-1	A+	F-1	A
Moody's Investor Service	P-1	A1	P-1	A1
Standard and Poor's	A-1	A	A-1	A

## V. CONCLUSIONS

The review of the liquidity risk management functions of Lehman Brothers found no material deficiencies. There are a number of planned enhancements, which are described above and were discussed with the firm. The staff will review these with the firm as part of its ongoing supervisory program.

The Lehman Brothers approach to the liquidity pool and cash capital differs from the traditional approach that has been seen in the other securities firms. The liquidity pool as viewed by Lehman Brothers includes the undrawn portion of the holding company's \$1.5 billion committed working capital credit facility whereas the traditional approach does not include such facilities in the liquidity pool. The SEC staff view is that such facilities are distinct from cash and unencumbered liquid securities that can be readily hypothecated. Regarding cash capital, the Lehman Brothers approach is different from that used by other firms in that committed unsecured and secured facilities with remaining terms of over one year are included as a source of cash capital at the holding company in addition to equity and long-term debt with a remaining term greater than one year. While the staff recognizes that committed secured and unsecured facilities may be viewed as a source of funding in managing liquidity risk, it does not agree with changing the traditional definition of cash capital to include such facilities. For purposes of analysis, the staff will adjust the liquidity pool and cash capital numbers accordingly.

Lehman Brothers currently has adequate liquidity and sufficient capital to fund its current business in the staff's opinion.

Overall, with respect to liquidity and funding risk management, Lehman Brothers has an adequate liquidity and funding risk management function to become a CSE, and accordingly, it is recommended that the application by Lehman Brothers to become a CSE, as it pertains to the liquidity and funding risk management function, be approved.

**Information Memorandum  
Non-Public**

To: Robert Colby, Deputy Director  
Michael Macchiaroli, Associate Director  
Matthew Eichner, Assistant Director  
Division of Market Regulation

From: Lori A. Richards, Director  
Mary Ann Gadziala, Associate Director  
Office of Compliance Inspections & Examinations

Re: CSE Examination of Lehman Brothers, Inc. and Lehman Brothers Holdings, Inc.

Date: September 15, 2005

**Executive Summary**

Staff from the Office of Compliance Inspections & Examinations (exam staff in headquarters and the Northeast Regional Office), herein referred to as “staff,” conducted a risk management and internal-controls based examination of the consolidated organization, including the registered broker-dealer, Lehman Brothers Inc., (collectively “Lehman” or the “firm”), in connection with the firm’s application to be regulated as a consolidated supervised entity (“CSE”) pursuant to Rule 15c3-1 under the Exchange Act.<sup>1</sup>

The examination focused on the following areas: internal audit; the firm’s internal control systems for managing market risk, legal and compliance risk, credit risk, funding and liquidity risk, and operational risk; Sarbanes Oxley internal controls; anti-money laundering controls; and net capital computations.<sup>2</sup> Staff conducted various tests of the firm’s implementation of its procedures and consistency with the requirements under Exchange Act Rule 15c3-4 focusing on the following businesses conducted within several unregulated material affiliates: credit and interest rate derivatives, private equity investments, and real estate and leveraged loans.<sup>3</sup>

The examination revealed a number of weak controls, procedures, and/or risk management systems across various areas of the firm. A number of the internal controls processes we examined appear to be in the early stages of development or are manual and informal in

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<sup>1</sup> Approximately 21 staff persons participated in the examination. The document request letter initiating the examination was sent to the firm on May 5, 2005.

<sup>2</sup> As of the date of this memorandum, the staff’s capital review is ongoing.

<sup>3</sup> These business activities are conducted within: Lehman Brothers Inc., Lehman Brothers Holdings, Inc. (the parent holding company), and the following unregulated material affiliates: LB Derivative Products Inc., LBI Group Inc., LB Special Financing Inc., and Property Asset Management Inc.

nature (e.g., legal and compliance program and system reconciliations). Overall, the systems and procedures at Lehman were not as developed and were more informal, compared to the other CSE applicants examined. We note that the examination was delayed and some reviews were abbreviated because the firm did not initially provide staff with documents and access to key personnel in a timely manner.

The reviews conducted by different examination teams identified similar weaknesses, including informality of the firm's committees; absence of documentation of actions taken; and minimal written framework setting forth the control processes. The more significant deficiencies appeared to exist with respect to various aspects of the following tested controls: the coverage of the compliance program; controls to assess legal contract enforceability; compliance surveillance and monitoring; internal audit coverage; credit risk monitoring and trade capture; credit and market risk system reconciliations; position back-testing and scenario analysis; and the transaction review and approval processes for principal investments.

Staff held an examination exit interview with the firm on September 8, 2005, outlining findings from the examination. This memorandum summarizes the examination findings that the staff deems most significant. Each finding is followed by the firm's initial verbal response (if any) in italics. While Lehman has proposed corrections or enhancements of its control systems in many of the particular areas cited by staff, it may be beneficial for the firm to conduct a comprehensive risk management self-assessment to ensure compliance with Rule 15c3-4's requirements with respect to internal risk management controls.

## **Significant Examination Findings**

### Legal & Compliance (L&C)

The L&C risk management committees, including those committees with responsibility to approve transactions, act on an informal basis. For example, the staff found multiple concerns with the effectiveness of the new product committee approval process: no specific L&C review prior to committee submission, no formal committee vote to approve products, no independent controls on conditional committee approvals, and no formal post-implementation review process. Complex structured finance products were reviewed by various committees on an *ad hoc* basis. Many of the committees with L&C responsibility lacked formal charters, written procedures, and/or minutes.

The firm has not created a comprehensive L&C risk management system. In general, it appears that the firm has not assessed the applicable legal and regulatory standards that may limit the firm's activities, that require the firm to take action, or that impact the firm's contractual obligations. No L&C controls (monitoring or surveillance) have been created for unregulated products. L&C controls for regulated products are limited and do not appear to cover a number of activities that can create compliance risks for the firm. For example, no independent surveillance was done for the firm's individual investor business; equity wash trades, parking, or marking the close; sale of restricted securities to non-qualified investors;

or mark-ups for municipal securities. For other subject matters, the firm relied on manually intensive and/or limited scope monitoring reviews. Exceptions were at times closed for reasons unrelated to current legal standards. The firm did not have controls to track sales and trading personnel who routinely entered into trades in the absence of a master agreement or controls to ensure that material contract terms from master agreements are appropriately entered into the firm's Entity Master System, which feeds the margining systems.

The firm has limited documentation of the L&C system, including L&C reviews and reports. No written procedures or mission statement exist for the Legal function. Written procedures for the Compliance function, the Contract Negotiation and Documentation function, and the business units are generic and provide insufficient guidance as to specific responsibilities. The firm did not have a formal system for updating written procedures. No written guidelines are provided to the business units for hiring outside counsel, and it is unclear whether the business units have been instructed to inform the Legal function when they hire outside counsel.

*Firm Response: Firm personnel stated that they take the staff's findings regarding the L&C function seriously and will be evaluating each finding to determine what steps should be taken. This may include the institution of more formalized processes and documentation and, to the extent prudent, the development of technological systems to automate manual processes and/or the improvement of already-existing systems to enhance processes.*

Staff Comment: The firm did not address the need for a comprehensive L&C risk assessment, nor did the firm identify any specific improvements that would be forthcoming.

### Internal Audit

In years 2004 and 2005, the Corporate Audit Department's ("CAD") audit program has focused heavily on Sarbanes Oxley Act 404 ("SOX") audits, which are important in fulfilling SOX requirements but are generally limited to financial controls. Areas that are typically covered in a traditional full scope audit, such as risk management, compliance, and supervisory controls are not being tested. Furthermore, based on the firm's assertions that more comprehensive audits will be conducted going forward in addition to the current level of SOX audits, it is uncertain as to whether CAD's current staffing level will be adequate. Lastly, CAD did not report all high risk SOX audit findings to the Audit Committee.

*Firm Response: All key risk management controls will be covered annually beginning in year 2006 and going forward in order to ensure the accuracy of the capital calculation and compliance with CSE guidelines. CAD has begun conducting full scope audits, including compliance and supervisory controls of Capital Markets businesses in 2005 and will continue to cover these areas consistent with the following audit cycle: high risk areas 12-18 months, medium risk areas 18-36 months, and low risk areas 36-60 months. CAD will memorialize this audit cycle in its policy manual. Furthermore, the Audit Director indicated that CAD will ensure it has adequate staff to cover the audit plan, annual audit requirements, and the audit cycle.*



## Credit Risk Management

Staff found procedural and systems weaknesses in the credit risk area. Staff found that the CAMEO margin system reduces post margin exposure after a margin call is made, but before collateral is received by the firm. This is of concern because the firm's post margin exposure or current credit exposure to the counterparty is understated until the collateral is received, which may be a one day period or more. In addition, this understated post margin exposure amount is fed to the Credit Department, which uses this calculation in assessing credit exposures for counterparties.

Staff found that certain interest rate product transactions (bond index swaps and contingent swaps) are not being captured in the system that calculates maximum potential exposure. The firm does not have an automated daily reconciliation between the credit risk work station ("CWS") and the system that calculates maximum potential exposure ("MPE"), and between CWS and the firm's books and records. This could lead to an inaccurate exposure calculation due to positions not being captured by the MPE system and inaccurate books and records.

The staff's review also found that in some instances credit analysts did not apply proper procedures in determining a counterparty's internal credit rating, and that the counterparty credit file did not always include the information and analysis to support the analyst's internal credit rating determination. At the time of the staff's review, the Credit Department had 306 counterparties that were past due in receiving a credit review by the analyst, including several with significant exposures. In addition, several hedge fund and other lower rated counterparties trade with the firm but are not required to receive a credit review by the analyst. Finally, the firm is increasingly using MPE for risk measurement and limit setting, however it does not have a monitoring report that compares aggregate MPE counterparty or family limits versus usage.

*Firm Response: The firm stated that it plans to further discuss the issue involving the understatement of post margin exposure and needs to determine how to resolve it. The firm indicated that it plans to develop an automated monthly reconciliation between the MPE system and CWS, and between CWS and the General Ledger. However, it is in the early stages of the process. The firm estimates that this reconciliation will be in place by the end of year 2005, but it could take longer. In addition, the firm stated that once automation is achieved, it does intend to perform the reconciliation between MPE and CWS on a daily basis. The firm will need to investigate to determine whether it's feasible to perform the reconciliation between CWS and the firm's books and records on a daily basis. The firm is investigating why MPE is not being calculated for all interest rate products, and expects to have the problem resolved by year end 2005.*

*The firm also indicated that it will make some system enhancements to help ensure the proper application of the internal credit rating scoring. In addition, it plans to update its procedures to require the analyst to fully document information/analysis supporting its credit evaluation and rating. The Head of the Credit Department indicated that completing*

*counterparty credit reviews in a timely manner continues to be a priority, and they will work on the overdue counterparties with the largest exposures first. Furthermore, the firm indicated that it will require credit reviews of all hedge fund counterparties. Finally, the IT group is working on the MPE aggregate limit report for delivery by year end 2005.*

### Market Risk Management

Similar to findings in the credit risk area, staff found weaknesses in the firm's market risk control processes. The firm does not perform a daily reconciliation between the market risk system, called Lehman Risk, and the firm's books and records. A periodic reconciliation of Lehman Risk to the firm's books and records is necessary to ensure that all items have been completely captured by the system.

The current back-testing program does not appear to provide reliable validation of the firm's value-at-risk computations (which are utilized in the firm's capital calculations) and product pricing models. Back-testing is used to assess the integrity of the firm's statistical risk models. No back-testing exceptions were observed at the holding company and division levels. This appears to be the result of the firm not removing intra-day profit and loss (P&L) and any fee income or expenses from P&L data in making comparisons of expected versus actual P&L. The firm's analyses of back-testing exceptions at the business unit level are rudimentary with respect to breadth, quality, and scope of the reviews. Furthermore, the firm has conducted only two scenario analyses since July 2004. Scenario analysis is a risk management technique that projects portfolio performance resulting from a simulation of specific market events. Finally, the Model Validation Group does not prepare validation reports that clearly demonstrate the independent work it performs in validating individual pricing models that are created by the business areas.

*Firm Response: Lehman indicated that it plans to conduct quarterly reconciliations until the expected completion of the firm's automated reconciliation process on December 1, 2005. At that point, it will move towards a daily reconciliation. In addition, the firm recognizes the limitations of its current back-testing system and has a project underway to provide more accurate P&L by December 1, 2005. Furthermore, it indicated that the back-testing program was recently developed, and there are plans to improve the quality of the exception review. It is Lehman's intention to have back-testing results available on a daily basis so that clustering of exceptions should be quickly identified and analyzed. In addition, the firm recognizes the need to develop a rigorous scenario analysis program and is currently scripting scenarios that cover a broad array of market stress conditions in order to be flexible with respect to Lehman's changing risk profile. The scenario testing program is expected to be implemented December 1, 2005. In regards to model validation, the firm will prepare a one or two page summary detailing the level of due diligence performed in validating models.*

## Operational Controls and Risk Management

For interest rate and credit derivatives, the firm does not have formal reconciliations between the front-office trade capture system, the middle-office systems, and the daily P&L systems. This is a concern because there may be transactions that do not flow through the various systems and get captured in the books and records. Regarding private equity transactions, there is a lack of independence between the two approval committees (Screening Committee and the Investment Committee) and the Investment Committee does not require a minimum quorum for the approval of investments.

The firm's operational risk management function is in the developmental stage. As such, no substantive infrastructure with respect to meeting the objectives of managing operational risk throughout the organization has been developed to date, and policies and procedures have only recently been produced. As a result, the staff suspects that Lehman may be lagging its peers in addressing operational risk management requirements.

*Firm Response: The firm indicated that it is in the process of building automatic reconciliations between the various systems. Regarding the lack of independence between the Steering Committee and Investment Committee, the firm's Chief Investment Officer (CIO) stated that the screening process is more democratic in nature and consensus driven. Furthermore, the CIO stated he would consider mitigating the lack of independence by establishing a process for documenting issues discussed in meetings for potential new investments. In addition, the Global Head of Management stated that she agreed that a minimum quorum currently does not exist and should be established.*

*With respect to operational risk, the firm is aware that its peers are ahead of them in developing the infrastructure to implement an advanced measurement approach ("AMA"). AMA is a sophisticated methodology for calculating operational risk capital charges. The firm is dedicated to developing an AMA support structure and has developed an AMA Implementation Action Plan and Gap Analysis detailing the expected timetable for deliverables. The first phase of this program, Risk Identification and Data Collection is underway. Systems development and analytical model development plans are in the early stages of development. The firm does not expect to have a prototype analytical model until fiscal year 2006.*

\* \* \* \*

*A comprehensive examination report is being finalized.*

**From:** Giles, James [mailto:GILESJ@SEC.GOV]  
**Sent:** Wednesday, September 06, 2006 7:12 PM  
**To:** Levinson, Marshall (Exchange); Friedman, Robert (Exchange)  
**Cc:** Spurry, Steven; Seabolt, Robert E.; Eichner, Matthew  
**Subject:** RE: quarterly Internal Audit meeting

Marshall/Bob,

Our meetings the past two quarters have focused largely on the review of a handful of individual audits. While the review of selected audits will remain a focus of our on-going meetings, we would also like to put on the agenda going forward discussion of the audit processes in general. In that vein, we want to add a few topics for the next quarterly audit meeting on November 16, 2006.

The overall goal of these additional discussions is to get a better sense for the bi-directional flow of information between the Internal Audit Department and both the Audit Committee of the Board as well as the Internal Audit Advisory Committee. As part of these discussions, we also like to request some documentation that will help us prepare for the discussion.

- I. Interactions with the Audit Committee of the Board
  - a. Walk us through a typical quarterly meeting agenda with the Audit Committee.
  - b. What reporting does the IA department provide to the Audit Committee (and what does the Audit Committee request)?
  - c. What is the nature of ad-hoc meetings with the Audit Committee
    - i. When would IA or business areas make special presentations to the Audit Committee?
    - ii. Who initiates these presentations/discussions?
- II. Interactions with the Internal Audit Advisory Committee
  - a. We understand that the Committee meets bi-monthly and that this meeting is a brainstorming session to decide what areas IA should look to do special projects. What is IA's input into the determination of special audits to perform?
  - b. Are all special audits that IA performs originated from the Advisory Committee?
  - c. What is the Advisory Committee's input into the risk assessment process and the final audit plan for the year/cycle?
  - d. What reporting does the IA department provide to the Advisory Committee (and what does the Advisory Committee request)?
- III. Follow-up Tracking System
  - a. Demonstration of FUTS
  - b. Linkage of unresolved issues back to risk assessment
  - c. Does IA provide any summary reporting of unresolved issues to Audit Committee or senior management?
- IV. CSE Review of Risk Management and Governance
  - a. Formal description of Bear Stearns' specific process for conducting the review of risk management and governance under the framework developed by the five firms.
- V. Documents requested
  - a. Reporting package provided by IA to the Audit Committee of the Board for the last quarterly meeting.
  - b. A list of special presentations IA has made to the Audit Committee during the past 12 months.

- c. A list of special presentations that business areas have made to the Audit Committee during the past 12 months.
- d. A copy of all special presentations to the Audit Committee and/or Advisory Committee regarding EMC or Bear Res.

After you have had a chance to look through the email, we would like to have a brief conference call to discuss the agenda for the next quarterly meeting. As part of the call we would also like to address the content of discussions surrounding the audits selected for review. We would like to walk away from these discussions with a solid understanding of what it is the auditor(s) did on the engagement. Having the auditors give some specific examples of some of the key tests they performed as well as clearly stating what was out of scope would be helpful. Finally, in selecting our audits for review, a risk ratings matrix or listing of the audit universe by rating would be quite useful. Does the group have either of these?

Please give us a call or email so we can set up the conference call. Perhaps we could have the call on September 18th if that works for you.

Thanks,

Jim  
202-551-5536

September 18, 2006  
Conference Call with BS Internal Audit  
Re: Agenda for next quarterly IA meeting

This call was to discuss the email we sent Bob Friedman and Marshall Levinson on September 2006. That email discussed three main items:

- (1). Internal Audit processes that we wanted to focus on at the next quarterly (and on-going) IA meetings:
  - (A). Bi-directional flow of information (e.g., Interactions with the Audit Committee of the Board; Interactions with the Internal Audit Advisory Committee)
  - (B). Follow-up tracking system (see Sept. 6<sup>th</sup> email for details)
  - (C). CSE review of risk management and governance
- (2). Address the content of the discussions (i.e. the discussions on specific audits).
- (3). Process for selecting audits

**I. Internal Audit processes that we wanted to focus on at the next quarterly (and on-going) IA meetings**

We gained some additional color on the interactions between IA and both the Internal Audit Advisory Committee and the Audit Committee of the Board.

**Interactions with the Internal Audit Advisory Committee:**

Bob Friedman made it clear that this Committee serves strictly an advisory role. The committee is made up of senior people that IA can “bounce things off”. IA doesn’t have any obligation to report to this Committee and the Committee may only make suggestions (e.g. it does not decide what Special projects IA might perform but can be an input into IA’s decision to do a certain project). Rather, IA uses this committee in two ways:

(1) First, they use the committee as another source of information in planning its audit plan (e.g., confirmation of their own concerns, etc). IA will give the Committee draft copies of its audit plan and audit universe (with risk assessment levels) for the Committee to challenge. However, there is no reporting back to the Committee on these matters. IA stated that generally the business heads will see audit entities (that they are responsible for) that IA has given a low risk assessment and will try to persuade IA that it deserves to be medium or high risk.

(2) Secondly, if necessary, they will come to the group to get follow up issues closed (e.g., brings peer pressure to get things closed). I believe they said that they present a list of aged unresolved issues to the Committee twice a year (??). (*We asked for this reporting.*)

### Interactions with the Audit Committee of the Board:

Our understanding of the communications between IA and the Audit Committee seemed to be confirmed during this conference call.

Outside of the following exceptions discussed below, the only reporting from IA to the Audit Committee appears to be the submission of the audit reports. They provide no summarized information to the Committee. Bob and Marshall stated that they have had several discussions with both the Chairman and the Audit Committee in its entirety regarding the question of whether or not the Committee wanted any other type of reporting and they said they have always gotten the same answer, “no”. They didn’t want any more reporting and wanted to leave the reporting to IA’s judgment. They went on to state the Audit Committee has said that “summarization in this industry isn’t very meaningful.” “The Audit Committee doesn’t want to see this.”

Specifically, BS’ IA doesn’t have any reporting process to capture “themes” that might cut across various audit entities nor do they provide much reporting on the “following-up on issues” (e.g. outstanding audit issues not yet remediated). The other CSE firms provide this type of reporting.

### Exceptions:

- (1) Reporting on the execution of the audit plan- Bob stated that they do report to the Audit Committee regarding the execution of the audit plan (in particular around the Sept/October time frame concerning coverage of the plan). (*Ask to see these documents.*)
- (2) Special Presentations to the Audit Committee  
Bob stated that IA prefers to have those responsible for the audit entity (e.g., the business area) give presentations to the Audit Committee. For example, the new president of EMC is giving a presentation to the Audit Committee on Sept. 19<sup>th</sup> to discuss the progress in addressing issues highlighted by IA in previous audits.

It is extremely rare for IA to bring an issue to the Audit Committee’s attention. Typically, they address the issues with the business and if they don’t get the issue resolved IA may go to either the Internal Audit Advisory Committee or the Sub-Committee of the Board<sup>1</sup> to apply pressure and get an issue resolved before taking the issue to the Audit Committee. IA stated that there have been only two circumstances (in the past few years???) in which IA presented an issue directly to the Audit Committee: (1) Derivative Operations (both confirms and “breaks” in the back office<sup>2</sup>) and (2) EMC issues resulting from the exponential growth seen at the company during 2005.

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<sup>1</sup> This sub-committee includes Sam Molinaro, Bobby Steinberg, Jeff Farber, etc.

<sup>2</sup> See are previous write up of the Derivative Ops audit last quarter.

## CSE Review of Risk Management and Governance:

We asked to see a more detailed plan for how BS' IA was going to implement the audit approach under the framework developed by the five firms. Steve Angelo had previously given us a list of audits that were intended to cover the scope of this mandate, but no details were given.

Steve said that there is a more detailed scope document that is current a work-in-process that he will provide us during the Nov. 16<sup>th</sup> meeting.

## **II. Discussions of individual audits selected for review during the quarterly meetings**

There were two main changes requested concerning the dialogue we would like to have on a going-forward basis. First, we would like to dive deeper into the field work the auditors actually perform, not just re-hashing what is in the summary report. Secondly, we would like to switch from a model where the auditors come in just to answer our questions to one where they come in to explain the key points of the audit (scope, field work, findings, remediation plans, and perspective). This will hopefully provide us with a much richer understanding of the audit and should help us to then focus our questions.

## **III. Process for selecting audits**

We discussed with the IA team our desire to have a more “risk-based” process for selecting individual audits for review during our quarterly meetings. In the current process, we get a list of the audits performed during the quarter and then pick some of the audits. In selecting audits for review we aim to pick those that appear to be material to the firm and/or pick audit entities that we have focused on in our other interactions with the firm (and or industry). As a result, many of the audits we have selected this year would have fallen into these two categories: (1) EMC- representations and warranties- focused on in monthly risk meetings with Mike Alix; (2) Derivative Operations, Credit Derivatives (particular with respect to price verification) and Acquisition/Leverage Finance- from both an industry and firm perspective.

With that said, we would like to have the list of audits categorized in a way that provides both (1) the risk assessment level assigned to the audit and (2) the significance of findings for the audit. Since there is no summary reporting or rating of audits, this would be crucial in helping us select audits where the risk is high and IA has found significant issues. It would provide an objective, risk-based approach to selecting audits for review.

The IA team stated that they could provide this for us. While this process would be quite easy for firms that assign ratings to audits, the differentiation regarding the significance of findings is much less transparent at BS. However, Bob explained how one can ascertain that an audit had significant findings. As stated, the audits are not rated. To be able to find out if an audit has had significant findings, one should look at the executive



summary paragraph near the top of the audit report. The wording used for the most severe finding would be as follows “IA found material inadequacies in the internal controls or found significant violations of Firm policies and procedures”. ***While that would be the worst theoretical finding for an audit entity, IA has never written that up in a report.*** Instead, you will find the following wording in every audit report “Internal Audit did not find any material inadequacies in the internal controls or significant violations of Firm policies and procedures”. ***If the audit did have a significant finding(s), then in the same paragraph it would mention the finding specifically (The IA team gave a rough estimate of 10% for the percentage of audits that would fall into this category and they would put an asterisk next to these audits on the list send to us ).*** The EMC –Review of Representations and Warrants Department Audit is an example of an audit with a significant finding. Paraphrasing the wording in the executive summary paragraph for this audit was as follows:

“While Internal Audit did not find any material inadequacies in the internal controls or significant violations of Firm policies and procedures, it did disclose a backlog in the timely request and collection of claims and a finding that certain processes should be enhanced to ensure that policies and procedures are followed....”

If the audit did not have findings that IA felt were significant, the report would just reference the reader to a section later in the report to see issues discovered in the audit.

**DRAFT**  
**Bear Stearns Quarterly Internal Audit Meeting**  
**February 22, 2007**

OPSRA staff (Bob Seabolt, Jim Giles, and Steven Spurry) met with Marshall Levinson, Senior Managing Director; Brent Camery, Senior Managing Director; and Stephen Angelo, Managing Director, to review the activities of the internal audit department (IAD) during the fourth calendar quarter of 2006.

**IAD Organizational Changes**

Marshall Levinson described some IAD organizational changes that were made. There are now three co-directors of IAD. Brent Camery will be responsible for New York, Steve Wexman will be responsible for IT and Bob Friedman will be responsible for everything outside New York. Bob will work full-time out of Chicago.

**Review of the Internal Risk Management Control System**

Bear Stearns' IAD issued its letter to the Commission on its audit coverage of the review of the firm's risk management and control system on February 14, 2007. The primary focus of this meeting was to discuss the audits of market risk, credit risk, liquidity risk, and operational risk, the reports on which were issued prior to February 2, 2007. These are discussed below.

**Governance - Audit Committee**

OPSRA's concern regarding the level of engagement of the audit committee precipitated by less and lower quality interaction between IAD and the Audit Committee was communicated to Sal Molinaro by Mike Macchiaroli in the meeting held on February 13, 2007. One particular area that was previously discussed between OPSRA and IAD was the development of a formal management reporting structure to the audit committee. Brent Camery asked OPSRA staff for input on the types of things that would be covered in a reporting package to the Audit Committee. We agreed to put our heads together and come up with some suggestions.

**Quality Assurance Review**

OPSRA staff queried Marshall Levinson about the Institute for Internal Auditors (IIA) standard issued in January 2002 recommending that internal audit departments engage an independent quality assurance (QA) review of their IA department every five years, the first of which should have been completed by January 2007. Levinson indicated that the decision was made, based on a cost-benefit analysis, to conduct an internal QA review, the report of which is available. IIA standards are basically a set of best practices and are not formal requirements as the IIA has no authority to require compliance with the standards.

## **Review of Audit Reports**

Prior to the meeting OPSRA staff reviewed the list of internal audit reports issued from November 1, 2006 through February 2, 2007. Of the 38 reports issued the staff selected four for detailed discussion with the department heads and staff that conducted the audits and an additional four were selected to be made available for review by OPSRA staff. The reports selected are identified on the list provided (see J drive). The reports selected for detailed discussion were:

06-115 Review of the Global Credit Dept – (New York, London, Dublin) – High Risk Findings

06-131 Limited Review of Operational Risk Mgmt

07-05 Review of the Market Risk Mgmt Dept (New York and London) – High Risk Findings

07-15 Review of Liquidity Risk Controls - High Risk Findings

## **Notes on Audits Reviewed**

### **Review of the Market Risk Management Department (NY & LDN)** (drafted by Jim Giles)

#### Background and Scope:

This limited review of the Market Risk Management Department was performed as part of IA's coverage of the (1) Risk Oversight and Governance and (2) Functional Risk Management components of the firm's Internal Risk Management Control System. The audit was globally conducted, with the LDN based internal auditors primarily focused on the Model Review function since this function is run out of LDN (where both Slava and Kan are located).<sup>1</sup>

As such, the scope of this review included reviewing procedures and controls around: governance and oversight by the various market risk committees (including Risk Committee, MTM committee, and Model Review Committee)<sup>2</sup>; departmental policies and procedures; pricing model reviews; VaR model (RIO data integrity and system access (coordinated with IT Audit)<sup>3</sup>; and VaR model stress/backtesting; and review of the status of findings noted during the CSE examination and performed Sarbanes-Oxley management testing.

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<sup>1</sup> The Model Review team currently has a couple of people in NY who are focused on the Cash models (e.g. mortgage businesses). As of the time of the field work for this audit, reviews of Cash models had not yet begun. They are currently underway and we have discussed some of the reviews during our quarterly model control discussions.

<sup>2</sup> We highlighted the omission of the Executive Committee which meets monthly with CRO and meets much more frequently to discuss specific items, particularly with respect to approving lending commitments. Internal Audit agreed to include the Executive Committee within its scope during the next review.

<sup>3</sup> The VaR model review was limited to data quality and completeness of positions (i.e. more reconciliation focus), CSE follow ups (e.g., documentation), etc. and did not include any work on the firm's methodology. D&T performed a review of the VaR methodology; however, the reporting from this review was solely related to an opinion on the capital calculation footnote in the annual report.

The review of data quality of risk metrics in this review focused primarily on VaR and firm-wide scenario analysis risk metrics as these were cross-functional and performed centrally under the control of risk management. Validation of data integrity of other risk measures used by the business and risk managers in particular product spaces (e.g., aging reports for Mortgages) were done in other audits through a two-prong approach: (1) the audits of front-office systems through IA IT audits and (2) individual business/product area audits. (“Risk Management’s procedures related to price verification, aged inventory monitoring, and day-to-day transaction & trader-limit reviews will be tested as part of the individual business audits.”)

The audit entity had a High Risk rating with High Risk Findings.

From the audit report:

Our review did not disclose any material inadequacies in internal controls or significant deficiencies in internal controls over financial reporting. However, there are a number of issues that, in the aggregate, are concerning (e.g., issues concerning the completeness of trade populations used in the VaR calculation, the completeness of pricing model reviews, and the number of outstanding CSE findings).

Issues and Management Action Plans/Actions Taken:

1. Completeness of Positions Used in the VaR calculation

Regarding the completeness of positions in the VaR calculation, the issues revolved around the robustness of the reconciliation approaches performed by BUCS (formerly done by Susan Flynn). On a monthly basis, BUCS reconciles the “position files” to Datawarehouse (Firm-wide position repository used for price verification), which is then reconciled to the general ledger. However, BUCS cannot independently verify that the “position files” reconciled by them agree to the positions processed by RIO for risk calculations (for several products).

The two biggest areas of concern were: (1) The inability to reconcile several products (predominantly derivative products) where the information in RIO consists of “risk” values such as sensitivities and the information in the “position files” consist of market values. (2) Due to issues surrounding proxy trades and the unavailability of position-level data from source systems, reconciliations between the “position files” and Datawarehouse are not being performed for Credit Trading and Mortgage Derivatives.

MAP/Actions taken

Regarding the first issue, Risk management IT will implement a feed based “checksum” in RIO to display the total actual market value (or other appropriate measure, such as DV01) from each feed processed by the system. Once the above modifications are complete, each month BUCS will compare the market values, or other risk measures, displayed in RIO to the “position files” before reconciling them to Datawarehouse to

verify that the same files were processed by RIO for risk calculations. Target date 1/31/07.

*As of the date of this audit report, the check sum calculation has been put into place for most feeds; however work is on-going in this area.*

Regarding the second issue, Risk Management IT will work with Risk Managers and others to develop files representative of the positions on which VaR was based for Credit Trading and Mortgage Derivatives. Target date for IT completion is March 30, 2007. BUCS will subsequently develop and implement a repeatable reconciliation process. Target date is June 29, 2007.

*The auditors stated that this process is up and running now (ahead of schedule).*

## 2. Completeness of Pricing Model Reviews

The main finding by IA with respect to the Model Control function (including MTM committee) was that they could not substantiate Model Control's assertion that all currently used derivative pricing models had been reviewed as FAST did not maintain a comprehensive list of all derivative models they developed to allow for a reconciliation to models reviewed by the Model review team.

They also had a finding that the group had not yet reviewed existing valuation models for "cash" products. *This was of course known by everyone and at the time was a conscious choice. We however expressed concern that such a large part of their business (e.g., mortgages) had no model review, even if the models were used solely for risk sensitivities and not to price the securities/loans. Also, the Model Review Team has subsequently started to do reviews in this area and we have discussed some of these in our quarterly meetings with the team.*

The auditors found the documentation and recommendations of the reviews they sampled to be "reasonable"- *a conclusion that our group would concur with based on our limited reviews as well.*

They also found no issues with respect to the follow-up on the recommendations ("all had been implemented"). *This conclusion seemed a little odd (maybe just a result of a small sample) as the follow-up on recommendations was one area that we were concerned with after looking through the MRC minutes. The same items seemed to appear on the list over-and-over again.*

### MAP/Actions taken

FAST has created an inventory list of all "cash" and derivative models in use across the trading books of the Firm and provided the list to the Model Review Team. The list will be updated and sent to the Model Review Team on a quarterly basis. The Model Review Team will reconcile the current list to those models that have been approved by the Team by 1/31/2007 and thereafter. *In discussions with the lead auditor, he stated that all derivative models they*

*sampled from Lynx (i.e. front-office derivatives system) for the audit were included on Model Review's list of approved models.*

In addition, the listing of "Cash" models has been prioritized by the Model Review Committee and the Model Review Team plans to increase headcount with the objective of reviewing all existing "cash" models by December 31, 2007. *As previously stated, this process has already begun. However, while additional personnel were hired to review the "cash models", the group lost two of its most experienced Model Reviewers (who focused on Equity and Credit Derivatives)—This was not discussed in the IA meeting; rather was discussed in our last quarterly Model Review discussion.*

### 3. Open CSE Findings

Market Risk Management is in the process of addressing several issues identified in the SEC's CSE Examination Report. Some still being addressed include:

- Incorporating a stress calculation applicable to the Max Recovery positions (for the firm-wide scenarios).
- Calculating Mortgage Derivatives VaR in the same manner as other Derivative areas.
- Improving the Firm's clean P&L back-testing.
- Improving and documenting controls and procedures regarding the VaR model.
- Enhancing procedures around market risk functions, including pricing model validation, price verification and aging of inventory.
- Enhancing documentation with respect to the status of outstanding pricing model review issues.

#### MAP/Actions Taken

The firm has addressed some of these already (e.g. stress test for Max Recovery positions) and are currently working on addressing the other issues. Plans that we are focused on include the follow:

- We will work with the Controllers department to expand the "static" P&L backtesting process to all Whitebooks. This is an extensive process, and we expect our efforts to continue through 2008. *See our list of follow-up areas below.*
- We (Risk Management) are in the process of documenting the existing controls and procedures regarding the VaR model inputs, including the historical time series; and over the course of 2007, the Firm will continue evaluation of these procedures and controls to strengthen and formalize the processes in these areas (*we recently received the revised documentation and are currently reviewing it*).
- We (Risk Management) are in the process of supplementing our Risk Management Policy & Principles manual to provide greater specificity for key functions performed by

the department, including price verification, aged inventory process & model validation.  
Target date: 1/31/2007.

***We will request the revised Policy and Principles manual and any other more granular procedure manuals for the price verification and model validation functions.***

4. Review the Model Review Committee's Terms of Reference

The Firm needs to re-clarify the MRC's Terms of Reference regarding the authority of the Committee to elicit remedial or corrective actions stemming from the Model Review Team's recommendations made on individual models, and re-clarify the pre-approval rule that requires models to be approved prior to use.

MAP/Actions taken

Slava stated that he would review the Model Review Committee's Terms of Reference and, if applicable, request approval to any changes from the Executive Committee in NY. Target date is 2/28/2007.

*The lead auditor saw this issue as one of just re-ratifying the Terms. However, under the version of the policies we have, the terms seem too vague. Due to seeing recurring items on the MRC minutes (as part of our quarterly meetings with the Model Review Team), we became concerned about the enforcement power that the MRC (and the model control function in general) had. This was the impetus for our discussion during the last meeting with the Model Review Team concerning what role the group (and committee) played: whether purely consultative or if it actually had enforcement powers. Kan and Mike Alix stated that this was an area of discussion within the firm as well. We should follow up to see if the enforcement power of the group (and committee) has been strengthened in the policies and procedures or if they are still silent on the issue.*

OPSRA Follow-Up Items

**As part of our on-going supervisory work we plan to set up separate meeting(s) to discuss the following issues:**

**(1). Reconciliation of VaR population (i.e. issues raised in this review). (Discussion with Risk management and controllers)**

**(2). VaR backtesting – further developments in clean P&L backtesting (expected to not be fully resolved until 2008). Would like to see what tangible progress has been made since CSE. Has the Controllers group made systems improvements necessary to move this forward with respect to providing “Static P&L” for the various derivative products? (Discussion with Risk management and controllers)**

**(3). VaR methodology & documentation- Once we have digested the revised VaR documentation we have received, we will set up a meeting to discuss targeted questions as**

well as get a general overview of changes since CSE and future enhancements planned. (Discussion with Risk management)

**(4). Regarding policies and procedures around market risk functions, including pricing model validation, price verification, etc—we should ask for the revised “Policies and Principles” manual as well as any other more detailed procedures with respect to Model Review, MTM committee, etc. (During the meeting, Steve Angelo stated that, for Model Review, there are more granular procedures than just the section within the policies and principles manual.) We should then discuss any areas where lines of authority appear gray (or where the policies are silent) (e.g. enforceability of the MTM Committee recommendations; model reserves, etc). (Discussion with Risk management)**

### **Review of Liquidity Risk Controls** (drafted by Bob Seabolt)

#### Background and Scope:

This limited review of the Liquidity Risk Controls was performed as part of IA’s coverage of the (1) Risk Oversight and Governance and (2) Functional Risk Management components of the firm’s Internal Risk Management Control System.

Bear Stearns’ Treasurer’s Group maintains an alternative funding strategy focused on the liquidity and self-funding ability of the underlying assets. The objective is maintain sufficient cash capital and funding sources to enable the firm to refinance short-term unsecured borrowings with fully secured borrowings, so that the firm is not reliant on forced balance sheet reduction to endure a period of constrained funding availability.

The two principle components to the alternative funding strategy are the liquidity ratio and net cash capital model. Treasury prepares a liquidity risk analysis that focuses on a 12 month time frame assuming that the firm does not liquidate assets and cannot issue any new unsecured debt, including commercial paper. Under these assumptions, Treasury monitors the firm’s cash position and borrowing value of unencumbered unhypothecated financial instruments in relation to its unsecured debt maturing over the next 12 months with the objective being to maintain the ratio of liquidity sources to maturing debt at 110% or greater. This analysis is prepared on a consolidated basis and on a parent company only (PCO) basis. The PCO analysis is done because regulations may prevent the flow of funds and/or securities from a regulated subsidiary to its parent company or other subsidiaries. Bear Stearns maintains a minimum of \$5.0 billion of liquidity (cash and securities) immediately available to the Parent Company at all times.

The scope of the limited review focused on the evaluation of procedures and controls surrounding the computation of the PCO liquidity ratio. The audit entity had a High Risk rating with High Risk Findings.

#### Issues and Management Action Plans/Actions Taken:

1. Necessary Improvements to the Computation – High Risk Findings



The high risk issues identified focused on improving the accuracy of the identification and analysis of unencumbered securities by legal entity (regulated and unregulated) and the application of appropriate financing haircuts in determining the borrowing value of the securities.

- The computation currently assumes that the short-term debt of the major unregulated entities can be financed on a dollar-for-dollar basis with no margin requirement. A haircut should be applied to all inventory assumed to be hypothecated.
- When assuming the hypothecation of an entity's inventory consideration should be given to whether such inventory is already used to margin short positions or other balances at the clearing broker. This was not implicit in Treasury's analysis.
- All entities that could have a significant impact on the computation, both regulated and unregulated, should be separately analyzed to determine the amount of liquidity they can provide, or will require, in a crisis.

#### MAP/Actions Taken – Bob Upton – Treasurer's Group, Jeff Farber – Controllers

The Treasurer's Group has developed two new automated reports (BGO449 and BTO300) which will replace the previously used balance sheet methodology to estimate unencumbered inventory. These reports will identify the actual unencumbered inventory available by entity, category, and subcategory. Excess margin collateral needed to support unregulated entities' outstanding secured financing will be reflected as encumbered in these reports and therefore will not be included in inventory available for hypothecation from individual entities. The deficiency described in the first bullet point should be remediated upon delivery of a functional user acceptance tested version of these unencumbered inventory reports. The BGO449 is already in production while the BTO300 is expected by July 2007. In the interim, Treasury will use actual unencumbered inventory sourced from regional reports with the BTO300 test reports used only to allocate between regulated and unregulated entities.

Regarding the second bullet point, the principal constraint to usage of affiliate long positions that are housed at the affiliate's clearing broker (BSSC) is Reg. T requirements, whereby longs are used to support (margin) shorts. The Treasurer's Group has designed and is now scoping implementation of a new structure for the clearing relationship between affiliates and BSSC. This structure involves "self-covering" of shorts and fully paying for all longs. This will result in affiliate long positions being full paid for and available to monetize to repay cash to TBSCI. This should be in place by or before July 2007. In the interim, the Treasury Group is in the process of establishing regular affiliate Reg. T reporting to identify and adjust for the possible constraint.

In response to bullet number 3, all legal entities have been assigned to a legal entity controller who will be responsible for understanding the funding implications of each

significant balance sheet. This will require training of the legal entity controllers to sensitize them to the accounts and issues that will provide or require liquidity. Corporate Accounting will work with the Treasurer's Group too roll this out, which is expected to be in place for some of the significant entities by June 2007 and the rest by the end of the year.

## 2. Data Enhancements to the PCO Liquidity Available Computation

The Treasurer's Group uses balance sheet amounts for each of the unregulated subsidiaries as the starting point for determining the borrowing value of the inventory held. Borrowing value is calculated by multiplying the securities' current market value by the average advance rate. The advance is the current prevailing rate that banks are willing to lend on specific types of collateral. Unlike the calculation of the consolidated liquidity ratio, where each asset class is measured utilizing an advance rate relating to the actual underlying inventory, the PCO liquidity ratio calculation is based on an estimated rate for each subsidiary's aggregate inventory. Reporting should be developed that analyzes the actual inventory available for hypothecation at the major unregulated entities so that specific borrowing rates for each asset class can be used.

### MAP/Actions Taken – Bob Upton – Treasurer's Group

As previously stated, The Treasurer's Group has developed two new automated reports which will replace the previously used balance sheet methodology to estimate unencumbered inventory. These reports will identify the actual unencumbered inventory available by entity, category, and subcategory. As a result, the contractually obligated advance rates pursuant to the firm's committed secured facilities will be applied to each asset class. Much of this inventory will be funded in the secured markets beginning July 2007 pursuant to the firm's secured funding initiative. In the interim, Treasury will use actual unencumbered inventory sourced from regional reports with the contractual advance rates applied to each asset class.

## 3. Analysis of the Intercompany Payable Should be Performed

The entire amount of the intercompany payable from the regulated broker-dealers is included as liquidity available in the PCO liquidity ratio. Each month an analysis should be made and documented to determine the feasibility of the entities' ability to pay the balances owed to the parent. BS&Co. and BSIL margin requirements at BSSC should be taken into consideration. In addition the current calculation uses the intercompany balances that appear on the "Daily Intercompany Payables and Money Fund Report." At May 31, 2006, these amounts differed from the adjusted amounts presented in the final balance sheets of BS&Co., BSSC and BSIL.

### MAP/Actions Taken – Bob Upton – Treasurer's Group

Beginning with the June 2006 PCO liquidity ratio calculation and in all subsequent calculations, intercompany balances were obtained from the final balance sheets as

reported in the Legal Entity Reporting Package. For each monthly calculation, the Treasurer's Group will review the availability of unhypothecated proprietary securities at BS&Co. and BSIL and the availability of hypothecable securities at BSSC that are readily available in the context of the current 15c3-3 and PAIB deposit computation (meaning that the hypothecation of such securities would not increase the deposit requirements). The evaluation of this availability will be in the context of the relevant intercompany payable. This should be in place sometime in the first half of fiscal 2007. Shifting to the enhanced secured funding program and the revised affiliate clearing structure is likely to impact both the payables and availability, potentially requiring further modification to this process.

#### 4. Additional Considerations

Consideration should be given to incorporating the Treasurer's Group's stress loss analysis into the parent company liquidity ratio.

##### MAP/Actions Taken – Bob Upton – Treasurer's Group

The monthly Funding and Liquidity Package (FLiP) contains a stress loss liquidity calculation as a stand alone analysis. This analysis quantifies potential call on the firm's liquidity, including a stress loss, incremental repo margin requirements on current and prospective borrowings in periods of stress, derivatives collateral required in the event of a downgrade, and potential draws on committed loan facilities. The appropriate means to explicitly incorporate this analysis into the PCO liquidity ratio is being evaluated with the target for implementation sometime in the first half of fiscal 2007.

#### 5. Discrepancies Noted in the PCO Liquidity Ratio Calculation

IAD noted several clerical errors that would have increased the liquidity cushion by \$1.2 billion. IAD recommended that procedures be developed to better ensure that the computation is accurate and receives an appropriate level of review.

##### MAP/Actions Taken – Bob Upton – Treasurer's Group

The errors were fixed for the May 31, 2006 calculation. A more formal and enhanced review procedure has been developed to prevent similar mistakes in the future. Also, a new calculation methodology will involve linking spreadsheets to source data which will reduce the need for manual data entry, thus significantly reducing the chance of clerical errors.

### **OPSRA Follow-Up Items**

**OPSRA staff indicated that, while the limited scope audit was thorough in the areas it covered (it basically covered only the liquidity ratio), there were many elements of liquidity and funding risk management that were not included in the scope. OPSRA staff suggested**

**that IAD should under take a comprehensive review of the Treasurer's Group policies and procedures and develop an expanded scope to cover all relevant elements of liquidity and funding risk management. This expanded scope audit should be included in the firm's 2007 audit plan.**

**Review of Global Credit Department – (New York, London and Dublin)**

To be drafted by Steve Spurry

**Bear Stearns Internal Audit Meeting  
(February 27, 2008)**

OPSRA staff (Jim Giles, Kevin Silva, and Steve Spurry) met with Marshall Levinson, Brent Camery, Stephen Angelo, Ian Cox (by phone), Mark Dankenbrink, and Richard Dellolio to review the activities of the internal audit department (IAD) for November 2007, December 2007, and January 2008.

**Audit Committee Presentation (Dated December 19, 2007)**

We briefly discussed the 2007 fiscal year-end (November 30, 2007) Audit Committee presentation dated December 19, 2007. The year-end summary statistics below were presented to the Audit Committee. Going forward we will have comparative numbers.

<b>Summary Statistics</b>	
Total Headcount	84
Audit Reports Completed	118
Total Issues	496
Closed Issues	314
Open Issues	182
Elevated Risk	2

The two Elevated Risk issues were as follows:

1. BSAM needs to enhance its written procedures for the best execution of fixed income trades. In addition, there are insufficient controls in the current Guidelines to prevent unapproved fixed income soft-dollar arrangements. (07-71)

Status: The original target date was August 31, 2007. BSAM has requested guidance from outside counsel. The revised target date was December 31, 2007. [We will follow up on the status]

2. The hierarchy tables control the sources used to price customer statements. These hierarchy tables have not been re-assessed in years and should be reviewed. (07-97).

Status: There is a larger project to review pricing with a goal to remove duplicate pricing sources and have pricing consistent over all products. Evaluating the hierarchy tables for equities and municipal securities will be part of the project. For government securities, the Finance Desk has been requested to evaluate the hierarchy table. The revised target date for completion is March 31, 2008. [We will get an update at or before our next meeting.]

## Review of Audit Reports

The following audits were selected for discussion at the February 27 Bear Stearns internal audit meeting:

- 08-01 Global Review of the Market Risk Management Department
- 08-02 Review of the Global Credit Department
- 08-08 Life Settlements
- 08-10 Global Review of Corporate Treasury and Funding/Liquidity Risk Management

We also requested that the following audits be available to review:

- 08-04 Mainframe Security-Top Secret Security Review
- 08-05 EMC Mortgage Corp-Confirmation of Loan Info.
- 07-118 Review of the European RMBS desk.

Of the audits available to review, we had a fairly extensive discussion about the “European RMBS desk.”

### Global Review of the Market Risk Management Department

On January 7, 2008, IA completed a global review of the Market Risk Management (“MRM”) department. The reviewed covered risk oversight and governance, functional risk management, and business line risk management. IA’s review did not disclose any material inadequacies in internal controls or significant violation of Firm policies and procedures, but did uncover the following areas of weakness which require action plans: (1) significant loss of risk management experience, (2) VaR model inputs lacking completeness and accuracy, (3) risk reporting for Asia needs to be enhanced, (4) development of hypothetical stress loss limits, (5) development of stress loss scenarios for Bear Energy, (6) BSIL/BSIT backtesting is being done outside of the main VaR system, and (7) MRM policies and principles for the new tiering limit structure needs to be updated.

*Significant loss of risk management experience* – Two business areas identified by IA as suffering a significant loss in experience were Credit Trading and Mortgages. The senior Credit Trading Risk manager, Oliver, left Bear Stearns late last year, while the two most senior risk managers in Mortgages, Phil and John, left shortly before that. IA also noted that several [not sure exactly how many] junior mortgage risk managers also left the Firm. Since the review, Bear hired Dan in August of 2007 as a replacement for Phil, and Phil was hired on as a consultant through the remainder of 2007. MRM is still searching for a replacement for Oliver in Credit Trading, but are using two senior risk managers in London to cover a portion of Oliver’s responsibilities until a replacement is found. [Jim and Steve, do you know who the risk managers in London are?]

IA also noted that Asia is risk managed remotely from London and NY with only one risk manager physically located in the Asia region. Given recent growth and the number of traders in the region, IA recommended that MRM consider developing a local Asia risk management team. MRM is currently using two recruiting firms in Tokyo and Hong Kong to conduct interviews with the expectation that two new hires will be added. [It wasn't clear if one would be located in Hong Kong and one in Tokyo, or if both might be in one of the locations and cover both areas. I think the former.] MRM is also transferring a VP from London to Hong Kong.

The third staffing recommendation was for the Model Review Team ("Team") which is currently staffed with only "two" full-time employees. Six employees have left since August of 2006 and, in IA's opinion, "is not adequately resourced to complete pre-implementation reviews of all new derivative models requested by the business." IA also noted that the Team may not be able to review the backlog of cash models for instruments such as mortgages and bonds. This was highlighted to the Model Review Committee in September 2006, and the backlog was supposed to be cleared up by the end of December 2007. [Update needed] In October 2007, a new head of the Model Review Team was hired, Jonathan Kinlay, and his intention is to establish an action plan to address the issues identified in 2006 as well as issues identified in this more recent IA review. Jonathan's target date for establishing an action plan was February 29, 2008. [Get update.]

*Completeness and accuracy of VaR model inputs and calculations* – IA noted the following primary issues with respect to completeness and accuracy of Bear Stearns' VaR calculation: (1) the Commodity Futures business and Interest Rate/Equity hybrids on the Interest Rate Derivatives desk are not included in VaR; (2) proxy data is used for some of the historic volatility data inputs; (3) VaR calculations for the Risk Arb desk are done outside of the main VaR system; and (4) dividend and correlation risk are not captured in VaR.

The target date for including the Commodity Futures business and the Interest Rate/Equity hybrids was January 31, 2008. [We will get an update from Rupert.] W/r/t the use of proxy data for historical vols, Rupert Cox noted (in his response to the IA findings) that historical implied volatility has been enhanced significantly placing less reliance on proxies. Rupert also noted that items (3) and (4) will be incorporated into the main VaR model by June 30, 2008. [Follow up]

*Enhance risk reporting for Asian entities* – IA noted that MRM does not produce a "full suite" of risk limit reports for the Asian region. MRM's response by Jurg Niederberger, MDP Risk Management Asia, responded by stating that risk reporting enhancements will be implemented in line with the increase in risk management resources in the region. He gave a target date of March 31, 2008; however, his response also discussed the "Bear Stearns Citic" joint venture as part of the enhancement that will allow better risk reporting. [We will follow up to see if discussions surrounding renegotiations of this joint venture will negatively impact Asia risk reporting plans.]

*Develop hypothetical stress loss scenarios* – In December of 2006, the Executive Committee approved stress loss limits for business lines, but IA recommends that MRM enhance the historical scenarios currently being used with hypothetical scenarios. Rupert Cox's noted that MRM is working with the Risk Policy Committee to develop hypothetical scenarios on an ad-hoc basis. A hypothetical "recession scenario" was present to the Committee on November 7, 2007. [IA gave no indication on whether the recession scenario was approved, but we will follow up with Rupert.]



**DRAFT**  
**Bear Stearns Quarterly Internal Audit Meeting**  
**April 5, 2006**

OPSRA staff (Matt Eichner, Bob Seabolt, Jim Giles, and Steven Spurry) met with Marshall Levinson, Senior Managing Director, Robert Friedman, Director of Internal Audit, and the department heads of the internal audit functional groups to review the activities of the internal audit department (IAD) during the first quarter of 2006. This was the first formal Bear Stearns quarterly internal audit meeting held under the CSE supervisory program.

**CSE Audit Approach of the Review of Risk Management Process and Governance**

Levinson and Friedman provided a list of the functional risk management areas to be covered with estimated start dates and tentative audit plan hours. This list is on the J drive. After further discussion with OPSRA staff regarding the review and scope of the risk governance process required to be undertaken, they agreed to provide an approach for the coverage and timing of the risk governance review at the next meeting. In addition they agreed to provide a draft of their proposed report on the review of the risk management governance and process that is required to be provided to the SEC each year.

**Review of Audit Reports**

Prior to the meeting OPSRA staff reviewed the list of internal audit reports issued in the first calendar quarter of 2006. Of the 20 reports issued the staff selected four for detailed discussion with the department heads and staff that conducted the audits. The listing of reports is on the J drive. The reports selected were:

- 06-08 Credit Derivatives-New York
- 06-10 London Credit Department
- 06-13 EMC – Representations and Warranties Department
- 06-20 RIO System Review

**Notes on Audits Reviewed**

**EMC Mortgage Corporation (“EMC”) - Review of Representations and Warrants Department:**

The Audit we reviewed covered EMC’s Representation and Warrants Department (i.e. Claims) processes and procedures for filing and collecting claims submitted to sellers for reimbursement. EMC is a wholly-owned subsidiary of Bear Stearns and is a full-service mortgage servicing company. OPSRA selected this review based on our conversation with Bear Stearn’s Chief Risk Officer during the prior monthly market and credit risk meeting. The Chief Risk Officer noted that the Credit Department was currently focusing a lot of attention on the timely request and

collection of claims related to “put-back rights” Bear Stearns has with mortgage originators that sell Bear Stearns residential mortgages. These put back rights include selling back loans to originators at cost for certain reasons, particularly if there is an early payment default or an early prepayment event. During the month, Bear Stearns increased its reserves for this issue.

While Internal Audit did not find any material inadequacies in the internal controls or significant violations of Firm policies and procedures, it did disclose a backlog in the timely request and collection of claims and a finding that certain processes should be enhanced to ensure policies and procedures are followed. The audit noted both a short-term action plan implemented by management to address these issues and a longer-term management action plan to address the underlying cause of the problems at EMC (i.e. the underinvestment in infrastructure for a rapidly growing business). Loans serviced at EMC grew from approximately 200,000 in December 2004 to over 500,000 currently.

In the short-term, EMC has added personnel to assist in bringing down the backlog of outstanding claims. The business expects a significant reduction in the number of aged outstanding claims by 8/31/2006. In addition, the business has sold some of its servicing rights on existing mortgages and has bought a higher percentage of its new residential mortgage loans without servicing to help reduce the demands on EMC’s personnel and infrastructure in the short-term. The final processes and procedures identified to ensure claims are processed and collected in a timely manner will be directly impacted by the results and implementation of a longer-term project. The business plans on presenting to senior management its recommendations for addressing the infrastructure inadequacies at EMC by June 30, 2006. If accepted, either modifications to the current Whole Loan Information Tracking System (“WITS”) will be made or a new system developed to correct the concerns by the end of 2006.

In addition, the IA stated that EMC management was going to give an update to the Audit Committee regarding a whole host of issues, including acquisitions sales and accounting, timeliness of reconciliations, the backlog in timely request and collection of claims, etc in May or June. **OPSRA will follow up on the outcome of this meeting.**

### **RIO System Review:**

OPSRA selected this audit for review based on the fact that RIO is Bear Stearns’ firm-wide risk system, which calculates and reports both VaR and Scenario Analysis results at both the Firm-wide level and at lower levels of granularity.

While the primary focus of OPSRA’s review of the RIO system during the CSE review concerned the appropriateness and completeness of the methodology for capturing all the material risk factors and the subsequent calculation of VaR, the focus of IA was similar to its focus for any IT application audit. As with every IT application audit, IA looked at the inputs, processing, and outputs, which in this case were (1) data feeds (risk data feeding into RIO); (2) FAST’s VaR model; and (3) RIO reporting tool. Within these components, the audit focused on the following: (1) RIO workflow processes; (2) User access/Security; (3) System Feeds Documentation; (4) Change control, etc.

In addition to this audit, IA plans on looking at the change controls around the VaR engine itself every year and will re-audit the system again within 3-4 years. Finally, Deloitte and Touché, LLP has (I think they have already done this) reviewed the VaR Model itself, including reproducing the logic and independently testing against RIO produced results. **We can follow up with Manoj (FAST RIO team) concerning any new documentation/ changes as a result of this.**

While IA did not find any material inadequacies in the internal controls or significant violations of Firm policies and procedures, it did disclose a few issues for which management action plans have been generated. Some of these plans call for additional procedures to be followed on an ongoing basis (e.g. periodic reviews by RMD of RIO workflow and RIO user access) and some plans are to address immediate concerns, such as documentation of all system feeds into RIO. The majority of the management action plans had 4/30/2006 as the due date for addressing the concerns.

As an aside, OPSRA noted in its CSE Market Risk Review report the need for enhancement to the documentation of RIO system and methodology, some of which was out of the scope of this audit performed by IA. **We will follow up with FAST RIO team on the progress they have made in this regard.**

**Other follow-ups:** (1) IA is going to get back to us regarding whether or not there are formalized procedures requiring the FAST group to get RMD approval before making changes to the VaR Model.

### **Review of Credit Derivatives-New York:**

OPSRA selected this audit for review based on the complexity and growth of the product space.

This audit represents an audit of a particular product and as such cuts across a variety of functional areas. OPSRA focused on the procedures conducted by IA regarding credit and market risk management, valuation model reviews, independent price verification.

While IA did not find any material inadequacies in the internal controls or significant violations of Firm policies and procedures, it did find an issue requiring follow-up. IA discovered a spreadsheet model that the middle office was using to book trades, but which had not been reviewed by the Risk Management Department's Model Review Group. IA discovered this by looking at FAST database and comparing the models to RMD's model group model listing.

With respect to market and credit risk management, the IA interviewed RMD and Global Credit personnel concerning their daily processes. The testing appeared to be limited to reviewing limit excess approvals (in RMD) and verification of credit approvals on a sample basis.

With respect to the audit procedures regarding price verification, IA first looked to make sure that all trades were reviewed by RMD, who has the price verification responsibilities for Credit Derivatives. They looked at reconciliations of the mark-to-market committee (verifying from MTM memo to front office system (Proteus) to G/L). **They took a sample of trades and**

**compared the price to the price provided by Markit Partners, which IA stated provides prices for all of Bear Stearns' Credit Derivatives, without exception.**

**Follow up:** We found this last statement to be a little puzzling and plan to discuss this more in-depth with the risk managers covering Credit Derivatives.

### **Review of London Credit Department**

In addition to the obvious reason, we selected this audit given that Bear's risk management organization is somewhat bifurcated between the U.S. and the rest of the globe (e.g., there is essentially a chief risk officer for Europe and ASIA responsible for both market and credit risk, although he reports to Mike Alix).

While there were no material findings, there were several noteworthy takeaways. Primarily, IA noted a lack of monitoring with respect to trade documentation, namely ISDAs and long form trade confirmations. It appeared that Credit could not readily provide information regarding how many counterparties had outstanding/unsigned master agreements or long form confirmations (interpreted the latter as pertaining to executed transactions that were documented entirely on a stand alone basis, where there were still outstanding issues between the derivatives documentation folks and the counterparty). However, this was not viewed by the Head of IA as a credit issue. He suggested that the industry's willingness to execute trades before all documents were signed was an industry problem, akin to the credit derivatives assignments and confirmations issue. Still, it seems that at one point this could become a credit issue, in terms of affecting one's willingness to do further trades with a counterparty. **Consequently we will follow up with GCD.**

IA also noted a significant amount of outstanding counterparty credit reviews past do, and a lack of reporting of this information from the London Credit Department to (?). Consequently, it was agreed that LCD would strengthen such reporting.

Finally, IA found a disproportionate amount of trades in BSIL that were not receiving any PE treatment (modeled or alternative/add-on). Still, these were only 12 trades (compared to 18 for the firm) and, as one might expect, were highly structured transactions that FAST/GCD had yet to address. (I believe said Credit would strive to not let these linger for so long).

04/17/06

## **Bear Stearns Quarterly Internal Audit Meeting May 31, 2007**

OPSRA staff (Bob Seabolt, Jim Giles, and Steven Spurry) met with Marshall Levinson, Senior Managing Director; Brent Camery, Senior Managing Director; and Stephen Angelo, Managing Director, to review the activities of the internal audit department (IAD) for the period from February 2 through May 9, 2007.

### **Governance - Audit Committee**

OPSRA's concern regarding the level of engagement of the audit committee precipitated by less and lower quality interaction between IAD and the Audit Committee was communicated to Sal Molinaro by Mike Macchiaroli in the meeting held on February 13, 2007. One particular area that was previously discussed between OPSRA and IAD was the development of a formal management reporting structure to the audit committee. Brent Camery, at the meeting held on February 22, 2007, asked OPSRA staff for input on the types of things that would be covered in a reporting package to the Audit Committee.

OPSRA staff reviewed the Audit Committee reporting packages of a few of the CSE firms to come up with a set of possible ideas for the types of ongoing information provided to Audit Committees and communicated those to Mr. Levinson and his staff. Following is a listing of the types of information reported to Audit Committees at other CSE firms:

- Reporting on findings during the period – Number of findings by risk rating, discussion of significant (high risk?) findings in audits conducted since the previous meeting.
- Summary statistics on findings – status of open significant (high risk?) findings. Reconcile findings since previous period (previous number open findings plus new findings less remediated findings equals current open findings). Aging of unremediated findings
- Identification of trends or themes – This would entail mapping findings by risk category and business unit.
- IAD activities – Progress related to plan, plan changes and reasons for changes, unplanned activities, resource updates, and current challenges faced by IAD
- Strategic and technological initiatives.
- Regulatory interaction.

### **Quality Assurance Review**

OPSRA staff, at the February 22, 2007 meeting, queried Marshall Levinson about the Institute for Internal Auditors (IIA) standard issued in January 2002 recommending that internal audit departments engage an independent quality assurance (QA) review of their IA department every five years, the first of which should have been completed by January 2007. Levinson indicated that the decision was made, based on a cost-benefit analysis, to conduct an internal QA review, the report of which is available. IIA standards are basically a set of best practices and are not formal requirements as the IIA has no authority to require compliance with the standards. In addition, Bear Stearns does not refer to the IIA standards in their audit reports.

A draft copy of the internal QA review was provided to the OPSRA staff. The internal review concluded the IAD is materially in compliance with the IAD Reference Guide (IAD's policies and procedures) and "Generally Conforms" to the IIA standards. "Generally Conforms" is the IIA's highest measurement for standards conformance. Potential areas of improvement were noted and are summarized below:

Areas where IAD should improve its compliance with the IAD Reference Guide (At the date of the report, these have been or are in the process of being addressed):

- Additional staff training should be provided regarding workpaper standards to better develop consistent application of such standards.
- The IAD Reference Guide should be updated whenever significant department policies and procedures or organizational changes have occurred. The changes should be made timely and the effected sections should be dated to document when changes were made.
- IAD should improve the timeliness of the submission of workpapers to Quality Control for review.
- Team Leaders should store all final audit plans and programs on the shared drive.

Areas where IAD did not fully conform to the IIA Standards:

- IAD has a training and staff development program; however it is not in sufficient detail nor is it fully documented. IAD has agreed to develop a more formal training and staff development program.
- As IAD does not reference the IIA Standards in its audit reports, an external QA review was not required.

### **Review of Audit Reports**

Prior to the meeting OPSRA staff reviewed the list of internal audit reports issued from February 3, 2007 through May 9, 2007. Of the 37 reports issued the staff selected four for detailed discussion with the department heads and staff that conducted the audits and an additional seven were selected to be made available for review by OPSRA staff. The reports selected are identified on the list provided by the firm (see J drive). The reports selected for detailed discussion were:

- 07-20 Value at Risk Calculation Engine – General Controls Review (H)
- 07-41 Review of Credit Trading – New York (H)
- 07-42 Review of Max Recovery Limited (H) – High Risk Findings
- 07-49 CSE Capital Calculator System Review (H)

## Notes on Audits Discussed

### Value at Risk Calculation Engine – General Controls Review

This review by Internal Audit was not a broad strategic review of the VaR calculation engine regarding whether the methodology was sufficient; rather, it was a general controls review of the engine. As such, the testing involved confirming adherence to policies and procedures and ensuring that the control environment was up to IA standards.

The scope of the review included the general controls governing VaR directory security and file transfer controls, as well as procedures for user acceptance testing, program control and restart/recovery.

The review did not disclose any significant weaknesses in internal controls or significant violations of Firm policies and procedures (i.e. no high risk findings). During the discussion, the auditors also stated that they viewed the move of responsibility for the VaR engine from FAST to Risk Analytics (Rupert's world) as a big positive from a control perspective.

While there were a couple of issues regarding program change management and security controls, the two issues we discussed somewhat were as follows:

#### (1). VaR Model Documentation

The audit report noted that there was a general lack of system documentation regarding the VaR calculation processing (something we noted in our CSE review write-up). However, subsequent to the writing of the audit report, Rupert provided detailed documentation regarding VaR inputs, processing, and outputs. This was also provided to us and is currently scanned and on the J: drive.

#### (2). File Transfers, Batch processing & system feeds Documentation

The audit report noted that position and trade activity files from systems that feed the VaR calculation engine do not include automated controls to validate the completeness of the files transferred (this was also noted in the Market Risk review we discussed last quarter). IA noted that there are manual review processes performed by the VaR group but that automating these controls would be more effective and reliable.

The Management Action Plan (MAP) by Rupert was to request respective groups that send source data files to VaR to implement completeness controls for all new or modified data feeds into the calculation engine. They expected to make their initial requests by March 30, 2007.

We engaged in a discussion with Alex Gremmo (the in-charge on this audit) for a little while regarding this issue. I believe he said they were a little behind schedule in their efforts. We told them that they were lagging their peers (who have been using VaR as a central risk management tool for years) in this respect and that others have found it important to have these "completeness controls" on the front-end vs. finding problems through manual reconciliations on the back-end.

I also found it interesting that they are only asking the front-office personnel to add in these controls for “new or modified data feeds”. Thus, they will be relying on back-end manual reconciliation processes for the existing feeds (*Follow up with Rupert.*)

### **Review of Max Recovery Limited**

The scope of this review included an assessment of the managerial and supervisory procedures and controls, and an evaluation of policies, procedures and controls over: transaction authorization and recording, claims analysis, cash disbursements and reporting, monitoring of Eversheds<sup>1</sup>, Inventory and P&L recognition, valuations, including reserves, compliance, and admin procedures.

In the UK, the vast majority of the inventory positions (\$293 million in total @ 11/30/2006) are IVA claims purchased in bulk from banks, credit card companies, etc. In an IVA, the debtor has arranged prior to bankruptcy to pay a trustee or “IP” and the debtor can keep his/her assets. Over the last 18 months, the UK assets have been underperforming the model expectations.

The audit had a high or elevated risk finding mainly due to lack of oversight of its primary third-party service provider Eversheds. “While the review did not disclose any significant weaknesses in internal controls or significant violations of Firm policies and procedure” the report stated: “However, MRL should improve its oversight of Eversheds, its third party service provider, to ensure that Eversheds strengthens a number of its key controls over the processing of MRL’s portfolio of receivables.”

The audit found a relatively high level of accounts with reconciliation issues (e.g., credit balances, “orphaned accounts”); a self-audit by Eversheds showed for closed cases a high error rate of 8.5%; and Eversheds failed to achieve monthly targets set by MRL (e.g., 80% of cash remittance collected from IPs (achieved only 40%)).

MAP- Eversheds has recently recruited and hired a project manager to help the firm meet MRL requirements.

The other noteworthy issue was the finding regarding the lack of “independent verification of MRL’s valuation model.” The MAP for this finding was that the model was to be reviewed by the Model Review Group by 4/30/07. With Slava’s departure, this review slipped. However, based on our conversations with Kan at the last monthly risk meeting, this is an active issue for the Model Review group currently.

### **Review of Credit Trading – New York**

Credit Trading in New York consists of five trading desks: High Grade and High Yield Flow desk, which trades corporate bonds and credit default swaps; Emerging Markets Flow desk, which trades emerging markets bonds and CDS; Structured Trading desk, which executes structured transactions such as Collateralized Synthetic Obligations (CSO’s) and First –to-Default

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<sup>1</sup> Eversheds is a UK law firm and multi service provider which performs all collection and legal work in connection with the Max Recovery claims on the UK debts (for IVAs and bankruptcies).



Swaps; Proprietary Trading desk, which was recently formed as a buy-side hedge fund (VOX Capital) engaging in proprietary structured credit derivatives trading (primarily CSO's); and Corporate desk, which trades preferred stock and corporate retail. There is also a separate Credit Products Marketing and Sales Group.

The scope of the review included an assessment of the procedures and controls surrounding trade documentation, processing and reconciliations; credit and market risk management; pricing model review; price verification and reserves; error/suspense accounts; potential conflicts of interest, and supervision (including written supervisory procedures). Also, as part of the review, IAD assisted the SOX compliance office in performing management testing required by SOX. Emerging Markets and High Yield cash products were reviewed as part of separate audits in 2006 and Credit Products Marketing and Sales will be covered in a separate review at a later date.

The review did not disclose any significant weaknesses in internal controls or significant violations of firm policies and procedures. Issues identified focused on the need for enhanced procedures and controls for opening and monitoring risk books (front office system Proteus is scheduled to be replaced by Calypso in 2007), timely approval of market risk limit breaches, absence of independent review of a valuation model (Credit Spread Range Accrual Swaps), and a long-dated open reconciliation item. Management action plans have been implemented or are in process for all issues identified.

### **CSE Capital Calculator System Review**

The CSE Capital Calculator System is used by the Controllers Group and the Credit Department to calculate the firm's consolidated capital summary and ratios. The market risk system, Risk Information Organized (RIO) and credit risk system, Global Risk Management System (GRMS), are the repositories for most of the critical risk data. The capital calculator uses month-end extracts from these two systems as well as an operational risk calculation and information extracted from the general ledger to calculate the overall capital position for TBSCI and BS&Co. Excel spreadsheets containing data on credit facilities not provided by GRMS are also inputs to the calculator.

The capital calculator system was initially developed by PwC in 2005 as a working prototype. The system has been rewritten and enhanced by the firm's IT group (ITG) and incorporates additional application and database controls and has a more robust database for data storage and control. The system was moved into production in January 2007 after several months of parallel run. Further enhancements to the front-end are planned for mid-2007. ITG will enhance the capital calculator to include the use of Effective Expected Positive Exposure (EEPE) for OTC swaps. Bear will continue to use MPE for BS&Co. until the NYSE adopts the change.

The Regulatory Reporting Group, within the Controllers Group, is responsible for establishing controls over the regulatory process. These responsibilities include the alternative net capital calculation at BS&Co. and the CSE capital calculation for TBSCI.

The scope of the review included input, processing and output controls associated with the collection, analysis and distribution of the firm's net capital information. This included controls

in the areas of data integrity, file transfer controls and reporting functionality. Also reviewed were the effectiveness of logical security controls and user administration, audit trails, system development life cycle compliance, back-up and recovery plans, and the controls over the process for filing CSE capital reports to the SEC.

The review did not disclose any significant weaknesses in internal controls or significant violations of firm policies and procedures. Issues identified focused on improving the reconciliation process, reducing manual processes, improved documentation, and database security. Management action plans have been implemented or are in process for all issues identified.

**Bear Stearns Quarterly Internal Audit Meeting**  
**August 17, 2006**

OPSRA staff (Bob Seabolt, Jim Giles, and Steven Spurry) met with Marshall Levinson, Senior Managing Director, Robert Friedman, Director of Internal Audit, and Stephen Angelo to review the activities of the internal audit department (IAD) during the second calendar quarter of 2006.

**CSE Audit Approach of the Review of Risk Management Process and Governance**

Levinson and Friedman provided an updated CSE audit plan with estimated start dates and tentative audit plan hours. This list is on the J drive. They did not provide details on the process or committees to be covered in the “risk oversight and governance” portion of the audit framework. Both Morgan and Goldman have provided fairly detailed firm specific approaches to the Internal Risk Management Control Systems review framework agreed upon by the five CSEs and the SEC. OPSRA staff should request the same from Bear.

**Review of Audit Reports**

Prior to the meeting OPSRA staff reviewed the list of internal audit reports issued in the second calendar quarter of 2006. Of the 55 reports issued the staff selected four for detailed discussion with the department heads and staff that conducted the audits and an additional six were selected to be made available for review by OPSRA staff. The reports selected are identified on the list provided (see J drive). The reports selected for detailed discussion were:

06-34 BSB Risk Management Department

06-65 Review of Secondary Trading and Sales for ABS, CBOs, and Agency CMOs

06-66 Review of Investment Banking – Acquisition Finance

06-73 Review of Derivatives Operations

**Notes on Audits Reviewed**

**BSB Risk Management Department**

BSB plc is Bear Stearns’ bank in Ireland. Internal audit conducted a limited review of the Trading Risk Management Department. This function in Ireland is not an independent risk management function because the MD in charge, although she reports to the Board of Directors of BSB (a separate bank board is required by regulators), also performs other business related functions for the Bank. The way the structure was described by IA staff is that there is ongoing communication with firmwide risk management in NY but no formal reporting line has been established (see issues identified below).

Responsibilities of the include the ongoing assessment of BSB methodology and appropriateness of the market risk measurements, monitoring the actual market risk levels against pre-approved

limits set by senior management, and provision of management information to BSB senior management and Board members. Independent price verification is performed by the NY and London firmwide risk management group and business unit controllers.

The scope of the limited review included assessment of the department's managerial policies and procedures, supervision of the department, the establishment and approval of market risk limits for BSB, reporting to the BSB Board and Management Committee, the procedures and process around the computation, reporting and follow-up of limit utilization, stress testing and backtesting, and the adherence to the firm's internal procedures and regulatory rules and guidance.

Internal audit found no significant weaknesses in internal controls or significant violations of Firm policies and procedures. There were some issues identified, some of which are noted below:

Reporting line for Head of Trading Risk Management

There is no formal reporting line for the Head of Trading Risk Management to the Global Risk Management function. This was established end of June 2006.

Minimal evidence to confirm that BSB Board members and Management Committee have been provided with results of "scenario based testing".

Enhanced reporting will be developed out of the RIO system. Target 9/29/06.

Limited evidence to confirm that discussions of market risk limit changes and other risk management issues with the Board have taken place.

Board meeting minutes have been enhanced to document such discussions.

Three currency limit breaches were identified without documented approval by the Chairman of BSB Board and independent CEO (same person).

Internal audit confirmed that these breaches were identified and investigated, but the formal approvals were not documented. Written approvals (initials) will be acquired for breaches going forward.

Reevaluate BSB market risk limits for minor currencies.

This business has been operating below limits for quite some time. Management is taking this under consideration.

Through discussion with Board members and review of minutes there is a need to assess the depth and composition of the risk information provided at the Board meetings to ensure that members are able to fully comprehend the firm's risk appetite and risk measurements.

A formal ALCO committee has been established which will monitor risks faced by BSB. Also the department head has produced a document for Board members explaining BSB's trading activities, product range and market risk measures and controls.

**Note:** I don't quite understand how the actions undertaken specifically address the issue identified. I think I will request to see the report again at the next meeting and ask more questions.

### **Review of Secondary Trading and Sales for Asset Backed Securities, Collateralized Bond Obligations, and Agency Collateralized Mortgage Obligations**

These three desks are part of the mortgage business. The ABS desk, which trades securities collateralized by credit card receivables, auto loans, and home equity loans, reports to Jeff Verschleiser. The CBO desk, which trades securities collateralized by high yield, investment grade, and emerging market bonds, reports to Michael Nierenberg.

The scope of the audit focused on procedures and controls surrounding trade documentation, processing and reconciliations, suitability, credit and market risk management, model review, potential conflicts of interest, and supervision. The audit uncovered no significant weaknesses or violations of the firm's policies and procedures. There were, however, six issues identified, the two most noteworthy of which are discussed below:

1) The variety of in-house developed models used to price ABS/MBS inventory have not been historically subject to model review (something OPSRA staff is aware of and discussed with risk management during CSE). However, a model review team for this area has recently been formed (we are getting the status update at our September risk meeting). The auditors noted that, as of their review, no comprehensive list of models/calculators had been made. However, it noted that model review is working with FAST and the trading desks to come up with this list and prioritize the models for review based on their complexity and **the level of external review performed by D&T**. The latter (bold) part of this statement we found to be somewhat troubling, and the head of IA also seemed surprised at this line in the report. Again, we will discuss with risk management to see if they agree with IA's description. Also, the head of IA said during our discussion that he felt all models – whether used to price inventory or for risk – should be subject to review. He later backed off this statement in an email.

2) All trades executed with non-broker-dealers are initially recorded in a temporary, non-customer specific account, until later rebooked to a newly created customer account or investment manager sub-account. Sometimes new accounts were not opened, or IM sub-account allocations were not performed in a timely manner. Of 1,124 total trades, 317 were rebooked after trade date, 221 of which after t+1, and the remainder between t+2 and t+9.

The main implications of this relate to regulatory concerns around books and records, timely trade confirmation, and counterparty credit risk capture. Going forward, the desks have agreed to have all trades properly booked by t+1.

### **Review of Investment Banking- Acquisition Finance (June 30, 2006)**

The Acquisition Finance group (i.e. leveraged finance) is a joint venture between Investment Banking ("IB") and Fixed Income. Within the Acquisition Finance business, the IB department

services the needs of clients, particularly sponsors or private equity firms (e.g. KKR, Apollo, etc) in arranging financing structures for acquisitions of portfolio companies.

The audit was limited to the processes for which IB participated. The auditor explained this to mean the processes up to and including the closing of the financing. The scope of the review included the adequacy of policies, procedures and controls over: deal processes, including the committee approval process; deal due diligence; confidentiality of information; physical and IT security; revenue recognition related to Investment Banking activities; potential conflicts of interest; employee trading and outside business interests; supervisory review of correspondence, etc. In addition, IA performed SOX 404 management testing for this area.

While IA did not find any material inadequacies in the internal controls or significant violations of Firm policies and procedures, it did disclose a few issues for which management action plans (“MAPs”) were generated. All of the issues presented in the IA report surrounded controls developed to ensure the confidentiality of material non-public information that the Investment Banking Acquisition Group may receive in the course of its operations (They found no problems, other than the security of material non-public info, with adherence to the policies, procedures or the effectiveness of controls surrounding all the processes from due diligence, approval process, through to the financing of deals.) Most of the MAPs have already been implemented with the remaining remediation plans to be addressed by the end of August.

The issues concerning the security of material non-public info included:

(1) Control over physical access needs to be enhanced

Non IB employees (from various groups) had received access to IB floors. Several employees located on floors that contain Trading and Sales staffs for FI and HY also had key card access to IB floors.

MAP

They are in the process of identifying and reviewing physical and systems access to IB floors. 8/31/06 is the target date for the completion of the physical access review/corrective action and implementation of the periodic review process.

(2) Unassigned IB phones able to dial through to research floors

The phones have now been blocked.

(3) Watchlist procedures need to be enhanced

They reviewed Committee memos and noted two issuers were not added to the Firm’s watchlist as of the date of the memo. Also, the watch lists worksheets do not explain the basis or rationale for when issuers are placed on the watch list

MAP

The basis or reasoning behind why an issuer is placed on the watch list is now being input on the conflict database.

(4) Distribution of Committee memos

The distribution of commitment committee’s memo for deals includes members of PCS and Trading Departments. This information may contain material non-public information.

## MAP

IA will review distribution lists and will re-iterate to deal team captains that committee memos distributed must be reviewed prior to their circulation to ensure all names included are appropriate to maintain the information barrier. Target date 7/31/06.

### **Review of Derivative Operations (July 27, 2006)**

Derivative Operations performs the back-office function for derivative trades through out the Firm. Among other tasks, this function includes inputting the trades into SWAP<sup>1</sup> (the back office system), the reconciliation of trade information between SWAP and various front-office systems, as well as reconciliation of executed confirms to SWAP, and the processing of cash payments/receipts, rate resets, margin and collateral functions, etc. Derivative Operations has approximately 70 people in NY and Dublin, Ireland.

IA performed a limited review of Derivative Operations. The scope of this review involved the evaluation of the procedures and controls surrounding settlements, suspense accounts, rate resets, collateral and margin calls, reconciliation of executed confirmations to SWAP, written suspense procedures, service of legal agreements for derivative operations, 3<sup>rd</sup> party OTC derivative trade servicing business<sup>2</sup>, etc.

IA's review did not disclose any significant weaknesses in internal controls or significant violation of Firm policies and procedures. However there were issues identified in this review (in addition to the issue of the large number of front-to-back office reconciliation breaks which remains open and is being monitored by senior management).

Before discussing the issues IA highlighted in their report, we discussed the overall issue of "large number of front-to-back office reconciliation breaks"-referenced in the audit report but not discussed. The issue appears to be the result of having front-office systems (e.g., Protious, Atlas, etc) and back office systems (e.g., SWAP) that capture derivative trade data at different levels of granularity (e.g., a trade could have multiple legs). Marshall stated that some of these system breaks are (1) unfixable and some are (2) fixable. For the unfixable- they merely track these amounts over time. For the fixable, the issues are identified and fixed. He stated that they are getting much better on this population.

The long term solution to these breaks is the future implementation of "Calypso"- a vendor provided front-to-back system for derivatives. This implementation currently is planned to roll out in phases starting with the front-office by the end of the year and the back-office functionality in the first half of 2007.

The following were issues raised in the audit report:

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<sup>1</sup> SWAP is the back office system containing trade and counterparty information for the Firm's OTC derivative positions. Additionally, the Derivative Clear system allows Derivative Operations to input trades, make margin and collateral calls and process settlements.

<sup>2</sup> We hadn't heard of this business before. Basically, it is providing the servicing of OTC derivatives for 8 different counterparties (and hasn't been a growing business). There is not a financing component here, so the risk is mainly of the legal/operational variety.

(1) Inappropriate system access

Certain manager-level employees have system access rights that permit them to perform multiple functions in SWAP that together allow them to potentially circumvent controls (e.g. execute payments unilaterally). Marshall stated that these multiple access rights were limited to the most senior people in the department with the argument that they needed them on the emergency basis. While the argument did not resonate with IA, IA did take comfort in that fact that they did not see any problems in this area (due to this specific control deficiency).

MAP

Derivative Operations will modify the SWAP system access level of the referred to Officers to solely input or verify status. Completion date: 8/31/06.

(2) Reporting of out receivables and payables resulting from unsettled derivative trades (“fails”)

At the time of the review, fail statistics summarizing the number, age, and total dollar of outstanding derivative fails weren't compiled and reported in a meaningful manner to senior management.

MAP

Now the statistics are being generated and distributed to senior management on a weekly/monthly basis. *(Maybe a follow-up question for the next meeting. If the issue was that senior management wasn't getting information they needed, why wasn't senior management asking for this type of information?)*

(3) Executed confirm reconciliations are not performed timely

Due to increased regulatory pressure, the industry has cracked down on unconfirmed trades. With the increase in amount of trades being confirmed, the lack in the timeliness and reconciling of these confirms back to the data in SWAP has been an issue.

MAP

Procedures have been put into place to ensure confirms are reconciled in a timely manner.



## **Bear Stearns Quarterly Internal Audit Meeting September 6, 2007**

OPSRA staff (Bob Seabolt and Jim Giles) met with Marshall Levinson, Senior Managing Director; Bob Friedman, Senior Managing Director; Brent Camery, Senior Managing Director; and Stephen Angelo, Managing Director, to review the activities of the internal audit department (IAD) for the period from May 10 through August 1, 2007.

### **Current IAD Activities**

We talked about current IAD activities in light of recent events. First, IAD is not involved in the BSAM post-mortem at this time as the firm has engaged an outside law firm. Second, September is the time they begin the risk assessment process for 2008. Given recent BSAM specific and market events, it is time to refocus and review their audit plan for the remainder of the year and for 2008, asking themselves if the current plan makes sense, do priorities change, do audits have to be added or moved up in line, etc. Obviously the Structured Funds business was mentioned. There was or is an upcoming IAAC meeting to address these questions.

### **Trends**

We discussed the trend of the continued findings in the IT audits related to security issues, primarily user access and entitlements. IAD indicated that progress has been made by the equity division in identifying and correcting these issues because they had established a separate group to deal with these control issues. FID is not as far along. Efforts are being made by management to push the BUs to make improvements.

### **Review of Audit Reports**

Prior to the meeting OPSRA staff reviewed the list of internal audit reports issued from May 10, 2007 through August 1, 2007. Of the 25 reports issued the staff selected four for detailed discussion with the department heads and staff that conducted the audits and an additional six were selected to be made available for review by OPSRA staff. The reports selected are identified on the list provided by the firm (see J drive). The reports selected for detailed discussion were:

- 07-54    Securitizations – Auto Loans, Commercial and Residential Mortgage Loans (H)
- 07-68    Review of Scrittura Derivatives Confirmation System (H)
- 07-69    European Real Estate Principal Investments (“REPI”) Desk (H)
- 07-77    Review of Tri-Party Equity Repo

## **Notes on Audits Discussed**

### **Review of Scrittura Derivatives Confirmation System (H)**

The review did not disclose any significant weaknesses in internal controls or significant violations of firm policies and procedures. Issues identified during the review, along with the corresponding management action plans/actions taken were discussed in the report.

The Scrittura Derivatives Confirmation System (“Scrittura System”) is a third-party vendor product used by the Derivatives Document Group (“DDG”) to process derivative trade documentation, generate and route trade confirmations and maintain confirmation status. There are two components to the system, DocManager (“DM”) and Scrittura Workflow (“SW”). DM is a documentation system that receives and stores trade tickets and images all confirmation related documents. SW is used to generate and route the preliminary confirmation to selected personnel to verify the accuracy of the trade terms as well as to fax the approved confirmation to the counterparty for review and signature.

This was an IT audit. The scope covered the input, processing and outflow controls related to DM and SW. Reviewed were systematic controls related to confirmation editing, approval workflow, status monitoring, aging alerts, and relevant reconciliations.

An issue identified worth noting was that DDG personnel did not consistently update the statuses of trades confirmed via SwapsWire. The risk is that confirms could get put into the “segregated queue” and be counted as confirmed on aging reports when they were not. Systems controls have been put in place to prevent user from moving trades into the “segregated queue” unless the status is set to “confirmed”.

There were several user access and entitlement issues identified, including one where the developer had access to production data and could make changes. These have been or will be remediated.

### **European Real Estate Principal Investments (“REPI”) Desk**

IAD conducted a limited review of the REPI desk. The review did not disclose any significant weaknesses in internal controls or significant violations of firm policies and procedures. Issues identified during the review, along with the corresponding management action plans/actions taken were discussed in the report.

The REPI desk consists of 5 staff including the Desk Head. The principal activity is to identify real estate in Europe, generally office buildings, and identify third parties to participate in the purchase and ownership of the property. The desk performs due diligence on potential properties and structures the purchase between debt (usually 90% of the purchase price) and equity holdings. The desk finds a suitable client to take the equity holdings and syndicates the debt, retaining part of the debt usually consisting of a portion of the junior mezzanine debt. The desk earns structuring and agency fees from the equity holder, underwriting fees on the syndication,

interest on the firm's debt holdings, and sometimes additional profit based on achieving a minimum return to the equity holder. The transactions are booked in Bear Stearns Bank (BSB) with the principal investments held in Bear Stearns Commercial Mortgage Inc. (BSCMI).

The scope included the review and evaluation of procedures and controls regarding the supervision of the desk, transaction execution, operational procedures, accounting, risk management, and adherence to significant regulatory requirements and firm policies.

There were a few noteworthy issues identified:

- There is no formal document approval process for new transactions.
- Need for enhanced communication with the New Products Committee – The desk does not check for circumstances when an NPA may be required.
- The desk's valuation models should be independently verified.
- Need to ensure that all positions are independently price tested. No independent price verification is done for the junior mezz debt held by the desk.
- Counterparty names, as appropriate, should be added to the Compliance Watch List
- IAD recommended that the BUC should review the accounting treatment that is applied to the desk p&l. The desk earns a fee on the cash flows over the period the syndicated loan is outstanding (referred to as the "margin skim"). The desk recognizes as day 1 p&l the present value of the fees earned during the "lock-in period" with the remainder of the fees for subsequent periods recognized on the cash basis. The lock-in period fees are recognized on day 1 because it is unlikely that the borrower will refinance during the lock-in period because of the prohibitive cost. IAD wanted Controllers to review the accounting treatment to ensure consistency across the MBS whitebook.

IAD has followed up on all issues and all targets have been met. In particular, MTM memos are now prepared for the REPI desk.

We discussed in what ways the REPI desk was different from the syndicated CMBS desk. The REPI desk loans the money to the purchaser and syndicates the debt through its client list while holding as an investment 5-10% of the junior mezz debt (a more risk part of the capital structure). The REPI desk does not engage in securitization while the CMBS desk does a combination of both syndication and securitization. In Europe there is usually a higher level of syndication prior to securitization. The REPI desk actively sources the properties (goes out and finds the property) while the CMBS activity is usually client driven.

### **Securitizations – Auto Loans, Commercial and Residential Mortgage Loans (H)**

To be drafted by Jim

### **Review of Tri-Party Equity Repo**

To be drafted by Jim

**Follow-up Items**

- Follow-up with a call re: adjustments to audit plan resulting from risk assessment process and IAAC meeting.
- Follow-up with IAD senior management regarding their thoughts on feedback provided by OPSRA (at the May 31, 2007 meeting) in the area of formalized reporting to the audit committee.
- IAD will provide and update on the implementation of Calypso and the work they are doing in this area.

## **Bear Stearns Quarterly Internal Audit Meeting November 16, 2006**

OPSRA staff (Bob Seabolt, Jim Giles, and Steven Spurry) met with Marshall Levinson, Senior Managing Director, Robert Friedman, Director of Internal Audit, and Stephen Angelo to review the activities of the internal audit department (IAD) during the third calendar quarter of 2006.

### **CSE Audit Approach of the Review of Risk Management Process and Governance**

IAD provided an updated CSE audit plan with the current status of the CSE audits. Also provided was a document outlining the “internal audit coverage of Bear Stearns’ risk management control systems. These are on the J drive. OPSRA staff will review the scope document and set up a conference call with IAD to discuss our comments. The audits for Market Risk Management, Credit Risk Management, and Funding/Liquidity Risk Management are completed and the reports are in draft form. At this point it can be noted there appears to be significant deficiencies in the coverage for the review of liquidity and funding risk management which will be a focal point of our discussions of scope expansion in the 2007 CSE audits.

### **Interaction with Audit Committee**

OPSRA staff had requested and was provided with a sample of minutes of audit committee meetings, copies of the reporting package provided to the audit committee for the last meeting, and copies of any special presentations made to the audit committee by IA or any of the business units during the previous 12 months. It was indicated to us that it was not practice to produce a standard reporting package for the audit committee meetings. The Audit Committee and IAAC receive copies of all audit reports issued and such committees can choose to discuss these at the scheduled meetings or can pose questions to relevant personnel at any time. For the meeting in September 2006 a formal presentation was made to update the annual planning and risk assessment process due to significant changes made to these processes. There were no special presentations made by IA to the Audit Committee and there were two special presentations made by the business areas to the Audit Committee during the previous 12 months.

There continues to be a lack of a formal governance structure around the IA Department and the Audit Committee. Improvements in governance were made in other risk management and control areas coming out of the CSE review and subsequent discussions. OPSRA staff will meet to discuss where OPSRA goes from here regarding the IA function and its oversight.

### **Demo of Audit Findings Follow-up Tracking System (FUTS)**

IA staff took us through a demo of their audit findings tracking system. This system is a database system uploaded and maintained by an administrator within IA. It is not a web-based system with wide access. The administrator has to input the findings, planned remediation, and target dates from the audit reports into the database. On a monthly basis the administrator flags open items that are targeted to be completed and send emails to the responsible persons

requesting the status of the remediation. The database is then updated as appropriate. Aged items are tracked.

There does not appear to be formal summary reporting of unresolved issues to the audit committee. Levinson indicated that unresolved issues may be discussed with the IAAC which includes the CFO, Controller and BU senior managing directors.

### **Review of Audit Reports**

Prior to the meeting OPSRA staff reviewed the list of internal audit reports issued from August 1, 2006 through October 31, 2006. Of the 35 reports issued the staff selected three for detailed discussion with the department heads and staff that conducted the audits and an additional four were selected to be made available for review by OPSRA staff. The reports selected are identified on the list provided (see J drive). The reports selected for detailed discussion were:

06-86 Review of Credit Lab

06-89 Review of Fixed Income Clearing Services

06-94 Structured Funds (high risk finding noted)

### **Notes on Audits Reviewed**

#### **Review of Credit Lab**

IAD conducted a systems review of the Global Credit Department's Credit Lab Simulation System ("Credit Lab"). Credit Lab was designed to calculate the potential exposure ("PE") for various derivative products such as credit derivatives, interest rate derivatives, equity derivatives, foreign exchange, and forward/futures contracts. PE estimates the current exposure associated with the impact of adverse market moves over the life of the transaction at a 97.7% confidence interval. Credit lab also calculates three additional statistical measures: PE before collateral, maximum PE, and credit reserves.

The scope of the audit included the processing and output controls associated with the collection, analysis and distribution of the firm's PE to the firm's global risk management system ("GRMS"), including monitoring controls, data integrity, and file transfer controls. Also reviewed were application security and interface controls, as well as procedures for user acceptance testing, program change control, and restart/recovery.

The audit found no significant weaknesses in internal controls or significant violations of the firm's policies and procedures. There were some issues identified to management around quality assurance, documentation of program changes, user access and entitlements, and file transfer controls. Management has plans in place to address these issues.

## **Review of Fixed Income Customer Clearing (FICC)**

The role of FICC is described as being very analogous to prime broker (in the past we have heard this business referred to as fixed income prime brokerage). The business provides operational support to various types of institutions (mostly hedge funds, but also other portfolio managers or professional investors) that trade fixed income products and clear through BSSC. Services include opening new accounts, calculating account equity, processing U.S. and FX wires, and performing margin and credit balance interest calculations. Supported products include Treasuries and Agencies, MBS, TBAs, REMICs, CMOs, Sovereign Bonds, and Repos [Wasn't obvious if the repo activity was in scope in looking at margin calcs, etc., or if they were saying that was done elsewhere on the Finance desk? Also, the role of FICC was described as being a relationship manager and involved handling customer requests, and a comment was made that they don't actually get involved in clearing?]. Revenue is generated from ticket charges and other processing fees.

In coming up with its audit scope, IA looked to the written Supervisory Procedures, previous audits, and their background knowledge of the business. They came up with basically four main categories of issues to audit:

- Reviewing and approving new client relationships
- The review of existing clients
- Ticket charges – how are fees calculated and taken from the accounts (and interest charged on debits)
- Margin – a lot of effort goes into coming up with the true equity in the accounts. Need to make sure margin requirements are calculated correctly. Also, when there are debit balances (or deficits, which they said is rare), the money should be received/collected promptly. Also look at procedures around money leaving the accounts (wires and journal entries).

IA's limited review of FICC did not disclose any significant weakness in internal controls or significant violations of firm policies and procedures. Several issues were identified. Resolutions were reached before the conclusion of the audit or agreed to in each instance.

The first issue related to the pricing of some (just a few) hybrid ARM TBAs. Because these securities were not traded internally, an automated price feed had not been established and the relationship managers had been pricing the securities at par, which could have led to an understated margin requirement. The second issue related to the business's need to update the written supervisory procedures and better document its reasons for deviating from standard practice – for instance to update the current approval limits for wires to third parties and the level of management review required to approve net equity adjustments (for instance resulting from a failed trade). The final issue related to the need to enhance control for reviewing existing clients. For instance, there were clients who pre-dated the PBVC<sup>1</sup>, and the business had no record to monitor the review process to ensure that the PBVC eventually reviews all clients.

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<sup>1</sup> The Prime Broker Vetting Committee of GCS approves all new client accounts for GCS and FICC. This committee is made up of control personnel. We had never heard of this before, but IA personnel stated that credit does their review/approval before accounts get to the PBVC. Maybe follow-up with risk GCD?

## **Structured Funds:**

We picked this audit for review based on two criteria: (1) it was listed as a high risk audit with a high risk finding and (2) was the subject of one of our cross-firm projects, namely Hedge Fund linked derivatives.

BS Internal Audit performed a limited review of Structured Funds transactions in NY and LDN. The review focused on the leverage providing instruments and excluded those providing principal protection (i.e. CPPI Options or PPN). Thus it did not include the entire universe of Structured Funds transactions.

The high risk finding for this audit was a little unusual. Rather than highlighting an inadequacy in the internal controls or a violation of Firm policies or procedures, the primary purpose of this audit was to highlight the fraud risk that the firm was subjecting itself to with respect to investments in the underlying FofF shares vs. investing directly in a basket of individual funds equivalent to the investments held by the FofF when hedging a hedge fund linked derivative (e.g. TRS) entered into with a counterparty.

From the audit report:

A specific risk that we would like to highlight is that the Firm's exposure to potential fraud is greater when the investment underlying the transaction is made in a FofF rather than directly in a basket of individual funds equivalent to the investments held by the FofF.

### **Background given:**

The auditors gave some background information (statistics) on the portfolio<sup>2</sup> and on the risk mitigants, such as upfront collateral (generally 25-33% upfront collateral), liquidation triggers (between 5% & 10% of the initial NAV), and investment guidelines (e.g. diversification). The desk owns over 200 funds as transaction hedges.

To mitigate the risk the desk performs initial and ongoing due diligence reviews of the funds. The desk recently hired a professional to perform the due diligence reviews on a full-time basis, began developing a due diligence procedures manual, and establishing a cross-functional due diligence committee ("DDAC") composed of Business, Legal and Risk Management personnel. The desk has recently completed initial or subsequent due diligence reviews on all major fund counterparty/investments.

### **Scope of Review:**

The review included examining the procedures and controls around fund due diligence, trade documentation, processing and reconciliation, monitoring of triggers and investment guidelines, margin calculations, and credit and market risk management.

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<sup>2</sup> As of Feb 2006, there were 50 SF transactions outstanding globally with a notional amount of \$5.2 billion. The total gap risk (Investment – Collateral) stood at \$3.4 billion against a \$ billion limit. (I believe these figures were for the entire book, including principal protected transactions).



## Issues and Management Action Plans:

(1). As stated in the opening summary paragraph of the audit report, the most severe finding was not a finding of deficiency in a control or adherence to a policy/procedure, but was IA wanting to highlight the increased fraud risk inherent in hedging these derivative transactions with FofF investments.

“Transactions involving direct FofF investments expose the Firm to a single point of failure and limit the Firm’s control and transparency over the underlying constituent investments.”

Currently, such transactions are subject to lower exposure limits (i.e. \$300 million per FofF/ \$500 million per Tier 1 FofF family and \$500 million). While the desk has recently expanded and formulized its due diligence process “no reasonable amount of due diligence can effectively guard against potential fraud at the FofF level”.

Internal Audit suggested that although DDAC already reviews all SF transactions, deals involving direct FofF or single fund investments (i.e. single potential point of failure) should require a higher, second level of management approval.

The action plan by management was to create a committee consisting of a member of senior trading management and the CRO’s designee to review and approve transactions involving direct FofF or single hedge fund investments. The Committee may subsequently choose to delegate approval authority to the DDAC for transactions under a certain exposure threshold, set at the Committee’s discretion. (To date, this committee has reviewed 3 transactions and Mike Alix has designated himself in all three cases).

There were other issues and MAPs as summarized below:

(2). NAV and FofF constituent statements- these statements are used by several control groups (RMD and middle office) to monitor compliance with the provisions of transactions and prices. IA found that certain statements were being sent directly to the trading desks and that the FofFs were sending these statements rather than receiving them from an independent fund administrator. IA asked that all statements should be received directly by the relevant control groups from the administrators. Mike Moriarty (SMD-SEP) will aid the control groups in obtaining this information directly.

(3). Lack of Independent Oversight over Due diligence:

There is no independent review performed to verify the due diligence procedures undertaken by the desk have been completed and that the results communicated to the DDAC are consistent with that review. IA recommended that Global Credit and RMD review and concur with the level and scope of the due diligence procedures and independently determine that the information communicated in this process is sufficient.

The action plan called for the front office, RMD, and Global Credit to work together to review the information gathering processes used in the due diligence process—with any enhancements that arise from this review to be added to the SEP HF due diligence manual. Barbara Biel has taken a lead role in this exercise. Also, on an on-going basis, prior to each DDAC meeting, completed due diligence files for the respective entity will be made available to members of the DDAC and to RMD to review.

(4). RMD oversight of Investment Guidelines and Trigger Levels:

RMD came up with procedures to more frequently review trigger levels and investment guidelines. Apparently this was being done on a quarterly basis. Now RMD will look at it on a monthly basis.

(5). Manual Processing and Maintenance of Transactions:

The processing/maintenance of transactions and monitoring of key event dates (e.g. deadlines for subscriptions and redemptions) are manually intensive. Excel spreadsheets are used by the desk and middle office for tracking NAVs, strike prices, barrier levels, etc. In addition, manual calculations are necessary to monitor adherence to Investment Guidelines. IA found an error in the calculation of a barrier level for one deal in NY and two hedge orders not processed when optimal in LDN, due to the lack of an automated control for tracking key event dates. The action plans includes a short term fix and long-term fix. First, Mike Moriarty will include the review of all manually calculated information on a monthly basis. Secondly, the business will work with IT to incorporate these calculations and develop a diary system for the key event dates within CALYPSO. (We can follow up on this as the implementation of Calypso has appeared to slip many times.)

## **Bear Stearns Quarterly Internal Audit Meeting November 29, 2007**

OPSRA staff (Bob Seabolt, Jim Giles, and Steve Spurry) met with Marshall Levinson, Senior Managing Director; Brent Camery, Senior Managing Director; and Stephen Angelo, Managing Director, to review the activities of the internal audit department (IAD) for the period from August 2 through November 5, 2007.

### **Current IAD Activities**

As mentioned in last quarter's write-up IAD is not involved in the BSAM post-mortem as the firm has engaged an outside law firm. Also, OPSRA staff held a conference call on 10/15/07 to discuss changes in the audit plan resulting from 2008 risk assessment process that began in September and that was reviewed by the IAAC. The changes were summarized in a staff memo that is on the Bear internal audit section of the J drive (InternalAuditPlanChanges07).

### Audit Committee Reporting

OPSRA's constant emphasis on the importance of formalized reporting to the audit committee has finally paid-off. Bear IAD has developed a reporting package for the Audit Committee, albeit, it is still a work-in-progress. The package contains summary IAD statistics regarding staffing, progress on audit plan, total findings, total elevated risk findings, number of open findings, a brief discussion of current year elevated risk findings, and identification and discussion elevated risk findings more than 3 months past due. Brent Camery indicated that additional information regarding trends in audit findings and control weaknesses will be added to the report.

### **Trends**

The preponderance of elevated risk findings in IT audits continues to be related to security issues, primarily user access and entitlements. In the previous meeting, IAD indicated that progress has been made by the equity division in identifying and correcting these issues because they had established a separate group to deal with these control issues. FID is not as far along. Continued efforts are being made by management to push the BUs to make improvements but findings continue to persist. See discussion of elevated risk findings in IT audits below.

One review discussed was the review of the implementation of new security software, eTrust, for the UNIX systems. The review found that various UNIX configuration settings and services significantly diminish the effectiveness of the eTrust security product resulting in control weaknesses. The "fix" is to make configuration changes to the eTrust product which will track all entitlements and provide a clear audit trail.

### **Review of Audit Reports**

Prior to the meeting OPSRA staff reviewed the list of internal audit reports issued from August 2, 2007 through November 5, 2007. Of the 29 reports issued the staff selected three for detailed

discussion with the department heads and staff that conducted the audits and an additional four IT systems audits with elevated risk findings were selected for discussion as a group to highlight common themes and remediation plans. The reports selected for detailed discussion were:

07-79 Risk Analysis Control System (RACS2) Review (H)

07-100 Global Review of Structured Equity Products – Exotics and Convertible Bond Trading Desks (H)

07-107 Review of the Executive Committee

### **Notes on Audits Discussed**

#### **Risk Analysis Control System II (RACS2) Review** - (drafted by S. Spurry)

Like Goldman and Morgan (the firms which historically comprised the “big 3” prime brokers), counterparty risk management of clearance accounts is carried out by a risk management group that resides within the PB business. OPSRA staff have met with this GCS Risk Control group on several occasions and received several demonstrations of the group’s RACS system (see original CSE report and other notes on RACS). GCS Risk is in the process of replacing RACS with RACS II. RACS2 was expected to be in production by December (apparently January now), and the two systems are going to be run in parallel for some time.

RACS II is being developed due to certain design limitations and the high cost of ongoing support for RACS. RACS2 uses additional internal (Bear) data and can link multiple sources of market data to improve overall data quality. Along these lines, RACS2 is being developed to process a wider range of financial instruments. Whereas RACS is primarily an internal tool used for assessing margin adequacy, RACS2 is going to be used to provide reporting to clients (which they will be able to access via Bear Prime). Consequently, reporting capabilities are being improved enhanced (including the “more effective aggregation of client data” – not sure what that means). (Interestingly, we recall Chris Engdall saying back in 2005 that he didn’t know if liked the idea of getting into the business of risk reporting to clients).

Under RACS2, the daily stress tests, which apparently are being expanded upon, are executed remotely at RiskMetricis (RM), as RM has more processing power and a “tremendous amount of stress testing available”. As a result, the most interesting issue identified through the audit was the fact that RM only guarantees 60% coverage in the event that their primary processing environment goes down (the back-up facility has less capacity apparently). While this is noteworthy enough in its own right, it leads to several other questions.

GCS Risk can’t send client portfolios directly to RM (confidential position information), so they basically have to send all positions on one big grid, which is then “re-filtered” back at Bear to come up with the client reports. It is not at all clear how this works for OTC derivatives. Will Bear send derivative terms? Are they just getting the shocks back and doing the revaluation internally? The IA guys had no clue.

Regarding the issue of back-up processing, it was said that GCS Risk was exploring doing bringing the processing back in-house, or at least developing some back-up capabilities in house. (So why set it up in the first place. Creating this large and complicated hand-off of data seems like regression as opposed to progression?).

We will schedule a meeting to discuss RACS2 with the GCS Risk folks after the system is in production.

The other issues identified in the audit are included in the report, which we took copies of.

### **Global Review of Structured Equity Products-Exotics and Convertible Bond Trading Desks** – (drafted by J. Giles)

#### Background and Scope:

Internal audit performed a limited review of SEP-focusing on the Exotics and Convertible Bond Trading Desks. The audit entity had a High Risk rating with an Elevated Risk Findings.

#### From the audit report:

The review did not disclose any material inadequacies in internal controls and procedures. However, the review disclosed that trade tickets on the Exotics desk are not always produced and/or approved on trade date, impacting books and records, P&L, risk reporting, and delaying the production of confirmations.

The Exotics trading desk includes: 5 in LDN; 3 in NY; 2 in TK; and 2 in HK. The Convertible bond Trading Desk includes: 6 in NY. The majority of the positions are booked in BSIL.

The scope included a review and evaluation of procedures and controls surrounding the supervision of the desks, trade execution and capture, transaction recording/process, confirmation, P&L reconciliation, account opening, and the adherence to significant regulatory requirements and Firm policies.

#### Issues and Management Action Plans/Actions Taken:

The audit report revealed several issues worth highlighting:

1. Ensure the timely completion and approval of trade tickets

Internal Audit found that the SEP exotics desks (both NY and LDN) had found numerous occasions where the trade tickets were not completed or approved on the trade date, on one occasion, this did not occur until T + 8 days. (7 out of 15 trades sampled in NY and 4 out of 10 trades sampled in LDN were not entered into Atlas until after trade date.) As a consequence, the books & records, P&L, and risk reports were impacted. In the most extreme case, risk went 8 days without having the risk captured on the trade due to this issue.

We asked IA how this compared to similar testing done at other desks since the ratios appeared to be particularly bad (in our view). While stating the obvious, that these trades are much more complex and require a lot of documentation on the trade tickets vs. other plain vanilla areas, they said that the results here were “terrible”. An interesting quote after talking about how such a poor percentage of trades were recorded timely the in-charge on the audit said “the trader was being a trader.” He also said the middle office personnel welcomed Audit’s presence and in particular their discussions with the trader(s) on this issue.

There were MAPs for both Exotics Trading and the Middle Office. Exotics trading MAP was that they would review all the outstanding Exotic Trades in TiGer (trade ticket system) to ensure that all trades are approved on trade date (12/31/07 target date). In addition, the Middle Office will also work with the trading desk to ensure all TiGer trade tickets are approved on trade date. They also noted that with the arrival of Calypso, all trades will be recorded only in Calypso, eliminating the need for TiGer tickets. See separate discussion of Calypso for details.)

## 2. Ensure Full Capture of the Effects of Corporate Actions on Trades

The SEP exotics desk incurred several operational losses in 2006 and 2007 as a result of Atlas and Lynx not fully capturing the effects of corporate actions for all the underlying equity components of the desk’s positions. (We asked what corporate actions were not reflected and they were stock splits.)

There was a MAP for the LDN middle office to set up further tools in Lynx and Atlas that would significantly reduce potential errors in processing corporate actions by 12/31/07. In the longer term, the introduction of Calypso will provide an automated solution for corporate action capture.

## 3. Confirm NPC and MRC Approval for all New Products

The Exotics desk(s) started trading a number of new products without obtaining pre-approval for the products’ valuation models from the MRC. Instead, the desks obtained approval from the MRC after they had started trading the products.

In addition, the desks do not have a procedure in place to determine when NPC approval is required for new trade types. In this case, the new products did not rise to the level where they needed NPC approval; however, this determination was made ex-post. (In discussing this issue with Steve Angelo, we discussed how the new product approval process worked briefly. First, there is a corporate policy new product approval. However, there doesn’t appear to be any robust, firm-wide infrastructure or process in place to ensure that new products go through the new product approval process. It is left to the heads of the individual businesses (not sure at what level) or control groups (BUCs or risk managers) for those businesses to bring to the attention of the NPC. However, IA

does test for adherence to this process across the various businesses through its functional audits of businesses-like this audit. IA did a targeted review of the NPC process one year ago and noted that all Senior Managing Directors received training on the NPC process (not sure if this was a result of the audit or not). Steve said that training was the number one issue from the review and that they will be rolling out an internet based training to everyone on this issue next year.

#### 4. Enhancement of the Independent Price Verification Process

IA noted that the Exotics desk(s) are not able to get 100% coverage on the correlation parameters in their price testing. This was not evident when reading the MTM Committee Memo.

Going forward, it will be footnoted in the MTM Committee memo. In addition, they will state what the actual coverage of the correlation factor is.

#### **Review of the Executive Committee** – (drafted by J. Giles)

This review is part of IA's reviews covering Risk Oversight and Governance. The review did not disclose any reportable weaknesses in internal controls or violations of Firm policies and procedures and IA had no issues included in its report.

The scope of this review was similar to the scope of any of the Committees IA reviews: it included the evaluation of the Executive Committee's powers, authority and responsibilities, as designated in the By-laws of the Corporation, membership, frequency of meetings, adequacy of meeting minutes, and the reasonable sufficiency and accuracy of any key recurring information provided to the Executive Committee for decision making.

We spent most of our time discussing the scope of work performed by IA on the accuracy of the information provided to the Committee. We discussed what that the phrase "key recurring information" meant and discussed that other firms (i.e. GS) thought it was important for the IA function to verify the accuracy of the information provided to Risk Committees, for which they may be making decisions based on (Doug Fuge highlighted this during the SIFMA/AICPA conference in NY the same week).

Marshall and company argued that auditing non-recurring information provided by independent risk functions was a waste of time. We brought up special presentations put together by Risk such as the PAUG presentation as an example of something prepared for the Executive Committee that was ad-hoc but one would expect them to rely on in making decisions.

In a nutshell, the Executive Committee receives a monthly risk presentation from Mike Alix which includes VaR and PE numbers. For the time period selected (2 ½ months) IA tied back these numbers to the source systems (RIO and GRMS). They did not audit the accuracy of any ad-hoc, special presentations to the Executive Committee or any of the materials provided for their approvals of lending commitments (as all are by their nature not recurring information).

## **IT Systems Audits with Elevated Risk Findings**

There were four IT systems audits issued during the period that had elevated risk findings. They were:

07-85 Commission Management System (“CMS”) Review: In-house system used by the Commission Management Group (CMG) to accumulate client commission arrangement balances and process payments for client services, such as research and market data.

07-88 Plymouth Park Tax Lien System (“BlueHound”) Review: Plymouth Park Tax Services LLC is a subsidiary of TBSCI that purchases and services tax liens for taxing authorities

07-97 BSSC Customer Statement Pricing Review

07-105 NextGen System Review: System used by the Portfolio Trading Group

### **Common Themes**

All four audits had findings related to systems access and entitlements. For three audits the issues were significant enough to warrant elevated risk status. For two of these three audits (CMS and BlueHound), IAD identified that neither the Info Tech Group nor business management clearly understands the system’s security features or user entitlement structures. For the third audit (NextGen) the issue identified was a lack of segregation of information between the portfolio trading group and the agency trading business due to lack of entitlement controls which allowed certain people to access both areas.

For the BSSC audit the access and entitlement issues were not deemed to be elevated risk level. The elevated risk finding related to the need to improve controls over the pricing of customer securities. There was no documentation on file to support the acceptance of prices from an independent broker when there was no vendor price available.

### **Calypso Update**

Terry Berland provided an update on the progress of the Calypso implementation. Calypso will provide a single front to back system for all derivatives products globally using one “golden copy” of the trade. Objectives for 2008 are to be live for operations, all flow products, and the majority of structured products. Rates and credit are currently live with parallel runs with conversions to live occurring weekly. Testing is being done at 10-20-30x average volumes. The official books and records are still in SWAP (back office). The switch to Calypso of the back office is scheduled for 3Q08. Pricing models were taken out of Calypso. All models are housed in the LINX model library and owned by the FAST team.

12/20/07 RES



**Bear Stearns Quarterly Internal Audit Review**  
**Follow-up Call on October 15, 2007**  
**Changes to Audit Plan**

At the quarterly meeting held on 9/6/07, IAD staff discussed current activities in light of recent events. September is the time IAD begins the risk assessment process for 2008. Given recent BSAM specific and market events, it is time to refocus and review their audit plan for the remainder of the year and for 2008, asking themselves if the current plan makes sense, do priorities change, do audits have to be added or moved up in line, etc. An IAAC meeting was held to address these questions. OPSRA staff (Bob Seabolt) had a conference call with Brent Camery, Senior Managing Director and Stephen Angelo, Managing Director, to discuss the decisions made. IAD had recommended changes and additional recommendations were made by the IAAC. The audit plan changes are summarized below.

**IAD Recommendations**

- Derivatives Operations: Accelerate audit. Was scheduled for 2008, but moved up to growing number of collateral disputes, which will be focused on in the audit. Audit has already been started.
- CMBS: Potential acceleration into 2007 depending on resources. Hope to begin in Oct or Nov.
- EMC: Two audits accelerated, Foreclosures and Loss Mitigation, due to changes in market conditions.
- EMC: One IT audit, CMAX (claims management system) moved up in place of another IT audit (residential risk application) due to changes in market conditions.
- BSAM: Planned audit of Blue Ribbon AAA-rated derivatives subsidiary cancelled because manager no longer with the firm and the business plan has been terminated.

**IAAC Recommendations**

- Independent Price Verification Process: The IAAC requested that IAD do a real time review of the IPV process for August 31<sup>st</sup> for a sample of products in credit trading, leveraged finance and MBS/CMBS. IAD completed this and presented to an Executive Session of the Audit Committee last week. This was not an audit. IAD provided negative assurance stating that nothing came to their attention that made them uncomfortable.
- AAA-rated Derivatives Subsidiary: This is the derivatives company that has been in place for several years (as opposed to the BSAM start-up that was terminated). IAAC recommended that an audit be done to change in management.
- Bear Wagner: Accelerate review to 2007. New business model is being analyzed (or should specialist business be allowed to die).

IAD was asked if there had been any changes to risk rankings in the 2008 audit universe due to the events of the summer of 2007. Brent Camery said that the process is just underway and at this point he has not any changes.

## **Review of the Market Risk Management Department (NY & LDN):**

### **Background and Scope:**

This limited review of the Market Risk Management Department was performed as part of IA's coverage of the (1) Risk Oversight and Governance and (2) Functional Risk Management components of the firm's Internal Risk Management Control System. The audit was globally conducted, with the LDN based internal auditors primarily focused on the Model Review function since this function is run out of LDN (where both Slava and Kan are located).<sup>1</sup>

As such, the scope of this review included reviewing procedures and controls around: governance and oversight by the various market risk committees (including Risk Committee, MTM committee, and Model Review Committee)<sup>2</sup>; departmental policies and procedures; pricing model reviews; VaR model (RIO data integrity and system access (coordinated with IT Audit)<sup>3</sup>; and VaR model stress/backtesting; and review of the status of findings noted during the CSE examination and performed Sarbanes-Oxley management testing.

The review of data quality of risk metrics in this review focused primarily on VaR and firm-wide scenario analysis risk metrics as these were cross-functional and performed centrally under the control of risk management. Validation of data integrity of other risk measures used by the business and risk managers in particular product spaces (e.g., aging reports for Mortgages) were done in other audits through a two-prong approach: (1) the audits of front-office systems through IA IT audits and (2) individual business/product area audits. ("Risk Management's procedures related to price verification, aged inventory monitoring, and day-to-day transaction & trader-limit reviews will be tested as part of the individual business audits.")

The audit entity had a High Risk rating with High Risk Findings.

### **From the audit report:**

Our review did not disclose any material inadequacies in internal controls or significant deficiencies in internal controls over financial reporting. However,

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<sup>1</sup> The Model Review team currently has a couple of people in NY who are focused on the Cash models (e.g. mortgage businesses). As of the time of the field work for this audit, reviews of Cash models had not yet begun. They are currently underway and we have discussed some of the reviews during our quarterly model control discussions.

<sup>2</sup> We highlighted the omission of the Executive Committee which meets monthly with CRO and meets much more frequently to discuss specific items, particularly with respect to approving lending commitments. Internal Audit agreed to include the Executive Committee within its scope during the next review.

<sup>3</sup> The VaR model review was limited to data quality and completeness of positions (i.e. more reconciliation focus), CSE follow ups (e.g., documentation), etc. and did not include any work on the firm's methodology. D&T performed a review of the VaR methodology; however, the reporting from this review was solely related to an opinion on the capital calculation footnote in the annual report.

there are a number of issues that, in the aggregate, are concerning (e.g., issues concerning the completeness of trade populations used in the VaR calculation, the completeness of pricing model reviews, and the number of outstanding CSE findings).

#### Issues and Management Action Plans/Actions Taken:

##### 1. Completeness of Positions Used in the VaR calculation

Regarding the completeness of positions in the VaR calculation, the issues revolved around the robustness of the reconciliation approaches performed by BUCS (formerly done by Susan Flynn). On a monthly basis, BUCS reconciles the “position files” to Datawarehouse (Firm-wide position repository used for price verification), which is then reconciled to the general ledger. However, BUCS cannot independently verify that the “position files” reconciled by them agree to the positions processed by RIO for risk calculations (for several products).

The two biggest areas of concern were: (1) The inability to reconcile several products (predominantly derivative products) where the information in RIO consists of “risk” values such as sensitivities and the information in the “position files” consist of market values. (2) Due to issues surrounding proxy trades and the unavailability of position-level data from source systems, reconciliations between the “position files” and Datawarehouse are not being performed for Credit Trading and Mortgage Derivatives.

#### MAP/Actions taken

Regarding the first issue, Risk management IT will implement a feed based “checksum” in RIO to display the total actual market value (or other appropriate measure, such as DV01) from each feed processed by the system. Once the above modifications are complete, each month BUCS will compare the market values, or other risk measures, displayed in RIO to the “position files” before reconciling them to Datawarehouse to verify that the same files were processed by RIO for risk calculations. Target date 1/31/07.

*As of the date of this audit report, the check sum calculation has been put into place for most feeds; however work is on-going in this area.*

Regarding the second issue, Risk Management IT will work with Risk Managers and others to develop files representative of the positions on which VaR was based for Credit Trading and Mortgage Derivatives. Target date for IT completion is March 30, 2007. BUCS will subsequently develop and implement a repeatable reconciliation process. Target date is June 29, 2007.

*The auditors stated that this process is up and running now (ahead of schedule).*

## 2. Completeness of Pricing Model Reviews

The main finding by IA with respect to the Model Control function (including MTM committee) was that they could not substantiate Model Control's assertion that all currently used derivative pricing models had been reviewed as FAST did not maintain a comprehensive list of all derivative models they developed to allow for a reconciliation to models reviewed by the Model review team.

They also had a finding that the group had not yet reviewed existing valuation models for "cash" products. *This was of course known by everyone and at the time was a conscious choice. We however expressed concern that such a large part of their business (e.g., mortgages) had no model review, even if the models were used solely for risk sensitivities and not to price the securities/loans. Also, the Model Review Team has subsequently started to do reviews in this area and we have discussed some of these in our quarterly meetings with the team.*

The auditors found the documentation and recommendations of the reviews they sampled to be "reasonable"- *a conclusion that our group would concur with based on our limited reviews as well.*

They also found no issues with respect to the follow-up on the recommendations ("all had been implemented"). *This conclusion seemed a little odd (maybe just a result of a small sample) as the follow-up on recommendations was one area that we were concerned with after looking through the MRC minutes. The same items seemed to appear on the list over-and-over again.*

### MAP/Actions taken

FAST has created an inventory list of all "cash" and derivative models in use across the trading books of the Firm and provided the list to the Model Review Team. The list will be updated and sent to the Model Review Team on a quarterly basis. The Model Review Team will reconcile the current list to those models that have been approved by the Team by 1/31/2007 and thereafter. *In discussions with the lead auditor, he stated that all derivative models they sampled from Lynx (i.e. front-office derivatives system) for the audit were included on Model Review's list of approved models.*

In addition, the listing of "Cash" models has been prioritized by the Model Review Committee and the Model Review Team plans to increase headcount with the objective of reviewing all existing "cash" models by December 31, 2007. *As previously stated, this process has already begun. However, while additional personnel were hired to review the "cash models", the group lost two of its most experienced Model Reviewers (who focused on Equity and Credit Derivatives)—This was not discussed in the*

*IA meeting; rather was discussed in our last quarterly Model Review discussion.*

### 3. Open CSE Findings

Market Risk Management is in the process of addressing several issues identified in the SEC's CSE Examination Report. Some still being addressed include:

- Incorporating a stress calculation applicable to the Max Recovery positions (for the firm-wide scenarios).
- Calculating Mortgage Derivatives VaR in the same manner as other Derivative areas.
- Improving the Firm's clean P&L back-testing.
- Improving and documenting controls and procedures regarding the VaR model.
- Enhancing procedures around market risk functions, including pricing model validation, price verification and aging of inventory.
- Enhancing documentation with respect to the status of outstanding pricing model review issues.

#### MAP/Actions Taken

The firm has addressed some of these already (e.g. stress test for Max Recovery positions) and are currently working on addressing the other issues. Plans that we are focused on include the follow:

- We will work with the Controllers department to expand the "static" P&L backtesting process to all Whitebooks. This is an extensive process, and we expect our efforts to continue through 2008. ***See our list of follow-up areas below.***
- We (Risk Management) are in the process of documenting the existing controls and procedures regarding the VaR model inputs, including the historical time series; and over the course of 2007, the Firm will continue evaluation of these procedures and controls to strengthen and formalize the processes in these areas (***we recently received the revised documentation and are currently reviewing it***).
- We (Risk Management) are in the process of supplementing our Risk Management Policy & Principles manual to provide greater specificity for key functions performed by the department, including price verification, aged inventory process & model validation. Target date: 1/31/2007. ***We will request the revised Policy and Principles manual and any other more granular procedure manuals for the price verification and model validation functions.***

### 4. Review the Model Review Committee's Terms of Reference

The Firm needs to re-clarify the MRC's Terms of Reference regarding the authority of the Committee to elicit remedial or corrective actions stemming from the Model Review Team's recommendations made on individual models, and re-clarify the pre-approval rule that requires models to be approved prior to use.

#### MAP/Actions taken

Slava stated that he would review the Model Review Committee's Terms of Reference and, if applicable, request approval to any changes from the Executive Committee in NY. Target date is 2/28/2007.

*The lead auditor saw this issue as one of just re-ratifying the Terms. However, under the version of the policies we have, the terms seem too vague. Due to seeing recurring items on the MRC minutes (as part of our quarterly meetings with the Model Review Team), we became concerned about the enforcement power that the MRC (and the model control function in general) had. This was the impetus for our discussion during the last meeting with the Model Review Team concerning what role the group (and committee) played: whether purely consultative or if it actually had enforcement powers. Kan and Mike Alix stated that this was an area of discussion within the firm as well. We should follow up to see if the enforcement power of the group (and committee) has been strengthened in the policies and procedures or if they are still silent on the issue.*

#### OPSRA Follow-Up Items

**As part of our on-going supervisory work we plan to set up separate meeting(s) to discuss the following issues:**

- (1). Reconciliation of VaR population (i.e. issues raised in this review). (Discussion with Risk management and controllers)**
- (2). VaR backtesting – further developments in clean P&L backtesting (expected to not be fully resolved until 2008). Would like to see what tangible progress has been made since CSE. Has the Controllers group made systems improvements necessary to move this forward with respect to providing “Static P&L” for the various derivative products? (Discussion with Risk management and controllers)**
- (3). VaR methodology & documentation- Once we have digested the revised VaR documentation we have received, we will set up a meeting to discuss targeted questions as well as get a general overview of changes since CSE and future enhancements planned. (Discussion with Risk management)**
- (4). Regarding policies and procedures around market risk functions, including pricing model validation, price verification, etc—we should ask for the revised “Policies and Principles” manual as well as any other more detailed procedures with respect to Model Review, MTM committee, etc. (During the meeting, Steve Angelo**

**stated that, for Model Review, there are more granular procedures than just the section within the policies and principles manual.) We should then discuss any areas where lines of authority appear gray (or where the policies are silent) (e.g. enforceability of the MTM Committee recommendations; model reserves, etc). (Discussion with Risk management)**

**LEHMAN BROTHERS**  
**CSE INTERNAL AUDIT QUARTERLY REVIEW**  
**Meeting on January 25, 2006**

**General**

The first CSE Internal Audit Review meeting with Lehman Brothers was held on January 25, 2006 in New York. Beth Rudofker, Head of Corporate Audit, Jim Tringali, and Laura Vecchio represented Lehman. Julian Sutton, International Audit Director, teleconferenced in from London. The SEC staff included Matt Eichner, Bob Cleland, Michelle Danis and Lori Bettinger.

The agenda included the following:

- Lehman Corporate Audit Overview
- Presentation of the 2005 audit reviews performed and Sarbanes 404(a) status followed by a more in depth discussion of certain audit reviews selected by the SEC staff.
- Review of the 2006 Audit Plan

The SEC staff focused on audit reports issued for the six months ended October 31, 2005. These reports were part of a presentation to the Audit Committee of Lehman's Board of Directors made during the week prior to the meeting. During the six month period ended October 31, 2005, Corporate Audit issued reports for 80 audit reviews, 69 with non-Sarbanes scope and 11 with Sarbanes scope. Of the 69 audit reviews, 40 had control concerns. The scope of Corporate Audit's reviews and testing for Sarbanes audits extends beyond those controls typically considered to be financial reporting. These reviews cover a broad range of front-to-back controls including operational, technology, credit risk, quantitative risk and front office trade authorization.

The Corporate Audit framework for reporting and follow-up on audit findings reflects four categories:

- Material Weaknesses
- Control Concerns
- Control Enhancements
- Efficiency Opportunities

During 2005, Corporate Audit reported no material weaknesses. They did report 289 control concerns as well as numerous control enhancements and efficiency opportunities.

The Lehman Global Corporate Audit Department is currently has staff of 116 people. Resources are located in each of the firm's major regions, including a recently established presence in India.



The SEC staff selected the following audits for more detailed discussion and review with the internal audit managers during the meeting:

- 1) Risk Management
- 2) Derivatives – OTC Options/Volatilities
- 3) Foreign Exchange – Options & Proprietary
- 4) Equity OTC Derivatives
- 5) Non Performing Loans

The staff noted that Lehman was directing considerable resources to branch audit reviews, particularly in light of the Frank Gruttadauria fraud case that occurred in the late 1990's in the Cleveland office. While the staff did not select any branch audits at this time, we will likely do so at a subsequent meeting.

The staff will continue to work with Lehman with regard to establishing protocol for the provision of audit information, which the firm, like some of its peers, views as highly sensitive. At present, most materials are available to the staff only on Lehman premises.

**LEHMAN BROTHERS**  
**CSE INTERNAL AUDIT QUARTERLY REVIEW**  
**Meeting on March 7, 2007**

The Quarterly CSE Internal Audit Review meeting with Lehman Brothers was held on March 7, 2007 in New York. Beth Rudofker, Head of Corporate Audit, Jim Tringali, Kathy Flynn, David Phelps, and Laura Vecchio represented Lehman. Julian Sutton, Director of Audit for Europe and Asia, teleconferenced in from London. Bob Cleland and Lori Bettinger from the SEC attended.

The agenda for the meeting included the following:

- A Review of the 2007 Audit Plan and report to the Audit Committee
- A Review of the 2006 CSE Report, Work Performed and Results
- 2006 Sarbanes Oxley 404(a) Results
- Sub-prime lending discussion and feedback from the SEC relating to the trip to visit Lehman's two mortgage subsidiaries, Aurora and BNC.

**2007 Audit Plan Review**

Rudofker began the review of the 2007 Corporate Goals and Audit Plan by pointing out that Lehman Audit has heavily used the CSE Program to drive enhancements to their Corporate Audit program. The CSE program has been used to "raise the bar" in many areas and acquire additional resources to accomplish their mission. She pointed to a significantly increased effort in the risk management areas as a prime example. Of particular note was the hiring of a full time quant by Audit. Beth was very high on this person, who is a V.P. currently working in risk management in a small bank in Cleveland and has experience in VAR, MPE, and quantitative analysis. Among the responsibilities, the quant will be looking at models and is expected to work closely with and supplement the relationship with PWC.

The goals of the 2007 plan were individually reviewed and included:

- Conduct comprehensive risk assessment across the Firm and execute audit reviews on a risk and cycle basis
- Provide complete audit coverage of areas mandated by regulators
- Participate in the evaluation and implementation of the Firm's key new initiatives
- Maintain visibility and credibility with business managers throughout the Firm
- Drive global consistency in audit approach and standards
- Staff and develop global department to be commensurate with the mission

Themes for 2007 in the Audit Plan included:

- Risk based cycle reviews with a focus on the highest risk as a priority
- Mandatory audits and regulatory follow-up, including CSE and Sarbanes-Oxley

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- Control evaluation and due diligence for 2007 business initiatives. This includes a long list including energy and commodities growth, Asia expansion, IMD build-out, emerging markets, India expansion, new offices (Russia, Brazil, Middle East, Canada), Insurance platform, principal investing strategies, etc.
- Technology Standards enhancement
- Branch, affiliate and subsidiary reviews for businesses, functions and /or entities that are either remote or decentralized.

Organizational development and resource utilization were reviewed. Increased efficiencies from continuing to refine Sarbanes testing, leveraging automation tools and implementing global standards were discussed. Significant 2007 audit projects were reviewed including CSE, Sarbanes Oxley, Markets in Financial Instruments Directive (MiFID), Interagency Guidance on Nontraditional Mortgage Products, Lehman India, and numerous others

Detailed Audit areas were presented for Capital Markets, including equities, fixed income and risk management and regulatory areas, the Mortgage Capital Division, Investment Management, Corporate Infrastructure, and Information Technology. The details for each functional area are included in the 2007 Audit Plan which is on the J drive.

Beth added that the 2007 Audit Plan is not static but will be expanded to address additional audit responsibilities related to new acquisitions and other special projects.

The status of the 2006 Audit Plan was reviewed. While the audit work is completed, there are 210 projects out of a total of 625 where the reports are still in draft form. Beth stated that most should be completed within the next month. There are 60 projects which are still in the field work status and need to be completed. A final update will be provided to the Audit Committee and the SEC at the next meeting in May. The completion of the 2006 audit plan is consuming significant time in 2007.

### **2006 CSE Report Review**

The CSE Report, work performed, and results as included in the 11 page report to the Audit Committee were reviewed. The requirements of the agreed upon procedures were reviewed and the report to the Audit Committee addresses the scope and areas of review including results. Corporate Audit concluded that no material weaknesses were noted in the internal risk management controls that would have an impact on the Firm's compliance with CSE requirements as of November 30, 2006 based on the reviews conducted. The Audit Committee Report includes details of the specific areas of audit review work that was performed and is on the J drive.

The audit reports of the reviews of the Risk Management areas were not available to the SEC staff at the time of this meeting. Beth stated that the audit work had been completed but the reports were not completed as action plans were still being worked out with Risk Management. Beth stated that Internal Audit had raised the bar this time for the audits of Risk Management to the typical Internal Audit level of scrutiny, which had not been done

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before. Beth also stated that Madeline and Risk Management were not challenging the Audit findings. They were being very cooperative. Madeline has been very thoroughly involved in the details relating to the findings and to developing action plans to address the concerns. Beth expected the audit reports to be completed within the next month. I had asked if we could review them as soon as they are completed. Time has been scheduled for the SEC staff to review the audit reports of Risk Management following the Monthly Risk Review meeting on 4/19.

### **Sarbanes-Oxley 404(a)**

The Corporate Audit Report presented to the Audit Committee relating to the Sarbanes-Oxley 404(a) work that was performed and the results for the 2006 year were reviewed by Beth. Lehman Brothers management is responsible for establishing and maintaining adequate internal controls over financial reporting. According to the report and certifications, the management conducted a thorough assessment during 2006 of the Firm's internal controls over financial reporting. As a result management concluded that the Company's internal controls over financial reporting are effective as of the year end November 30, 2006.

Corporate Audit provides senior management and the Audit Committee with an independent assessment of Lehman's internal control environment, including financial reporting controls that are relevant to the Sarbanes-Oxley Act, Section 404(a). Beth noted that Corporate Audit has refined their Sarbanes process over the past two years to make it more efficient and consistent with SEC and PCAOB guidance in a number of ways. Those refinements include:

- Focusing the audit on the matters most important to internal control
- Defining and focusing testing on primary controls
- Establishing materiality guidelines
- Eliminating unnecessary procedures
- Applying an entity level general controls testing approach where possible
- Scaling the audit for smaller companies

Among the matters discussed was the significant decrease in the number of financial reporting controls that were tested. In 2006, there were 4,014 financial reporting controls identified and tested, a 34% decrease from the 6,100 in 2005. The decrease relates to the items noted above. Among the more significant drivers of the decrease was a change in testing approach in IT applications which reduced the number of controls tested by approximately 1,200. A change to a consolidated global testing approach for many IT infrastructure areas further reduced the number of controls by 300. The materiality of equities and fixed income areas in Asia were further reducing the number of controls by 350.

The management review and sign-off entailed various levels of management and in total approximately 652 individuals in the Firm were required to certify and signoff on controls for which they were responsible.

## **Sub-Prime Lending**

There was a brief discussion relating to sub prime lending. Beth said that there were no out sized risks beyond what is already reserved for. She chose not to provide much comment on current market conditions. She said that her focus was on the nature and appropriateness of the products that the firm is offering. It is very important that the firm makes the appropriate types of loans to the appropriate people. Additionally, there is focus on the adequacy of the controls and processes surrounding these businesses, particularly the loan origination and underwriting. She noted that Lehman is very concerned about the fraud which emanates from collusion and relationships like those involving brokers, builders, appraisers, and closing agents. Such relationships are very difficult to detect. Beth stated that she is not worried from a risk prospective but is concerned from a control prospective. There is also considerable senior management concern about protecting the firm from reputational damage. She noted that the FBI is currently investigating certain loans and certain organized practices and activities, noting that there is much more law enforcement involvement in these matters now than has been the case in the past. The FBI and other law enforcement agencies are coming to Lehman to look at a few loans as a part of their investigations. In the past Lehman has gone to law enforcement. Beth feels that the QC person in California has a special fraud focus.

Lehman had asked for feedback from the SEC staff on their visits to Aurora and BNC. Lori indicated that these were very good visits. The cultural differences between Aurora and Lehman were discussed as Aurora obviously had not been "Lehmanized". Beth noted that the products and clientele for the two businesses differed and very little discussion had occurred as to whether significant changes would be made. She stated that any changes would be client driven.

## **FSA Issue**

Prior to the meeting, Beth had called Matt to give us a heads up that E&Y is including an issue in their statutory report to the FSA on LBI relating to the use of manual systems for an emerging market currency business. There was a \$60 mm deferral associated with the issue.

We reviewed the matter with Beth. There were pricing differences between the front and back office systems involving the EMG business in London amounting to \$58 million. She stated that the differences were not material. The differences have existed at least since 2005. The front office and risk systems are correct. The errors are in the middle office. The pricing is manually calculated on spreadsheets. They were found by the new product controller when the old product controller left. Additional controls have been put in place like daily validation, checking trades, improved platform, and proper product controller training and proper supervision so that the review and reconciliation requirements are performed properly and timely. I mentioned to Beth that this is not the first time that there have been problems in London from the failure to properly perform responsibilities by product controllers and supervisors. She acknowledged.

### **Matters for Follow Up**

- Review the audit reports of Risk Management after the 4/19 Monthly Risk Review meeting. These reports were not completed at the time of this meeting with Audit.
- The next SEC meeting with Corporate Audit will be on 5/23 at 11 AM following the next Audit Committee meeting which will be on 5/15/07.

**LEHMAN BROTHERS**  
**CSE INTERNAL AUDIT QUARTERLY REVIEW**  
**Meeting on May 23, 2006**

**General**

The Quarterly CSE Internal Audit Review meeting with Lehman Brothers was held on May 23, 2006 in New York. Beth Rudofker, Head of Corporate Audit, Jim Tringali, Kathy Flynn, Amy Gilfenbaum, David Phelps, and Laura Vecchio represented Lehman. Julian Sutton, Director of Audit for Europe and Asia, teleconferenced in from London. The SEC staff included Matt Eichner, Bob Cleland, Michelle Danis and Lori Bettinger.

The agenda included the following:

- Lehman Corporate Audit Update
- 2006 CSE Status
- Audit Reviews

Rudofker provided a Corporate Audit update. She reviewed the global Corporate Organization staffing, which continued to grow with the increases primarily in IT. Staffing of the growing India operations and of the establishment of a Corporate Audit presence there was also discussed. The increases are primarily to support the firm's growth and new business initiatives, increased regulatory requirements and expanded audit coverage of control areas. Strategic control activities and projects were discussed, including energy trading in the U.S. and Europe which is not growing as fast as anticipated, IMD growth in Europe, non-performing loans in Europe, mortgage origination in Japan and Korea, and growth of the Hong Kong office. Rudofker briefly discussed ten strategic initiatives, emphasizing the CADII approval in Europe for credit products and mentioning planned expansion in to the Persian Gulf area, Dubai and Katar. She emphasized that Corporate Audit is heavily involved in the establishment of appropriate internal controls in new businesses and strategic initiatives, particularly energy. An overview of the Lehman Corporate Audit quality assurance review program was provided. Lehman relies primarily on internal evaluations and feedback and is not currently looking for an outside independent review although that is being considered for 2007.

CSE status was discussed. Corporate Audit discussed their audit program and plans regarding CSE Agreed Upon Procedures and the related Audit Committee communications. Tringali reviewed the audit coverage relating to internal risk management control systems testing. A draft of the letter prepared by the five CSE internal audit groups working together intended to provide a representation to the SEC of the work performed related to agreed upon procedures and the requirements of Rule 15c3-4 was briefly reviewed. The reviews will take place at three levels: Risk Oversight and Governance, Functional Risk Management, and Business Level Risk Management. Lehman was aware that they had some work to do to improve Committee Oversight &

Governance. Laura Vecchio has taken the lead on this effort and made a presentation describing her work in detail. Laura heads the Internal Control Committee Oversight & Governance Group, which reports to Beth as a separate function from Corporate Audit. Following the presentations and discussion, Eichner requested that Corporate Audit provide a detailed audit program for 2006 addressing the work to be performed related to 15c3-4 and the capital calculation at the next meeting.

Corporate Audit had completed their reports on a large number of audits during the quarter. The significant increase in the number of audit reports completed this quarter was attributable to finishing up the 2005 Sarbanes-Oxley reviews in addition to the reviews of the business and support areas normally conducted. Rudofker reviewed a memo to the Audit Committee which described the audit coverage and summarized significant findings. No material weaknesses were found in any of the audits. The SEC staff had selected seven audit reports for more in depth review and discussion during this meeting. The following are the reports that were selected and reviewed by the Corporate Audit director responsible for the performance of the work. Audit findings and action plans were discussed:

1. 474 Risk Management
2. 396 Program Trading
3. 387 Liquid Markets Prop Trading
4. 411 SOX - Margin
5. 449 Regulatory Reporting - 15c3-1 & 15c3-3
6. 478 SOX 404 - NPL
7. 479 SOX 404 - REO

The staff will continue to work with Lehman with regard to establishing protocol for the provision of audit information, which the firm, like some of its peers, views as highly sensitive. At present, most materials are available to the staff only on Lehman premises.

### **Matters for Follow Up**

- QRM model review follow up with Eduardo Canabarro by Corporate Audit and the SEC
- CRMPG II review at the next meeting
- CRD Risk Assessment at the next meeting
- Audit Program for 2006 for work to be performed related to 15c3-4 and the capital calculation at the next meeting
- Overview of major IT projects or planned projects

Note: Could we take away the Audit Committee memo beginning sometime in the future?



**LEHMAN BROTHERS**  
**CSE INTERNAL AUDIT QUARTERLY REVIEW**  
**Meeting on May 30, 2007**

The Quarterly CSE Internal Audit Review meeting with Lehman Brothers was held on May 30, 2007 in New York. Beth Rudofker, Head of Corporate Audit, Jim Tringali, Kathy Flynn, David Phelps, Amy Gilfinbaum, and Laura Vecchio represented Lehman. Julian Sutton, Director of Audit for Europe and Asia, teleconferenced in from London. Matt Eichner, Bob Cleland, Lori Bettinger and Michelle Danis from the SEC attended.

The agenda for the meeting included the following:

- Corporate Audit Update - Review the 2007 Semi-Annual report presented to the Audit Committee in their meeting on 5/15/07
- Audit Reviews - review audits selected by the SEC staff from the last 6 months
- CSE Update - Review the Risk Management audit reports (5)
- LOTC – Corporate Audit review scope and AUP discussion
- New Product Committee Update

**Corporate Audit Update**

Beth provided a Corporate Audit update driven by the information in the “Report on Corporate Audit Activities” for the six months ended April 30, 2007 that was presented to the Audit Committee of the Board of Directors on May 15, 2007. One of the conclusions in the report was that no material weaknesses were noted that would have an impact on the Firm’s financial statements. During the six month period, Corporate Audit issued reports for 305 audit reviews including 137 Risk Scoped Reviews and 168 SOX Only Reviews. The Sarbanes-Oxley/SOX reports were previously reviewed with the Audit Committee in the February 2007 meeting and with the SEC in the 3/7/07 meeting. Of the 137 Risk Scoped Reviews, 53 contained control concerns. A total of 98 reports related to the Capital Markets Division, including 31 Risk Scoped and 67 SOX. The Mortgage Capital Division and Investment Management were also audited heavily with the number of Risk Scoped reviews totaling 31 and 39 respectively. Risk Scoped reviews are full or targeted scope reviews. Action plans have been put in place to address control concerns. Statistics with regard to follow-up of new and prior actions plans were also reviewed. The audits selected by the SEC staff for review in this meeting are listed below.

Beth reviewed staffing noting that Corporate Audit now has 152 professionals, up 9% since October 2006. Resources increased primarily for the following reasons:

- Capital Markets new business initiatives and increased regulatory requirements
- Technology new initiatives and regulatory requirements
- IMD business growth
- MCD acquisition of Capital Crossing

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Beth noted the hiring from Goldman of Stephen Davies, a Senior VP hired to head European Information Technology and Operations Infrastructure Audit as Lehman strengthens its International audit team. He will report directly to Julian Sutton, the International Managing Director, who reports to Beth. Sherry Marchand, another Senior VP, came on board as one of the 5 auditors that came with the Capital Crossing in Boston acquisition, where the integration is going well.

Global audit utilization was reviewed including audit plan coverage, business unit coverage, and risk coverage. Audit spent 88% of resources on planned activities and 14% on unplanned activities.

Significant control activities and projects were discussed, including Basel II, Lehman India, Emerging Markets like Eastern Europe, Russia and Turkey. The acquisition and integration of Capital Crossing in Boston is going well. Lehman is planning a BNC Branch Restructuring. BNC currently processes loans through 50 branches in 34 locations across the U.S. Beginning in June 2007, management will consolidate the branches into 5 Regional Operating Centers designed to create operating efficiencies, improve funding capacity, and provide much tighter control as the higher volume offices will be more efficient.

Strategic acquisition due diligence was discussed as acquisition activities have increased and Audit plays an active role in evaluating internal controls as a part of the due diligence process. In particular, the Eagle Energy acquisition was reviewed. This is a Houston based energy services provider that may become Lehman's physical trading component. No audit team is coming with this acquisition.

### **Audit Reviews**

The SEC staff had selected six audit reports for more in depth review and discussion during this meeting. The following are the reports that were selected and reviewed by the Corporate Audit director responsible for the performance of the work. Audit findings and action plans were discussed:

LOTC - Americas  
Equity Prime Brokerage Systems  
Appraisal Department  
Equity OTC Derivatives - Prop (Hong Kong)  
European Credit Risk Management Dept  
India Operations Prime Brokerage Americas

The review of the Equity OTC Derivatives – Prop (Hong Kong) was of particular concern because of serious internal control issues primarily relating to a pattern of late booking of transactions to either the risk system or the SmartTicker (official books and records). The majority of the late bookings were related to one individual trader. Such practices are unacceptable. Timely trade capture on Trade Date is essential for sound

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risk management and control practices. The trader was fired. Per Corporate Audit, there were no material effects on the financial statements or the risk system. The matter was reviewed with the Audit Committee by Beth.

### **CSE Update and Review of Risk Management Audit Reports**

Corporate Audit also conducted audits of five functions in Risk Management during the latter part of 2006. The reports took a long time to finalize and two still remain in draft form. The five audits covered the following areas:

- Credit Risk Management
- Maximum Potential Exposure
- Market Risk Management – Value at Risk
- Model Validation Group (draft)
- Consolidated Supervisory Entity (CSE) VaR Reconciliation (draft)

Jim Trangali reviewed each of the reports and the related findings. Some of the work, such as the Market Risk Management VaR Reconciliation was done with the assistance of an outside consultant, PWC. Much of the work was done before the Corporate Audit quantitative person was hired, but Beth noted that PWC may continue to be used in similar situations in the future as there is more work available than the quantitative person can do.

Both Beth and Jim expressed serious concern about the audit findings and the ability of Risk Management to handle and improve certain matters.

Matt Eichner and the SEC staff immediately also expressed considerable concern about the Risk Management functions, its management, lack of transparency, and lack of ability to effectively address regulatory and capital related matters in particular. There is also concern about the lack of depth and management style in the Risk Management function. Eichner stated that what is happening is bordering on unacceptable. After considerable discussion, both the SEC and Corporate Audit resolved to actively pursue improving the situation.

Corporate Audit stated that there are two additional Risk Management Audits in progress for which reports will be forthcoming. Those related to the audits of (1) Regulatory Reporting and (2) Corporate Governance. These reports are expected to be completed in the next several months and will be reviewed at the next Quarterly CSE Audit meeting on 9/6/07.

### **LOTIC – Corporate Audit Review Scope and AUP Discussion**

Audit set forth a summary of LOTIC Agreed Upon Procedures, requirements and audit coverage related to the “L” letter and the “M” letter. They requested that this work be performed going forward by Corporate Audit instead of E&Y, the outside auditors. Matt indicated that this was doable. He urged Audit to take into consideration the LOTIC unique governance, such as the reg calculation and products unique to LOTIC when

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planning and performing the work. Beth agreed that Lehman would send Matt a letter formally asking to substitute the Corporate Audit work for that of E&Y.

### **New Product Committee Update**

Laura presented a New Product Committee update. She provided a listing of the 19 new products approved during 2007 by the New Product Committee America, which also functions as a global committee for products approved globally.

### **Matters for Follow Up**

- Follow up on concerns about the management of the Risk Management functions noted above.
- Review the Risk Management reports relating to Regulatory Reporting and Corporate Governance at the 9/6/07 meeting.
- The SEC staff selected 16 audits for review from those completed from December 2006 to May 2007. Six were reviewed during this meeting on May 30<sup>th</sup>. The remaining audits will be reviewed at the meeting on 9/6/07.
- Regarding LOTC Agreed Upon Procedures, Lehman is to send Matt a letter formally asking to substitute the work of Corporate Audit for that of E&Y.
- Considering that the 39 Risk Scoped audits of Investment Management were the largest number of risk scoped audits performed during the six months for any area, and an interest in looking at Investment Management, an IM presentation focusing on the audit work, higher risk activities and more significant findings has been requested for the next meeting on 9/6/07.

**LEHMAN BROTHERS**  
**CSE INTERNAL AUDIT QUARTERLY REVIEW**  
**Meeting on July 25, 2006**

The Quarterly CSE Internal Audit Review meeting with Lehman Brothers was held on July 25, 2006 in New York. Beth Rudofker, Head of Corporate Audit, Jim Tringali, Kathy Flynn, Amy Gilfenbaum, and Laura Vecchio represented Lehman. Julian Sutton, Director of Audit for Europe and Asia, teleconferenced in from London. The SEC staff included Bob Cleland, Michelle Danis and Lori Bettinger.

There was progress in establishing a protocol for providing audit information to the SEC staff. Beth, with the approval of Russo, agreed to allow the staff to keep the first 13 pages of the Report on Corporate Audit Activities presented to the Audit Committee of the Board of Directors on June 13, 2006. We were only allowed to read and return the rest of the report that included a more detailed description of the audit findings. We have been getting "Review Highlights" that include a brief description of the findings for the audits that we select for review in the meetings. We were also able to keep the CPMPG II presentation and Risk Management Controls Testing Audit Plan for 2006-2007 that was updated to include dates for completion. The staff will continue to work with Lehman regarding the provision of information.

The agenda for the meeting included the following:

- Lehman Corporate Audit Update
- CSE Update – Risk Management Controls Testing Audit Plan for 2006-2007
- Counterparty Risk Management Policy Group – II (CRMPG II)
- Audit Reviews

Rudofker provided a Corporate Audit update driven by the information in the "Report on Corporate Audit Activities" for the seven months ended May 31, 2006 that was presented to the Audit Committee of the Board of Directors on June 13, 2006. No material weaknesses were noted that would have an impact on the Firm's financial statements. During the seven month period, Corporate Audit issued reports for 377 audit reviews. Note that Corporate Audit normally meets with the Audit Committee twice per year. Of the 377 audit reports issued, 298 included Sarbanes-Oxley controls testing and 79 had a non Sarbanes-Oxley scope. There was a reasonable dispersion across the functional areas of the firm with emphasis on the Capital Markets Division, Investment Management Division, and the Mortgage Capital Division. Of the 377 audit reviews, 57% had control concerns. Action plans are put in place to address control concerns. Statistics with regard to follow-up of new and prior actions plans were reviewed. The audits selected by the SEC staff for review are listed below.

Rudofker reviewed the global Corporate Audit Organization staffing, which continued to grow with the increases primarily in IT Audit to support the firm's growth and new

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business initiatives, increased regulatory requirements and conduct pre-implementation reviews for new technology development initiatives. Staffing of the growing India operations and of the establishment of a Corporate Audit presence there was discussed. Global audit utilization was reviewed including audit plan coverage, business unit coverage, and risk coverage. Audit spent 80% of resources on planned activities and 20% on unplanned activities. This is consistent with Audit's expectations.

Strategic control activities and projects were discussed, including CSE, energy trading in the U.S. and Europe which is not growing as fast as anticipated, IMD growth in Europe, FID Technology Architecture, Lehman India, non-performing loans in Europe, mortgage origination in Japan and Korea, growth of the Hong Kong office, committee structures and corporate governance, and FSA model approval in Europe (CADII).

There was considerable discussion relating to India as the firm is beginning to move its attention to developing businesses and a business model in India in addition to the support and transitioning functions. The Executive Committee has approved India business development in concept. Banking is one of the first areas being considered. The New Product Committee will play a key role. The SEC staff will continue to monitor activities in India.

CSE status was discussed. Targeted completion dates were inserted in the previously presented audit plan for testing risk management controls in accordance with the requirements of Rule 15c3-4.

CRMPG II is also a strategic project that prompted a presentation on the subject previously requested by the SEC. The presentation is included in the files.

The QRM review work performed since the last meeting and current status were discussed by Rudofker and the SEC. Documentation is still an issue. The matter has the attention of risk management and corporate audit as well as the SEC.

The SEC staff had selected eight audit reports for more in depth review and discussion during this meeting. The following are the reports that were selected and reviewed by the Corporate Audit director responsible for the performance of the work. Audit findings and action plans were discussed:

1. Small Business Finance
2. Special Servicing and Default Administration
3. Month-End Close & Financial Statement Preparation
4. Lehman Brothers OTC Derivatives Inc
5. OTC Equity Derivatives
6. Yield enhancement - Extended Scope Audit
7. High Grade & High Yield Bank Loans
8. Lehman Brothers Alternative Investment Management

The next meeting was scheduled for 12/5/06 at 11 AM with consideration given to the timing of the next Corporate Audit meeting with the Audit Committee which will be on 11/14/06 and the timing of the Thanksgiving holiday.

**LEHMAN BROTHERS**  
**CSE INTERNAL AUDIT QUARTERLY REVIEW**  
**Meeting on September 11, 2007**

The Quarterly CSE Internal Audit Review meeting with Lehman Brothers was held on September 11, 2007 in New York. Beth Rudofker, Head of Corporate Audit, Jim Tringali, Kathy Flynn, David Phelps, Amy Gilfinbaum, and Laura Vecchio represented Lehman. Arthur Hamilton who is in charge of the Capital Markets Audit Group in London teleconferenced in from London as Julian Sutton, Director of Audit for Europe and Asia was in India and not available. Bob Cleland, Lori Bettinger and Michelle Danis from the SEC attended.

The agenda for the meeting included the following:

- Audit Reviews - review audits selected by the SEC staff
- Regulatory Update
- Mortgage Business Update
- IMD Overview Presentation
- Confirmation Update

**Audit Reviews**

There were 10 audits selected by the SEC staff that were not reviewed at the last quarterly meeting. The plan was to review them at this meeting. Lehman has meets with the Audit Committee every six months, and this is when they summarize all of the audits performed from which we make our selections for review. Therefore, there was not a new list of audits to review this quarter. One of the 10 audits selected previously related to BNC Broker Loan Origination. Since the Lehman recently made the strategic decision to close down BNC in connection with a major restructuring of the mortgage business, this audit was excluded from those reviewed.

The following are the reports that were reviewed by the Corporate Audit director responsible for the performance of the work. Audit findings and action plans were also reviewed and discussed:

LBCB – Credit Risk Management  
NYSE – MISU  
GCCM  
Entitlement Modeling System (ELMO)  
Loan Pricing and Secondary Marketing  
MCD Compliance  
Volatility – Flow  
MCD – UK Loan Originations  
India MCD Remote Image Validation



In reviewing the audits one of the matters discussed was the suitability of leveraged loans on hung deals for the banks. Lehman has consistently indicated that much of the funding for loans from hung deals will come from the banks with most of the leveraged loans being funded by Bankhaus. Lori questioned the suitability of MICA loans for acceptance by Bankhaus and the German Regulators. Arthur did not have an answer as to the work the firm had done as to the suitability of these loans and the extent of contact with the German regulators. Arthur is to follow up on this and get back to us.

The audit of loan pricing and secondary marketing was done before the mortgage environment changed significantly and before Lehman decided to shut down BNC. There was discussion about the market, product, and cultural differences between BNC and Aurora, as well as the strengths of Aurora. Since the operations and business have changed significantly since the audit, Beth focused more on the retaining corporate audit staff despite the current downsizing of the operations. Audit wants to retain staff and work to improve systems and controls to put the business in a position that it will have the systems and controls to respond to the market demands quickly with the appropriate products and pricing for customers when the mortgage markets improve.

### **Regulatory Update**

- IBR Waiver - Jim Tringali and Arthur Hamilton provided an update on the IBR waiver relating to credit risk management that was submitted to the FSA at the end of June, and the FSA's on site visit the prior week to discuss the waiver and how it would fit into the capital framework. The primary effect is on the LBIE capital calculation. Jim and Arthur stated that there were no significant comments expressed by the FSA. The FSA emphasized that there would be a good independent review of the credit risk control group and controls over the risk models. The timing of the completion of the work by the FSA and their approval of the waiver is open and unknown. Approval by January is in question with much depending on the FSA resources available to address this application as well as the others submitted. Lehman noted the FSA received other applications before Lehman's was submitted at the very end of June and that theirs is probably not high in the queue. Lehman believes that the FSA has everything they need.
- OTS – Laura has been in contact with Matt re concerns. Beth made the general observation that they are deepening their reach into the Holding Company and expanding their scope. For example, the OTS selected 37 audits by Corporate Audit this year versus 7 audits last year. Of the 37 audits selected, 12 were from Europe and Asia and 2 from the bank were looked at last year and.
- NERO – They are on site doing a review of subprime. They are attempting to restrict their review requests to the broker dealer, LBI. They have asked for very extensive data, like every trade from January to August instead of testing or sampling as is generally their procedure. They are reviewing pricing and position marks. Beth noted that they had appropriately scoped their work relating to product control and margin collateral. Lehman is hoping the exam will be wrapped up soon.

- FINRA exam – started on 9/10. Lehman provided Michelle with a copy of the document request list. The exam includes that traditional financial operating exam and a review of risk management. Lehman noted that their approach to the risk management part of the exam was as if they were starting all over and had not performed work last year.
- FDIC – Finished their exam but a report has not been issued yet. No significant findings were noted in the exit review. Laura stated that the bank would have been given a rating of 1, the highest rating, except that it was a new institution which can't be rated 1.

### **Mortgage Business Review**

Following several announcements of significant changes and downsizing in the mortgage business, including closing down the subprime business, we requested an update. Lehman is still committed to the mortgage origination business although it has been dramatically scaled back and restructured at this time to address the current market environment. In the future they will size the business based on the market. It will be structured to function economically with a variety of products. While BNC will be completely wound down over the next two months, Aurora's business is expected to hire going into late 2007 and 2008 as it is expected that the mortgage business will come back. Beth noted that Lehman was very careful not to state that they were not getting out of the subprime business, just closing it down. They will focus on this market and it's potential. They may go back into it with the "right products" when market conditions are appropriate. Internal audit had no cuts in staffing, although they are still analyzing the status of the BNC auditors.

### **Investment Management Division Audit**

Amy reviewed the Investment Management Division audit scope and projects with emphasis on specific areas and findings in some of the audits performed.

### **Confirmation Update**

Lori asked for and received an update on the issues related to credit derivatives confirmations.

### **Matters for Follow Up**

- Bankhaus – Suitability of MICA loans for acceptance by Bankhaus. In connection with the audit of LBCB, Lori questioned the suitability of MICA loans for acceptance by Bankhaus and the German Regulators. Arthur did not have an answer as to the work the firm had done as to the suitability of these loans and the extent of contact with the German regulators. Arthur is to follow up on this and get back to us.

- Lori requested an updated organization chart for the Credit Risk Management function

**LEHMAN BROTHERS**  
**CSE INTERNAL AUDIT QUARTERLY REVIEW**  
**Meeting on December 5, 2006**

The Quarterly CSE Internal Audit Review meeting with Lehman Brothers was held on December 5, 2006 in New York. Beth Rudofker, Head of Corporate Audit, Jim Tringali, Kathy Flynn, Amy Gilfenbaum, David Phelps, and Laura Vecchio represented Lehman. Julian Sutton, Director of Audit for Europe and Asia, teleconferenced in from London. The SEC staff included Bob Cleland, Lori Bettinger, and Michelle Danis.

There was progress in establishing a protocol for providing audit information to the SEC staff. Beth, with the approval of Russo which was obtained at the last meeting, agreed to allow the staff to keep the first 12 pages of the Report on Corporate Audit Activities presented to the Audit Committee of the Board of Directors on November 14, 2006. We were only allowed to briefly read and return the rest of the report that included a more detailed description of the audit findings. We have been getting "Review Highlights" that include a brief description of the findings for the audits that we select for review in the meetings. We were also able to keep the presentations. The staff will continue to work with Lehman regarding the provision of information. See follow ups below.

The agenda for the meeting included the following:

- Lehman Corporate Audit Update – Review the 2006 Semi-Annual Report to the Audit Committee
- CSE Update – Risk Management Controls Testing status for 2006
- India Update
- Audit Reviews

Rudofker provided a Corporate Audit update driven by the information in the "Report on Corporate Audit Activities" for the five months ended October 31, 2006 that was presented to the Audit Committee of the Board of Directors on November 14, 2006. No material weaknesses were noted that would have an impact on the Firm's financial statements. During the five month period, Corporate Audit issued reports for 95 audit reviews with the most audits performed in the Capital Markets Division and the Mortgage Capital Division although the distribution of audits appeared to cover the firm's major businesses and functions. Only 6 of the audits had a Sarbanes/Oxley scope. Of the 95 audit reviews, 61 contained control concerns. Action plans were put in place to address control concerns. Statistics with regard to follow-up of new and prior actions plans were reviewed. The audits selected by the SEC staff for review are listed below.

Rudofker reviewed the global Corporate Audit Organization staffing, which continued to grow to support the firm's growth and new business initiatives, increased regulatory requirements and conduct pre-implementation reviews for new technology development initiatives. India internal audit was staffed with 5 people during the period. Global audit

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utilization was reviewed including audit plan coverage, business unit coverage, and risk coverage. Audit spent 86% of resources on planned activities and 14% on unplanned activities.

Strategic control activities and projects were discussed. Corporate Audit at Lehman actively participates in control related projects to assist in implementing effective controls and operating environments for new initiatives and strategic business developments. These activities include participation in due diligence and integration of new businesses, review of design and implementation of new technology, re-engineering of infrastructure and processes, involvement in regulatory initiatives and special investigations.

Corporate Audit reviewed the audit plan for Risk Management Controls Testing for 2006-2007. We got an update on the status of each of the functional and other risk reviews. Veronica Yeung and Jim Tringali provided a Global Risk Management presentation wherein they reviewed the 2006 audit tests performed relating to Risk Appetite, MPE Framework, Credit Risk Management, Regulatory Reporting, VAR Framework, Model Validation, and Internal Control Committee Oversight and Governance. The presentation is on the J drive. Some of the parts of the testing are complete while work is still being done on other parts that will run into 2007. An outside consultant, PWC, is being used in some areas where Lehman lacks the internal expertise and chose to hire an experienced consultant rather than try to hire. To date Jim indicated that Audit and some of the risk management functions have been very pleased with the work of PWC.

Lehman India has been a major project this year as Lehman continues to grow business processes and transfer them to India from other parts of the firm. The region currently has 1,350 employees and is projected to increase further as a result of incorporating more off-shoring functions and establishing a Capital Markets business. To build expertise in the region, low risk activities were initially transferred such as reconciliation preparation, MIS and data aggregation, quality control, and payable processing and monitoring. As expertise is established, additional activities are being considered for migration. Audit is conducting post transition reviews and testing in order to ensure that appropriate controls are in place. Kathy Flynn, the Audit Senior V.P. responsible for India, made a special presentation of "Corporate Audit – India Approach" which is on the J drive.

Audit was also active in performing due diligence related to two Mortgage Capital Division acquisitions. In August, Lehman Brothers Bank acquired Campus Door, a leading provider of private student loans based in Pa. In September, Lehman Brothers Bank entered into an agreement to acquire Capital Crossing, a FDIC-insured, publicly traded trust company headquartered in Boston, Mass. Capital Crossing purchases discounted loans secured by commercial real estate, multifamily and residential real estate and other business assets as well as operating a leasing subsidiary. The acquisition is expected to close in the first quarter of 2007. Audit made site visits and performed work related to both acquisitions.

There was a review of involvement with the various regulators, including the NYSE, OTS, FDIC, OCC, FSA, and SEC related to CSE. The OTS focus on predatory lending practices was discussed at some length as Beth felt that they were nit picking and demanding compliance with rules which were released one day before the exit meeting for their Safety and Soundness, Compliance, and Information Technology exam for Lehman Brothers Bank and LBHI which was commenced in July 2006. Nonetheless, Lehman got high marks overall.

We had asked Beth for a discussion of the increased volume of Mortgage Loan Putbacks following up on discussions in other meetings. Beth indicated that putbacks had definitely increased, particularly in the subprime space as market and industry conditions changed, rates increased, volumes slowed, spreads become tighter, and cost cutting and competition increased, including the certain effects from vertical integration by firms. Subprime loans originated by Finance America experienced a higher putback level than at BNC. This was particularly evident for legacy Finance America loans. Upon a close review of the requests for putbacks, Lehman concluded that the management and underwriting standards followed by Finance America were weaker than Lehman's standard practice. Additionally, the Quality Control function at Finance America was ineffective. They did not pin fraud on any individuals, but there were some questionable W-2s. The problems appeared to be isolated at one particular branch.

Lehman dismantled Finance America (Lehman blew it up), brought in new management, and brought the underwriting, quality control, and operating standards up to that of Lehman's mortgage loan origination business. There was knowledge of the problems among investors and in the industry that contributed to investors to being more aggressive in putting back the Finance America originated loans for any reason when in the past some of the loans probably would not have been put back. First payment defaults, which give the investor the right to putback the loan, are up slightly contributing to the increase. Some putbacks are defaults that go back as far as 2004 and 2005. Lehman is seeing an increase in putbacks for defaulted 2004 and 2005 vintage loans that have breached reps and warranties. According to Beth, investors have been combing through the documentation of defaulted loans looking for any small thing that could be construed as a breach of reps and warranties, thus allowing them to putback the loan to Lehman. The putbacks have resulted in an increase in the volume of loans being reworked ("scratch and dent loans").

Customer relationships have changed. In the past, if loans were put back, Lehman wouldn't do business with the customer in the future. At the present, everybody, certainly including Lehman, is trying to extend the loan origination pipeline, so they will continue to do business with customers who putback loans. Lehman is very concerned about the negative reputational implications of the Finance America problems. The situation has received much senior management attention. Beth stated that the firm was optimistic that the increase in putbacks was a temporary situation in the market that would soon subside, although she cautioned that there may not be a return to the lower putback levels that existed prior to this change in investor aggressiveness and market conditions. Beth believes that Lehman is at the tail end of exposure from Finance

America putbacks. Reserves have been established, utilizing a reserving methodology updated by risk management with the recent loss history. Beth stated that the lessons learned from this Finance America situation is to do more due diligence upfront and to test as much as possible.

CSE status was discussed. Targeted completion dates were inserted in the previously presented audit plan for testing risk management controls in accordance with the requirements of Rule 15c3-4.

The timing for filing of the AUP letter with the SEC relating to Audit's reviews of internal risk management control systems pursuant to 15c3-4 was discussed. Since the plan is to review this letter with the Audit Committee as a part of the 2/8/07 meeting which is more than 65 days after the year end, Beth asked that Lehman not be required to file this letter until that had been done despite the fact that it would result in the letter being filed beyond the required 65 days after the year end that the rule requires. The matter had been previously discussed with Matt Eichner by Bob, and Beth was informed that the staff would not object as long as the letter was filed timely after the meeting. Beth indicated that she hoped to file the letter within a matter of days after the Audit Committee meeting.

The SEC staff had selected seven audit reports for more in depth review and discussion during this meeting. The following are the reports that were selected and reviewed by the Corporate Audit director responsible for the performance of the work. Audit findings and action plans were discussed:

LEH.2006.253	Government Sponsored Enterprises (FNMA FHLMC FHLB)-Americas	Americas	Fixed Income
LEH.2005.473	Equity Volatility - Americas	Americas	Equities
LB.2006.37	Warehouse Lending - Irvine	Americas	Mortgage Capital
ALS.2006.33	Master Servicing	Americas	Mortgage Capital
LEH.2006.376	Energy Trading Platform	Americas	Information Technology
LEH.2006.41	CFD's - Compliance with Tax Fact Pattern	Europe	Equities
LEH.2006.778	NPL Control	Europe	Fixed Income

The "NPL Control" review was a Target Control Environment (TCE) review for a new product in Europe. Audit focused on identifying key operating controls required to support the business. In contrast to the New Product Committee process, a TCE aims to make recommendations early on, and is more detailed and targeted on control objectives.

The next meeting was scheduled for 3/6/06 at 11 AM with consideration given to the timing of the next Corporate Audit meetings with the Audit Committee which will be on 1/31/07 to review the Lehman Internal Audit 2007 Plan and on 2/8/07 to review the Sarbanes/Oxley Report and the SEC AUP Report.

### **Matters for Follow Up**

1. We will continue to pursue a protocol for providing audit information to the SEC staff. Beth, with the approval of Russo, agreed to allow the staff to keep the first

12 pages or so of the Report on Corporate Audit Activities presented to the Audit Committee of the Board of Directors on November 14, 2006. We were only allowed to read and return the rest of the report that included the scope and a more detailed description of the audit findings. We have been getting "Review Highlights" that includes the scope and a brief description of the findings for the audits that we select for review in the meetings. We were also able to keep the several presentations. The staff will continue to work with Lehman regarding the provision of information both before the meeting and during the meeting.

2. Selection of audits for review – We have been looking for a better way to get more information on the audits before the meetings. The report to the Audit Committee includes the scope paragraphs and findings for each of the audit reports. As noted above, Lehman is not willing to give us copies of this part of the report either at the time of the meeting or in advance because it includes the findings. Lehman is willing to provide scope paragraphs in advance as they did this time for the 14 audits selected and requested. No findings were provided. In the future, we would like the scope paragraphs for all of the audits prior to the meeting to give us some information on which to base our selections.
3. Additionally, Beth has agreed to provide us with copies of the audit reports selected for review an hour before the meeting so that we can look at them. Lehman has not allowed us to take these audit reports off of the premises primarily because of concerns about the findings that are in the reports.
4. The SEC staff should seek diversification of audit areas in selecting audits for review.
5. Internal Audit's performance of agreed upon procedures and their reviews of the Lehman Risk Management Control System that have been conducted during 2006 to meet the requirements of 15c3-4 and the relater letter to the SEC will be reviewed at the next meeting.
6. The Internal Audit Plan for 2007 will be reviewed at the next meeting as the Audit Committee should have reviewed and approved it by then.



## MEMORANDUM

February 10, 2006

TO: Robert L. D. Colby, Acting Director  
Herbert F. Brooks, Chief of Operations  
Michael A. Macchiaroli, Associate Director  
Thomas K. McGowan, Assistant Director  
Division of Market Regulation

THROUGH: Matthew J. Eichner, Assistant Director

FROM: Robert W. Cleland, Jr., Accountant

RE: Quarterly Internal Audit Meeting With Lehman Brothers

The first CSE Internal Audit Review meeting with Lehman Brothers was held on January 25, 2006 in New York. Beth Rudofker, Head of Corporate Audit, Jim Tringali, and Laura Vecchio represented Lehman. Julian Sutton, International Audit Director, teleconferenced in from London. The SEC staff included Matt Eichner, Bob Cleland, Michelle Danis and Lori Bettinger.

The agenda included the following:

- Lehman Corporate Audit Overview
- Presentation of the 2005 audit reviews performed and Sarbanes 404(a) status followed by a more in depth discussion of certain audit reviews selected by the SEC staff.
- Review of the 2006 Audit Plan

The SEC staff focused on audit reports issued for the six months ended October 31, 2005. These reports were part of a presentation to the Audit Committee of Lehman's Board of Directors made during the week prior to the meeting. During the six month period ended October 31, 2005, Corporate Audit issued reports for 80 audit reviews, 69 with non-Sarbanes scope and 11 with Sarbanes scope. Of the 69 audit reviews, 40 had control concerns. The scope of Corporate Audit's reviews and testing for Sarbanes audits extends beyond those controls typically considered to be financial reporting. These reviews cover a broad range of front-to-back controls including operational, technology, credit risk, quantitative risk and front office trade authorization.

The Corporate Audit framework for reporting and follow-up on audit findings reflects four categories:

- Material Weaknesses
- Control Concerns
- Control Enhancements
- Efficiency Opportunities

During 2005, Corporate Audit reported no material weaknesses. They did report 289 control concerns as well as numerous control enhancements and efficiency opportunities.

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The Lehman Global Corporate Audit Department currently has a staff of 116 people. Resources are located in each of the firm's major regions, including a recently established presence in India.

The SEC staff selected the following audits for more detailed discussion and review with the internal audit managers during the meeting:

- 1) Risk Management
- 2) Derivatives – OTC Options/Volatilities
- 3) Foreign Exchange – Options & Proprietary
- 4) Equity OTC Derivatives
- 5) Non Performing Loans

The staff noted that Lehman was directing considerable resources to branch audit reviews, particularly in light of the Frank Gruttadauria fraud case that occurred in the late 1990's in the Cleveland office. While the staff did not select any branch audits at this time, we will likely do so at a subsequent meeting.

The staff will continue to work with Lehman with regard to establishing protocol for the provision of audit information, which the firm, like some of its peers, views as highly sensitive. At present, most materials are available to the staff only on Lehman premises.

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Lehman Quarterly Corporate Audit Meeting  
For SEC: Lori Bettinger, Denise Landers, Michelle Danis (by phone)  
February 12, 2008

### SocGen Rogue Trader Lesson Learned Review

Beth Rudofker discussed the risk assessment and internal controls review initiated by Corporate Audit after SocGen's announcement of a \$7bn loss resulting from a rogue trading incident. A Global Task force, consisting of a steering committee and multiple working groups, has been formed with representatives primarily from the control groups across the firm. The assessments will be completed for high priority areas in 4-6 weeks with medium priority areas done by mid-April, and a final report to the Audit Committee in early May. Once the work is completed, they will need to determine what sort of message to send to their employees (i.e., what they expect of employees).

Many aspects of the fraud at SocGen remain a mystery. Beth said that worked in Audit's favor as it allowed them to be rather broad in their scope. The review is looking at processes in five areas in the transaction flow: Front Office, Infrastructure Set Up, Operations, Independent Valuation, and Governance. For each area, the working groups will conduct a high level assessment across the control areas to determine exposure triggers and identify controls and areas for improvement.

One potential control that is generating a lot of discussion at Lehman is whether to enact a mandatory vacation policy. Currently, they have no such policy, and did not believe that any of the other CSE firms did either. [Beth asked for our input on this if we learn otherwise.] If employees currently take vacation, they are able to work from home, and thus a mandatory vacation policy would need to be combined with restricting systems access from home. Beth wondered if such a policy would be needed if proper supervisory controls were in place.

Within the Front Office review, the task force is reviewing trader mandates, trading limits and authorizations, and front office supervision. The current limit system relies on net exposure, and Beth expressed comfort with how the net limits system is working. However, given the problem at SocGen, they need to start thinking about gross exposures and how limits on gross exposures would be structured. The granularity of the limits needed is a challenge (i.e., would need to be implemented by product type).

The Infrastructure Set Up review is concentrating on systems access, trading account opening and monitoring, and counterparty set up. Beth feels that lack of controls in this area was an important contributor to the breakdown at SocGen which is not getting a lot of attention in the press.

The Operations review is looking at trade capture, confirmations, clearance and settlement, intercompany transactions, and margin. From press reports it appears that the trader fabricated confirms, perhaps faxing them from his home. The margin story at

SocGen is also unclear. It appears the trader chose specific transactions with no cash movements or margin call and no requirement for immediate confirmation.

The Independent Valuation review is looking at risk management monitoring, daily P&L, month end price testing, and month end G/L reconciliation.

The Governance review is looking at treasury funding, firm governance, and client statement validation.

The task force identified five high priority areas. The first is to establish gross position limits consistently, as discussed above. The second is to strengthen controls when employees change responsibilities. Immediately after the SocGen incident was reported, Lehman identified employees that had moved from back office to front office and reviewed their system entitlements. Besides the analyst classes, there was a manageable number of employees to check (in the hundreds). The third area is to enhance the systemic monitoring of cancels and corrects. The fourth is to strengthen trade date controls, and the fifth is around the daily P&L process.

### SOX 2007 Report

Corporate Audit recently reported on their SOX 404(a) activities to the audit committee for the 2007 fiscal year. The process they underwent to complete the required certification was essentially unchanged from the previous year. No material weaknesses were identified in the Firm's internal controls over financial reporting.

Three priority control themes were identified by Audit: Equity Volatility, Asset Backed Credit Derivatives, and P&L Deferrals and Adjustments. Other control concerns included P&L Valuation (e.g., Price Verification, Daily P&L Controls), IT General Controls, Reconciliations, Accounting (e.g., Legal Entity Validation), Trade Capture and Processing, and Confirmations. Other product areas with control concerns (watchlist) were FID Derivatives Exotics, Mortgage Trading (there are still breaks between WLT and MTS, the general ledger), and Structured Commodities (the NPC worked well here, as they have put strict limits on the number of trades that can be done on spreadsheets – increased from 50 to 60 to 70 – and have made them come back each time).

### *Equity Volatility*

The Equity Volatility business saw growth in 2006 and the planned implementation of Euclid (trade capture and risk management system) was slower than planned. The business continued to rely on manual processes involving spreadsheets (SnM), resulting in a reconciliation backlog. Business volume again increased in 1Q07 and the migration of exotic products Euclid was slower than planned.

In 2007, senior management of the business and corporate groups increased resources considerably and substantial progress was made in the control environment – Beth visited London to discuss this issue. The daily P&L process was migrated from SnM to a back

office system based and Finance owned process, and the majority of exotic transactions were migrated to Euclid (currently over 75%). Work still remains to be done, such as completing the Euclid migration and resolving the historical P&L deferrals. There is still a \$60m net reserve on this position (basically, if you can't explain the P&L it's a deferral rather than an adjustment). Overall, Beth seemed happy with the progress the business had made in the past year.

### *ABS CDS*

During 2007, market volatility drove significant volume increases while infrastructure to process the business remained largely manual and spreadsheet based. Additional resources were dedicated to reconciling and validating trading activity and P&L on spreadsheets along with completing the migration to RAMP. The majority of the business is now processed on RAMP, but management must ensure that all products are price tested, and all products are valued using independently reviewed and agreed methodologies.

### *Deferrals and Adjustments*

As part of the month end control process, the daily revenue flash is reconciled to the general ledger. The policy to report and resolve deferrals at the product or regional level within a defined period of time is not consistently followed. Audit also found instances where adjustments to P&L were not documented or approved in accordance with the global valuation adjustments policy.

### CSE 2007 Report

Corporate Audit prepared a report on CSE for the Audit Committee for fiscal year 2007. No material weaknesses were noted in internal risk management controls that would have an impact on the Firm's compliance with CSE requirements. Specific areas of review included VaR framework (within the context of foreign exchange and commodities products), VaR reconciliation, potential exposure framework, credit risk management, Internal Control Committee Oversight and Governance group (within the context of Strategic Acquisition Review, Bridge Loan, and Structured Finance committees), Pricing Model Validation, Regulatory Reporting, and IMD Risk Management.

The CSE report discussed Lehman's approval from the FSA to use internal counterparty credit risk models for PD and EAD to calculate capital for LBIE. Beth and Jim discussed the problems they have had with the London branch. They characterized them as having a tendency to want to go their own way, for example, with respect to systems. As an example, Audit had been suggesting that the Model Validation group validate the VaR and MPE models, and they disagreed with that idea. Once the FSA required validation of risk models as part of the application, the Model Validation group quickly thought it was a good idea. Beth has been preaching the theme of global consistency.

The CSE report listed three 2008 initiatives. The first was the holistic trading book and second was the CSE/Basel II disclosures for 2Q08. Third, Lehman plans to apply to use the AMA approach to operational risk in the second half of 2008. Sean Moore is in charge of the framework piece around Op Risk, while Fong is in charge of the quantitative piece.

Audit identified eight themes from prior years and new findings to monitor going forward:

- 1) Data completeness, accuracy and automation
- 2) Management reviews and validation
- 3) Limit monitoring
- 4) Model documentation and methodology
- 5) Policies and procedures
- 6) Reconciliations
- 7) IT general controls
- 8) Corporate governance

#### Corporate Audit 2008 Goals and Audit Plan

Highlights of the 2008 Audit Plan include:

- 1) Audit has a headcount of 156, decreased by 6 MCD employees relative to November 2007 (mortgage-related).
- 2) Relative to 2007, more resources will be expended on compliance and regulatory risk, operations risk, and technology risk (the area of the biggest growth).
- 3) Audit's time is expected to be skewed towards areas of more significant risk.
- 4) There will be a significant reduction in resources devoted to the Mortgage Capital division, consistent with the downsizing of the business, while resource allocation will grow in investment management, risk management and technology infrastructure.

Significant 2008 Audit projects include:

- 1) SOX – See above.
- 2) CSE/Basel II – See above.
- 3) Emerging Markets – EM represents a growing fee pool and the business is transacting an increasingly broad range of interest rate and credit products.
  - In Europe, the focus continues to be on Russia, Middle East, Turkey and Africa with several new offices now established. In 2008, they anticipate developing FX and securities trading in new countries in Eastern Europe, the Middle East, and Africa. They are also building out a real estate origination presence in Turkey and Russia.
  - In the Americas, Lehman submitted an application for an IB license in Brazil. The new entity will eventually offer Fixed Income, Equities, and Advisory services to clients.



- In Asia, Lehman is building out existing businesses in Australia, Singapore, and China.
  - Lehman also has plans to expand its presence in India.
- 4) Investment Management Division – IMD build-out continues domestically and internationally. Audit is focused on global infrastructure initiatives.
  - 5) Mortgage Capital Division – MCD’s origination business has been downsized but its servicing business continues. Audit continues to work with the business on new initiatives and existing businesses.
  - 6) IT System Standards – Audit focus in 2008 includes developer production access controls, production management control, system entitlement management, and end-to-end data quality.

## Bear Sterns (Package Dated August 30; Discussion on September 15)

### Market Risk Profile

- The adjustable rate mortgage (“ARM”) businesses continued to be a significant source of market risk, however, the desk’s positions were reduced in August. The month-end market value position of \$6.85 billion is down from \$8.16 billion, but is still over the current limit of \$6.5 billion. The CMO business, which has also been a significant source of risk, grew the market value size of its positions for both its agency as well as non-agency products. The non-agency market value position of \$6.98 billion is over the current limit of \$6.5 billion. Both the ARMs and CMO businesses were profitable for the month, earning \$17 million and \$29 million respectively.
- The distressed debt desk earned a larger than usual profit of \$51 million for the month. Bear recently purchased 2 classes of energy trading claims from an energy company (El Paso) that was owed money by Enron. The distressed business had bought these claims at \$0.15 and \$0.04 on the dollar, and (this month) sold a chunk of each class at a substantially higher price, and marked up the residual position for an additional unrealized gain.
- The asset backed desk increased the market value size of its positions by \$175 million to \$517 million (well within the limit of \$750 million), and made a profit of \$13.5 million on the month (much of the profit was attributable to 2 CBO deals and one CLO deal, and the rest to home equity deal sell-offs). *Question for Bob:* Why did they break out an additional line for London MBS Conduit this month on Tab 3 (has \$147 million in market value)?
- The EMC desk grew the market value size of its positions to its highest market value level in a year (or longer). However, the \$1.87 billion dollar position is only marginally larger than the position held in December of 2003. When asked if senior management was looking to continue to grow this business, the risk manager responded that the firm would like leverage the desk’s servicing capabilities in subprime where applicable (but not necessary grow its positions its EMC sounds like).
- The corporates desk reduced their spread risk drastically, reducing its “spread risk pops” exposure from \$5.5 billion to \$900 million. The reduction in gross market value was smaller (reduced to \$6 billion from \$7.2 billion), but meanwhile, aged inventory is actually up (market value) for this businesses (where there has actually been a bit of a push to reduce). The risk manager stated that he was not aware of any push from senior management to reduce spread risk so severely, and felt this result was probably more of a function of decreased customer appetite for bearing credit risk.
- The REITS business lost money for the second consecutive month (-\$13 million), however the risk manager again attributes this to a conservative mark when rates are

falling, as has been the case (they are “hedging to a higher duration than they are marking”). He describes this as an unusual position, and notes that it will probably get “equivalent value” eventually as he will push for a mark-up if the market continues to rally (this is a bit puzzling to me, if they think there is a more appropriate valuation---based on replication sounds like, why not go ahead and use it).

- In the convertible arbitrage space, where there has been considerable pain as equity volatilities have continually fallen (to historical lows), losses and position reduction have stabilized, as the desk earned a modest \$1 million profit and grew its positions by \$9 million (I probably should have asked if this profit came from the delta positioning, as volatilities have yet to pick up).
- The equities derivatives desk continues to run a substantial long delta (albeit down \$9 million to \$32.5 million), however the risk manager notes that the desk is not taking much single name delta, and also that the book continues to run a long gamma profile (up to \$37.9 million). Furthermore, the United States is the only single country for which there is a big delta (so he says, but in looking at the risk report the negative \$10.3 million in Switzerland looks pretty big).
- The Mexican Peso FX desk is running a large positive delta of nearly \$100 million (which is its limit), and is expected to request a limit increase of \$25 million. This risk represents a proprietary position, which the risk manager does not exhibit discomfort towards as he asserts this is a (new) disciplined trader with a good track record.
- The Credit Derivatives business put on a very long position in UK credit spreads. Their SR01 exposure of \$179 million is up from being short -\$20 million in July.

### Credit Risk Profile

- There was a substantial decline in credit exposure on short-term financing transactions (stock financings, repos, etc; I can see that net exposure on repos and reverse repos decreased from \$1.5 billion to \$898 million, but stock loan and borrow actually increased a bit?), which was attributed to more/better CSAs being put in place.
- Bear’s net credit exposure to the Taiwanese Central Bank is up substantially to \$125 million (Bear Credit of 2-, BB- equivalent I believe). This transaction involves Bear borrowing some bonds that are hard to find, and Bear is in return lending some more valuable bonds. Interestingly, the Basel Standards would not recognize the netting agreement as valid for capital purposes.

### Risk Management

- The OPSRA team met with a member of the London and Tokyo risk management teams (he actually has market and credit functions, but spends a portion of his time on

model review) to hear about Bear's recently developed model review process. The current scope of this model review process is focused on OTC derivatives pricing models. That is, the initial goal of the program does not include a vetting of front-office non-pricing risk models (such as a model that outputs a duration for risk purposes, but does not impact pricing). There is a full time staff of 4 people allocated to this initiative (plus the gentlemen we met with), and the goal is to validate all new models as they are developed, and to schedule formal reviews to supplement the less formal work that has already been done on old models (there is a model timetable). The general nature of the process is that these 4 individuals will independently vet/check the correctness of model implementation as carried out by the front office quants (the FAST team members). Interestingly, the risk management team does not view this so much as a signing-off process, but as an opportunity spur discussion/bring to light the strengths and weaknesses of new models (this includes assessing the applicability of the model to the specific product under consideration). In addition to subjecting the models to various test (physically conducted by the independent 4-member team), the 4-member team compares model outputs to alternative models, discusses the results with FAST and other risk managers, and perform regression testing on validated models after their release. A Model Review Committee has been created, which consists of senior risk managers (those we typically meet with) as well as individuals with formal training in mathematics and experience in derivatives structuring and trading, risk model development, etc. See provided materials (PowerPoint, Policy, examples) for additional detail.

#### For Follow Up

- We will continue to monitor the sizes of the ARMs and CMO businesses, as both persists as significant sources of market risk and continue to operate in excess of allocated limits (approved overages).
- For several months there has been talk of enhancing the methodology used for valuing an "unusual position" in the REITS business. Although the business has exhibited negative P/L for two consecutive months, the risk manager expresses concern that the mark on the positions is overly conservative. We will follow up on this issue.
- There is talk of a possible limit increase request by a proprietary FX trader who is running material directional exposure to the Mexican Peso. We will monitor these events and the size of proprietary risk taking by this desk.
- The Credit Derivatives business put on a very long position in UK credit spreads. Their SR01 exposure of \$179 million is up from being short -\$20 million in July. We will follow up on how this position transpires.

*SS, 10/1/2004*

## **Bear Sterns (Package Dated July 30; Discussion on August 18)**

### Market Risk Profile

- The adjustable rate mortgage (“ARM”) businesses continued to be significant source of market risk, with this desk’s positions growing again in July. The month-end market value position of \$8.16 billion is over the current limit of \$6.5 billion (which was recently increased from \$3.75 billion), and the desk is approved for the (temporary) limit overage as management feels that the position is justified by current volume levels in this space. Within this space, the risk manager emphasized the difficulty associated with risk managing the IO products. This “pure floater” product is fairly new, and because there is little available prepayment history, the residual pieces of these securitizations are difficult to value and hedge, and therefore there is little appetite within the firm for holding this residual exposure. The CMO business, which has also been a significant source of risk, grew the market value size of its positions for its agency as well as non-agency products. Both of these businesses contributed to a rather profitable month in the mortgage space (41 million in P/L).
- The profile of the equity derivatives desk changed in July. While VaR decreased from \$6.2 to \$4.1 million (over the last several months, there have been talks regarding a possible increase in this desk’s VaR limit), the desk went from short \$25 million in delta to long \$44 million. Furthermore, while the desk went from being long to short vega, it increased its long gamma position.
- The Corporates desk, which had grown its exposure to spreads widening, brought down its exposure (spread risk pops decreased to \$5.48 million from \$8.06 million).
- The REITS (in fixed income) desk lost about \$5 million, however the risk manager attributes this at least partially to the fact that they are “marking the desk more conservatively than they are hedging” (does this mean they are overstating basis risk?). Apparently, the cash flows that the desk are realizing are greater than that predicted by the current/old model, so the Financial Analytics and Structured Analytics (FAST) team has set out to enhance the model, and we could see a mark-up on this desk in the near future as a result.

### Credit Risk Profile

- There were no noteworthy transactions or other events as far as credit risk is concerned. Bear did (through a subsidiary) invest directly in a credit insurer. This company, which apparently does wraps around municipals and CDO products (investment as well as non-investment grade), was recently downgraded which allowed Bear to buy in at a significant discount to book value.

### Risk Management

- The credit derivatives desk incurred an idiosyncratic-type loss of about \$4.6 million (with the cash desk losing another \$900,000 on the same name). The desk was long credit spreads on a particular name, and had hedged that position with shorts in other names in the same sector (they called this a hedge, sounds simply like a relative value type play to me). This event spurred an interesting dialogue regarding the appropriate way to think about such credit risks. That is, should a credit products group think about credit from a traditional/fundamental view, or more in terms of generic risk components (it seems to me this is an issue of whether or not one can/should view a credit products business as diversified and thus trading systemic-type risks?). As the risk manager put it: should the businesses have a name-by-name strategy or a global strategy?
- Within the independent risk management function is a team of four individuals charged with monitoring and providing a fresh, third party perspective on credit risks at the firm. We met with the head of this group. The group's charter is basically to try to spot potentially problematic credit exposures and to ensure that businesses are not holding on to positions that did not work out well (in order to avoid recognizing losses). Further, we are told the group was partially created to deal with some the information asymmetries between senior management and individual businesses regarding risk.

#### For Follow Up

- The Adjustable Rate Mortgage ("ARM") business continues to grow rapidly, and to operate with positions in excess of its allocated limits. Furthermore, the IOs piece of this business is particularly challenging from a risk management perspective, since these instruments are difficult to value and hedge (there is little prepayment history available). The risk manager notes there is little appetite within the firm to hold residual IO pieces. We will continue to discuss with senior risk managers the size of this business and associated limits.
- The risk manager noted a possible forthcoming change in the methodology used to value the firm's REITS positions (we think bear has swaps and/or swaptions with?), and that this methodology change could lead to a mark-up in this desk's positions. We will follow up on this initiative.

SS, 8/23/04

## **Bear Sterns (Package Dated June 20; Discussion on July 21)**

### Measured Risk

[insert graph here]

### Market Risk Profile

- The adjustable rate mortgage (“ARM”) businesses continued to be significant source of market risk, with this desk’s positions growing again in June. The month-end market value position of \$7.06 is over the current limit of \$6.5 billion (which was recently increased from \$3.75 billion), and the desk is approved for the (temporary) limit overage as management feels that the position is justified by current volume levels in this space. The non-agency CMO business, on the other hand, while still a significant source of risk, reduced the market value size of its positions from May, bringing it below its limit of \$6.5 billion (also recently raised, from \$5 billion). Both the ARM’s and CMO businesses were profitable for the month, making \$32 million and \$27 in P/L respectively.
- Also in the mortgage space, the Commercial conduit business sold off the remaining tranche of the \$1 billion dollar securitization discussed last month. This deal was a large driver of the \$25 million dollar profit recognized by this book for June.
- The convertible bond desk incurred a large loss in proprietary trading of nearly \$15 million. The performance of this desk has recently been a focal topic for the Executive Committee and the size of this book has been consistently reduced over the past three months (the risk manager also noted Bear has a general tendency to cut positions when performance lags and grow them when performance is good, which is essentially a convex portfolio strategy). The risk manager expressed some concern with this occurrence, as this book has historically served as a hedge for scenarios in which equity markets are down and volatility and credit spreads are up, since the desk is typically long vega.
- Management has decided to grow the Risk Arbitrage business, increasing the per-deal limit in this space to \$50 million from its previous level of \$40 million.
- The Credit Derivatives desk exceeded its short delta limit of \$800,000 (report states \$765, but since gotten even more short), which was approved through the end of August.
- The Equity Derivatives book, which is short out of the money S&P options, exceeded its VaR limit (was at \$6.2 million, not sure what limit is). Over the last several months there has been dialogue over the appropriateness of this limit (the desk, which was also over its limit in April, has been arguing for an increase), however, we are told that June’s VaR increase was not driven by an increase the size of a position. Rather, another book removing an offsetting positive gamma position drove the spike.

### Credit Risk Profile

- Levels of counterparty exposure remain low. Two reasons for this pertain to the asymmetric nature of collateral agreements (Bear doesn't post collateral when a swap is a liability, versus a counterparty posting collateral when it is an asset, etc), and the fact that Bear has more counterparties looking to receive the floating end of swap agreements (put differently, there are more counterparties seeking protecting against rising rates), so Bear's receivables and thus credit exposure decrease when rates rise.

### Risk Management

- With regard to the modeling issues related to the short end of the yield curve discussed last month, the risk manager said that "some" granularity has been added. While the modelers are still working on and getting comfortable with the details, the risk manager felt that the enhancements made thus far along with the stabilizing of interest rate volatility has made him comfortable for the time being. However, this is sort of a perpetual issue as the level of granularity needed is a function of the types of trades the firm is allowing (and as previously discussed, there is a tradeoff between granularity and liquidity). Right now, for instance, monthly points are being modeled, however, it is plausible that traders could follow strategies that require more granularity (not the case right now however).
- Mentioned working on building new scenarios (market risk)?
- The risk manager discussed a current push towards enhancing credit analytics to isolate areas in which Bear feels it needs to focus its attention. While CE levels remain low, the risk managers are weary of the fact this number largely represents exposure to counterparties of high credit quality. In particular, the team is focusing on understanding exposure to hedge funds under extreme scenarios, and thus the hedge fund credit folks (one of the two heads left the firm in June, and must be replaced) are working on new portfolio PEs and other desired metrics. The idea here is that the quant teams need to develop models for certain strategies/securities that will allow for the application of stress tests, so as to ensure that there is not one scenario that will hit the firm as well as many of its clients hard (simultaneously). And while Bear feels they have a lot of expertise in the mortgage space, they want to develop a more broad understanding of their entire hedge fund credit exposures (and not just the ones associated the prime brokerage clients). Further, models need to allow for some sort of sensible risk aggregation in the context of an economic capital model; this is particularly challenging for complex hedge fund portfolios.

SS, 7/27/04



## **Bear Sterns (Package Dated October 29; Discussion on November 17)**

### Market Risk

- The market value size of the “special situations” position decreased by a net (actually did buy \$1.7 billion in new loans in the process) \$900 million as this business completed the “Walt” deal discussed last month and also sold some raw auto loans to an insurance company.
- The ARMs desk, which has persisted as a source of market risk, did reduce its position as suggested by the business head at last month’s meeting (by \$1.2 billion to \$7.3 billion). The business accomplished this by selling some securitized product (versus raw loans).
- The corporates desk, which experienced slow activity for the month (and lost about \$5 million), reduced its spread exposure by \$1.1 billion spread risk pops to \$3.5 billion.
- When asked about the status of the method used to value the REITS position in the Fixed Income Investments business (had discussed valuing this position differently, see previous memos), the risk manager explained the mark is less of an issue now. Apparently, the fundamental rationale for this position was tax related, and in light of new information regarding the tax treatment going forward (Freddie was fighting the IRS and just recently gave up), the REIT is going to unwind the position. We are told that depending upon how the tender goes (apparently there are some legal issues) the final result for Bear could range from a \$50 million gain to a \$30 million loss.
- In the convertible arbitrage space, where there has been considerable pain as equity volatilities have continually fallen (to historical lows), losses and position reduction had stabilized in August and September, however resumed again in October. The desk lost \$1.2 million and reduced positions by \$142 million.
- Management decided to increase limits for emerging markets exposures (across the spectrum of products sounded like). The market value limit was increased from \$300 million to \$400 million, VaR from \$3.5 million to \$4.5 million, and spreads risk pops from \_ to \_. There was an increase in risk appetite for Mexico and Brazil in particular. (I didn’t really get much detail from him here regarding this decision; I will follow up next month).

### Credit Risk

- The risk manager discussed a current market trend of money flowing into leverage mortgage strategies through real estate investment trusts (REITs), and to a lesser extent through mortgage hedge funds. Apparently these mortgage REITs have been able to tap the equity markets through IPOs. As a result of increased activity in this space, Bear has seen an increase in the number of requests for “Aggregation

Facilities”. These are different from traditional whole loan financing facilities in that the historic rationale for those is to serve as a bridge to securitization (and those securities are then sold into the market), whereas these aggregation facilities are used to finance and securitize loans on balance sheet for the REITs, which then issue IPO and hold onto the risk. These asset-backed type activities have actually grown by billions of dollars over the last \_\_, and consequently we plan on meeting with the business folks to discuss their overall philosophy and gain a better understanding of their risk profile.

### Risk Management

OPRSA staff met with personnel from the Houston Energy Group (HEG), a newly formed (April-03) business which makes equity investments into “Independent Power” projects in the United States. While HEG engages in several types of transactions, all seem to share the common attribute that a long-term above market power purchase agreement (PPA) is involved. In other words, HEG is typically either purchasing/investing directly in an independent power producer (IIP), or monetizing contracts for an IIP (through a SPV), that are party to long-term contracts that enable them (the IIPs) to sell power at well above market prices (should I discuss Coke options separately, basically same idea seems...in-the-money option?). Interestingly, these deals tend to involve older plants that, but-for these long term PPAs, would not operate profitably. In other words, these plants are often producing power more expensively than can be purchased in the spot market.

The material risk born by this business is obviously going to be credit risk (furthermore, a concentrated credit risk since very few counterparties are involved). To best understand the exact nature of this risk, a little regulatory history regarding how these long term PPAs came into existence is needed. In 1978, the Public Utility Regulatory Act (PURPA) required utilities to purchase power from independent power producers as a way of promoting competition and efficiency (were in the midst of an energy crisis). As a result, many IIPs signed contracts with utilities in the 1980s at prices that are far above current spot prices. The sentiment at Bear seems to be that, since these PURPA contracts have been “blessed” by state and federal regulators, if a utility was to go bankrupt, IIPs would be placed at the top of the pecking order of creditors (or even made whole by government sounds like?). In other words, the HEG feels its recovery rate on these PURPA PPAs is quite high. It is worth noting, however, that these transactions really are putting Bear’s entire equity investment at risk, since, in the absence of a PURPA contract, these “old and cold” plants are typically unable to produce power efficiently enough to be sold into the spot market profitably. Obviously, the true test of how risky these deals are will be in seeing how high recovery actually turns out to be if one of these utilities does indeed default.

Because these transactions always involve PPAs, this business does not create a lot of energy price (market) risk. Given that these projects are valued on a discounted cash flow basis, there is some interest rate risk involved, however, that too is easily managed. Bear does assume certain operational risks through these projects (what if something breaks down at the plant), however, much of that risk is actually insured away.

The obvious question to ask in examining this business model seems to be: How does Bear get invited to participate in the gains of these deep in-the-money (and apparently implicitly government backed) contracts? The first obvious answer is that Bear has a cost of financing advantage (lower discount rate) over these IIPs and can therefore monetize these positions in a mutually beneficial manner (basically involves turning a physical contract into a swap and then monetizing the swap). Also, Bear feels part of its value added stems from its ability to restructure these contracts as the regulatory environment evolves. PURPA created certain market efficiencies, such as prohibiting utilities from sourcing third-party providers even when it is economical to do so (in other words, even if the spot price is cheaper than the IIP's production cost the utility has to take physical delivery from the IIP), and now parties are apparently allowed to work with regulators to restructure transactions (regulators must approve restructuring) where inefficiencies can be reduced.

#### For Memo

- Consistent with the intentions conveyed by the head of the business unit last month, the adjustable rate mortgage ("ARM") business reduced the market value size of its positions by \$1.2 billion to \$7.3 billion. However, given the current size and recent growth of this business, we will continue to monitor activity in this space.
- Over the last eighteen months Bear's Houston Energy Group (HEG) has completed a number of somewhat large power deals. These deals, which involve either direct equity investment into independent power projects and/or structuring OTC derivatives transactions to monetize long-dated power purchase agreements, expose the firm to counterparty credit risk. The credit risk manager suggests that there is appetite for further activity in this space, and we will discuss with him any new power transactions going forward.
- Appetite for emerging markets risk increased, as senior management raised balance sheet as well as VaR and credit spread exposure limits, particularly with respect to Mexico and Brazil. We will further discuss this change in the firm's risk appetite with the risk manager.

*SS, 11/23/2004*

## **Bear Sterns (Package Dated September 30; Discussion on October 20)**

### Market Risk

- Exposure in commercial conduit rose at the month end, with a \$520 million new deal.
- Inventories of auto loans (under “special situations”) are increasing as the firm ramps up for another “WALT” deal. Bear did the first such deal, which involves combining in a securitization loans originated by multiple manufacturers, about two years ago. The firm sees this as a value-added product that has the potential, through diversification in the originators of the underlying loan assets, to make investment in auto loans more attractive. Thus there is considerable appetite for a second deal.
- Exposure to investment grade corporate spreads is back to normal, after being reduced substantially at the end of August. At the end of September, the predicted loss from a 10 basis point widening stood at \$4.6 million, in contrast with only \$0.9 million at the end of August. The corresponding exposure measure at the end of July was \$5.4 million.
- A significant gain was realized from the termination of certain balance guaranteed mortgage swaps. Customers used these transactions, in which Bear received an above-market fixed rate, to transform fixed rate cash flows from commercial mortgages into floating rate cash flows that correspond to their funding costs. The trader who originally entered the swaps included a significant “make whole” provision which protected the firm when the termination occurred.
- The risk manager noted a structural exposure that the firm faces due to the market convention that fixings on certain mortgage trades occur on the 26<sup>th</sup> of the month while the listed derivatives often used to hedge the exposures expire on the 17<sup>th</sup>. There is apparently some discussion of hedging with FRA, an over-the-counter instrument, that would close the gap. The risk manager noted the biggest concern from his perspective was that any hedging mismatch left the firm long rather than short rates. A long posture, which is equivalent to holding a long position in Treasury securities, leaves the firm protected from a terrorist attack or other event that triggers a flight to quality.
- The firm had written a collar transaction on a stock now involved in a risk arbitrage deal. Because the uncertainty surrounding the position involves whether or not the deal will close, managing the risks off of the usual Black-Scholes Greek measures is not appropriate. But the risks are captured for aggregation purposes using these measures, leading to a somewhat misleading spike in risk.
- We followed up on the difficulties in measuring rate exposure at the short end of the curve that were highlighted during our conversation last spring. The FAST team is now converging on a technical fix that will increase the number of vertices at the short end of the pricing curve. The risk manager noted that they did not have any

difficulty when rates moved rapidly in response to an unemployment number at the beginning of August.

- We also followed up on the large long position in UK credit spreads visible in the previous month's risk report. Again, the risk manager noted that he could think of no particular reason why such a position would have been established. Michelle noted that the position may have been related to a dispersion trade across Europe which had since come off, with European credit indices being decomposed into EUR and GBP components.

### Credit Risk

- The credit risk manager noted some signs of stress in the hedge fund world. He noted that in many strategies performance appears to be suffering as money flows into these strategies based on past performance. Convertible arbitrage has suffered already, and some of the funds investing in credit are facing very tight spreads and few opportunities. He said that they, in particular, will be on the lookout for signs that funds are liquidating their most liquid positions or borrowing in order to fund redemptions.
- We asked about lending against partnership interests in hedge funds. The risk managers said this can be done, but is suboptimal from a legal perspective. The better structure in such cases is for the lender to purchase fund shares and then swap the economics to the fund.
- There was a jump in reported current credit exposure driven by the inclusion of over \$2 billion in customer cash deposits with large banks that were previously not reported (the "3-3 lockup", not new risk).

### Risk Management

Over the last year, the Adjustable Rate Mortgage business (ARMs) has emerged as a material source of market risk at Bear. The OPSRA team met with members of the ARMs business, including the business head, to discuss the economics and risk characteristics of this growing business. We also met with members of the front office quant team (the FAST group) who focus on ARMs pricing and risk models to get an overview of the Hybrid Mortgage Prepayment methodology.

The various ARMs products can be categorized several ways, based on the characteristics of the loans going into the securitizations or the characteristics of the securities themselves. First, products created from subprime versus prime loans have much more of a credit product flavor. Therefore, at Bear subprime mortgages are bought and securitized through the ABS rather than the ARMs business. In the ARMs space, there are three main types of adjustable rate mortgages to consider: Agency Product, Prime Jumbo Product, and ALT-A or Near Prime Product (ALT-A loans are often low documentation loans, i.e., for the self employed). In actuality, many of the loans that go into securitizations conducted by firms such as Bear are agency conforming, but because

there may be a cost advantage to the originators these loans end up going into non-agency securitizations. Within these sector classifications, various types of loans are issued in terms of the number of months until the first interest rate reset and the underlying index used to determine the new rate; but the two broad classifications for these types of loans are Short Reset versus Hybrid ARMs. Generally speaking, Hybrid ARMs have a fixed rate for a period longer than 12 months (typically 3, 5, 7, or 10 years) and then typically adjusts every 12 months. Short Resets ARMs have the fixed rate for a period equal to or less than 12 months and then adjusts on a monthly, semi-annual, or annual basis.

The Bear ARMs business is a securitization business, not a prop desk. And of course the desk does not simply buy and pool loans for outright sale. Rather, they perform credit and prepayment tranching and retain certain pieces of the capital structure for later Re-securitization. As Re-securitization strategies, which involve combining Hybrid IO and subordinate credit tranches, persist or increase in importance, the business looks to REITs and hedge funds as the ultimate buyers (and thus liquidity providers) for these retained pieces. Like in the fixed rate mortgage space, the two main types of securitization structures are passthroughs and sequentials. The business manager describes the securitization process as working more quickly in the ARMs space (versus fixed rate products), however there is actually less opportunity to forward sell inventory since there is not an analogous TBA market for these securities. Generally speaking, the business model appears to be one of high turnover, and the goal is not to let inventory age. In fact, a separate business, called the Residual Subs Desk, has been established for managing the residual pieces of these (as well as other) securitizations.

As this business builds whole loan inventory for securitization, they are exposed to fluctuations in rate levels, widening credit spreads, and changes in prepayment speeds (which is partially a function of rates). Their interest rate risk can be managed relatively easily, utilizing hedging instruments such as Eurodollar futures, swaps, mortgages, treasuries, etc. Credit spreads are a concern, especially for residual subordinate credit tranches, (since these loans do not have the GSE guarantee), however, are not the dominant risk factor since many of these loans are of high credit quality and are credit enhanced. Furthermore, there is default risk in that the business's model may not adequately predict default rates. While it is generally thought that defaults can be predicted reasonably well across large pools of loans, there is some concern, for instance, that a rapid increase in rates could lead to a jump in defaults for the relatively new Short Reset products. The prepayment risk, which is often described as representing a negative convexity risk profile, is the most material risk driver for this business. The business head and risk manager assert that negative convexity is less of an issue with adjustable (versus fixed) mortgages, as the loans they buy are very "fresh" (if the mortgages are newly originated, rather than several years old, then the home owners are less likely to start moving en masse) and the optionality tends to lie "in the wings" (prepayment requires relatively large rate movements). However, holding onto certain IO tranches for later re-securitization, such as this business does, certainly creates additional exposure to increasing prepayment rates. Furthermore, the business head has also contemplated holding onto to some Hybrid IO pieces for investment. These activities can be thought of as representing a macro position in prepayment speeds. Since prepayment behavior is such a material driver of risk in this space, we met with member of the FAST team to get an overview the Bear Prepayment Model. The most important point take away from this

discussion is the fact that the modelers have a reasonable amount of available data for modeling prepayment for the Hybrid products, but very little data for Short Reset products.

The growth in the size of the ARMs business at Bear has corresponded with growth in the ARMs market overall, both in absolute terms as well as ARM share of overall mortgage originations. This growth is attributed to how the level of interest rates as well as the shape of the yield curve has evolved. Furthermore, the relative ARM product mix is attributed to changes in the yield curve (while Hybrids are the dominant product now, the business manager expects to see Short Resets grow in the future). Inevitably, there are risks associated with these newly emerging products that are not well understood (e.g., understanding prepayment behavior for Short Reset products), and risk managers must check the growth of this business and assess whether the premiums earned justify the risk born. It seems obvious that the size of the Bear ARMs business is currently constrained by the current market value/balance sheet limit, and that with a higher limit the business head would increase the business size in terms of the number (and value) of loan portfolios that are bid on daily (although the business head notes that he feels that risk premium/spreads seem very narrow right now, and was planning a short-term reduction in inventory). And as competition increases, the business manager notes the need to grow its more vertically integrated conduit activities (doing more origination, are they already doing some?). OPRA staff will continue to monitor activity in this space.

## **Bear Sterns (Package Dated December 30; Discussion on January 19th)**

### Market Risk

- Positions are up across the board in the mortgage business, which the risk manager described as “loading back up”. The market value size of the ARMs desk positions reached another new high in December of nearly \$10 billion (this business has recently been described as experiencing a tremendous amount of flow). The CMO net market value is up \$1.1 billion to \$11 billion. Both desks had very strong months from a P/L perspective, each making over \$30 million. The asset back desk completed a number of CLO and CMBS deals, and thus had a large profit as well (\$24 million).
- When asked about the overall level of Passthrough activity (we had heard at Goldman customer activity was down in this space due to a flattening yield curve and less volatility) the risk manager said there was little to report there and said that desk hasn’t really been on his radar (and was basically flat from a P/L perspective). He describes this desk as flow business that provides hedging services (and earns no securitization income) and thus benefits from volatility. Furthermore, he said this desk does not take much proprietary risk (relative value types plays on different coupons, etc.), suggesting the firm had little appetite for such risk. He also noted that the net market value was not a very useful metric for tracking risk in this business, and suggested he was considering reporting an alternative metric (we will follow up on this possible initiative).
- The High Yield Desk grew the net market value size of its positions by over 50%, from \$72 million to \$110 million. This increase was focused in the Cellular/Wireless sector. The Distressed desk also grew by \$112 million. The largest driver of this increase involved the purchase of some bank debt to an independent power project (independent power producer I believe); the idea here seems to be that the original capital structure did not work out and now it is being restructured/worked out (and the desk has already turned over a decent portion of this position). As an aside, we are told the business and risk management are trying to figure out the best way to leverage the expertise of the Houston Energy Group (discussed in November) in taking these sorts of positions.

For reporting purposes, the risk manager indicating he is considering adding a row in the high yield/distressed reporting specifically for bank loans going into CLOs.
- Emerging Markets Risk is up gradually, as we have been told to expect over time. One interesting emerging markets story involved a potential situation in the Venezuelan credit derivatives markets. There are some Venezuelan Brady Bonds outstanding that have “value recovery rights”, which means they have supplemental payments attached based on the price of oil. Apparently now there are such supplemental payments due (oil is up) and payment is late. The concern is that someone will try to use this event as default event trigger (Bear has sold protection



and would lose about \$6 million given where the cheapest bonds are trading now), although it has not yet occurred (and Venezuela says they are going to make the payment).

- The Equity Derivatives desk had a higher than usual P/L of \$40 million, driven by a variety of factors (put some large collar trades, unwound a hedge on a convertible bond deal, etc.). The most interesting development in the equity derivatives space is that they are running a larger than usual delta of \$96 million partially due to a risk arbitrage position. Last month we discussed an intra-issuer (JC Penny) bond relative value trade put on by this same desk. Hence this desk head is exhibiting some propensity for mandate creep. Whereas risk management is working on the new limits/metrics for managing the JC Penny type of position, we are told this risk arbitrage deal is one-off (and driven by the fact that a customer wanted a call spread position; I believe this position involves buying and selling calls at two different strikes, not sure though). Regarding the large delta/directional exposure mentioned above, the risk manager did caveat this by stating he does not feel an option pricing model outputted delta really reflects the risk associated with this option position in a stock that is in the middle of a takeover – rather he thinks about this risk from more of a scenario perspective, where they get a little upside a substantial profit for a large drop in price (furthermore it is a net positive gamma position).
- The Credit Derivatives desk, which has been active in Structured Products (new deals or secondary trading?), got much longer SR01 (\$184 thousand to \$566 thousand). This net long is highly concentrated in the lower quality spreads, particularly BBB, and the desk is actually short the higher credit quality spreads, which are tighter. This desk, which made \$17 million in December, benefited from volatility in the auto sector, where it is active.
- The FX desk is still short the dollar through a large Mexican Peso positive delta (discussed in several previous memos). This risk manager noted this position has had a notable impact FX P/L volatility. This has obviously been a successful position as it was put on before the dollar began its decline, and remains on as positive carry, weak dollar type position.

### Credit Risk

- No material change in credit numbers, and we did not have the opportunity to discuss market trends with Mike Alex as he had to leave early for another meeting.

### Risk Management

OPSRA staff met with the senior credit risk manager covering Warehouse Lending. We requested this meeting having heard about the current market trend of money flowing into leverage mortgage strategies through real estate investment trusts (REITs), leading to an increase in the number of requests for “Aggregation Facilities”. It

seems the basic cycle for these facilities works as follows. Mortgage Banks, which originate loans, finance those mortgages through BS. BS earns a financing spread while the mortgage bank aggregates these loans for securitization. Once loans have been aggregated, BS securitizes them and the securitized products are basically sold from the mortgage banks to REITS (sounds like the mortgage bankers are the ones setting up these REITs), which then hold them on balance sheet. These REITS sell bonds or IPO to investors and repay Bear Sterns (as they move to the REIT balance sheet). So really, the credit risk time horizon (6 to 9 months) is not any longer for these Aggregation Facilities (which was our initial impression) than for traditional whole loan financing facilities, and only seem different in that these securities are held by the REITs (versus selling the securities or bulk loans into the market). Most of this activity is done in the residential mortgage space, albeit across the spectrum of loan types (with the primary asset classes being Alt-A and Sub-prime). In addition to earning a financing spread and getting paid for the securitization, BS also makes money in this space by providing hedges, purchasing some loans, and it leads to other securitization business.

The credit approval process for warehouse facilities focuses primarily on the ability of the originators to repay their loans and secondly on the collateral assessment, and credit plays a large role in the on-site due diligence. All warehouse facilities are over-collateralized (current exposure of zero), documented under master repurchase agreements and subject to daily marking-to-market and margin calls. Because of the zero current exposure, these lending activities are not reflected anywhere in the monthly report we see. Daily pricing is provided by various BS whole loan trading desks (priced daily based on rates and spreads and repriced monthly based on loan performance data provided by the servicer). The risk manager also discussed the legal risk surrounding predatory lending (if Bear were to finance such loans), which is the primary reason why BS declines a deal, and the safeguards BS has in place to guard against these risks. It is perhaps also worth noting that the facilities consists of committed and uncommitted lines (although it sounds like BS has never not allowed a client to draw on the uncommitted line and is not sure if it could). The current financed balance is \$3.1 billion (once again with zero CE) with approved limits (including both committed and uncommitted) of \$10 billion.

#### For Follow-Up

- Mortgages going to continue to grow, new limits?
- Facility Rating Discussed last time
- Venezuelan Brady Bond Issue
- Equity Derivatives new limits and analytics
- Mentioned something about using metric other than NMV for tracking Passthroughs on report

#### For the Memo

- The Adjustable Rate Mortgage (“ARM”) business continues to grow rapidly, with the net market value size of its positions reaching a new high in December. We will continue to discuss with risk management the size of this business and its allocated limits.
- Last month the risk manager described for us the need to implement new analytics and limits for managing the equity derivatives desk, as this business was taking risk not typically taken by an equity derivatives desk (i.e., an intra-issuer bond relative value prop position). In December, this desk put on a large risk arbitrage type position, which one also might argue falls outside their primary area of expertise. We are told this deal is one off and is driven primarily by client facilitation. We will continue to monitor and discuss with risk management such mandate creep with respect to this desk.

## **Bear Sterns (Package Dated November 30; Discussion on December 15th)**

### Market Risk

- The ARMs desk is back up from \$7.3 billion last month to \$9.1 billion currently (a new high). Last month there was a conscious decision to reduce risk in this book going into the November election, etc. This was followed by some large bulk purchases of mortgages this month as the business experienced a tremendous amount of flow business.
- The high yield desk went long credit for the first time since June. The risk manager stated that this was not a view on high yield spreads in general, but rather a view on the wireless sector, in which they have \$10-15 million in various names in the sector. The net market value of the high yield desk is still very small at \$72 million.
- There was a decrease in the net market value of ABS positions as the firm had four or five CBO/CLO deals during the month resulting in approximately \$19 million of profit.
- As a follow up to the discussion last month concerning management's increases in limits for emerging market exposures, the risk manager noted that they raised the spread sensitivity (spread risk pops) more than they raised the market value limits. Over the past few months the limits with respect to Mexico, Brazil, and Russia have been increased. He also stated that although the firm intends to incrementally grow the emerging markets business, that it would be more of a market making business than an area where they would express a view. He also stated that the increases in the risk limits were not just a result of the increase in investor appetite for emerging market debt, but reflective of the improvement in the economic conditions underlying the emerging market countries (e.g. tend to be net exporters of oil and are thus experiencing huge profits currently).
- Within the credit derivatives space, Bear has flipped from being short credit spreads to be long credit spreads (mostly in the U.S. names). The long positions are concentrated in the BBB and BB rating categories (potentially traders believe these categories have the greater chance of tightening as compared to the higher rated names) and somewhat offset by going short in the other rating buckets. This change in positioning did not cause the VaR to increase. VaR for the Credit Derivatives area actually decreased from \$1.7 to \$1.5 million.
- Within the equity derivatives space, the total end of the month VaR increased from \$3.1 million to \$3.9 million. Total long delta increased from approximately \$11 million to over \$30 million. This was partially offset by a large increase in gamma from approximately \$26 million to \$63 million. The major change in delta came from non-U.S. sectors which flipped from negative \$9 million delta to positive \$19 million. The major change in gamma came from the U.S. Within the U.S., they have been long gamma on single stocks and short gamma on indices. Within the non-U.S.

equity derivatives sector, the risk manager has not had any real discussions here; no real strategic decisions being made here.

- F/X measured risk came down from \$2.5 million to \$1.3 million as the short dollar delta decreased from \$250 million to \$209 million. The most dominant long position remains in the Mexican Peso followed by the Euro and Yen. The short dollar positioning that the firm has shown over the past few months is dramatically larger than where it was back in the spring/summer time. This view seems to be expressed consistently at our various other monthly risk meetings and has remained profitable.
- The risk manager highlighted the tendency to move out of some of the more risky positions prior to year end. Bear had reductions in some of the more illiquid and riskier residual positions among various desks. Residual positions within the CMO desk were reduced by \$171 million and residual positions within the subordinate CBO desk were reduced by \$41 million. Finally, the special situations desk was selling off auto loan residuals and the net MV for the desk dropped \$227 million.

### Credit Risk

- The credit risk manager noted that there were a couple of macro trends that were affecting the reported credit risk exposures. First, the reported net exposures were dominated by placements of excess liquidity with major international banks. Secondly, that the net exposure in the F/X area is the largest it has been in some time. The net exposure is up from \$507 million to \$991 million mainly as the result of market moves (i.e. weakening of the dollar). It should be noted that this same theme was discussed at Morgan Stanley as well.
- The credit risk manager discussed the firm's move to create a "facility rating" to supplement the current internal borrower rating. The borrower rating represents a view of the probability of default of the counterparty (based on a senior unsecured position). The facility rating is meant to give credit for credit mitigants other than securities collateral posted (e.g. any advantage that Bear would have over other creditors in bankruptcy proceeding, non-securities collateral, etc). The facility rating will in effect really be an adjustment to the recovery rate versus an adjustment to the probability of default. This movement is meant to help provide a more accurate rating for a reported exposure; however as we discussed in our ML CSE credit risk review report, blended ratings also bring with them potential problems. The facility ratings should be integrated into the risk reports for next month's meeting. We will follow up on the impact of this move.
- The credit risk manager discussed his views on some trends he has seen in the hedge fund area. He confirmed that there has been some relaxation of terms (erosion in credit support) in the industry, but that it has mainly been by new entrants (both U.S. and European) versus the big three prime brokers (Bear Stearns, Goldman Sachs, and Morgan Stanley). He also discussed the difference between and trends in traditional prime brokerage (margin lending) and synthetic prime brokerage. He referred to the

use of derivatives, repos, etc. to gain the same economic leverage as provided in a traditional margin lending situation as “synthetic prime brokerage” (e.g. the use of the credit default swap market to take positions and get more leverage than a typical margin account provides). He went on to state that within the synthetic prime brokerage area that hedge funds have been more aggressive on the initial margin and MTM of these derivative and repo type positions. He further stipulated that the providers of this leverage have rationalized the relaxation of terms here by the fact that they manage the risk under a portfolio approach and that they have cross product netting (and aggregation??). In addition to the relaxation of terms within the synthetic arena, of course there continues to be price competition in the traditional prime brokerage area.

This evolution of hedge funds to obtain leverage from the traditional prime brokerage as well as synthetically has not only caught the eye of regulators (see Timothy Geithner’s speech at the National Securities Conference this November), but the escalation of the use of two points of contact by hedge funds with the firm (prime brokerage and derivatives, repos, etc) has caught the attention of senior management. We should keep abreast of any changes Bear or other firms take to better manage the total exposure to a particular hedge fund and hedge funds in total. As a matter of practice, the broker-dealers generally manage the risk in the prime brokerage area away from the credit departments and outside of the general credit risk limit framework (e.g. typically the prime brokerage activity is not included in the CE and PE limits of the firm’s risk appetite grid as they state that these activities are over collateralized to managed to have zero CE and near zero PE).

With respect to systemic risks to the financial system, there appears to be some offsetting impacts to some of the recent trends regarding hedge funds. First, the continuing move to hedge funds bearing the ultimate credit risk coupled with the fact that hedge funds that operate under a MTM regime versus commercial banks, may exacerbate market moves (e.g. credit spreads widening). However, the ability of hedge funds to get lock-ups and to get longer term margin agreements from their prime brokers may help to reduce the need of some funds to sell into the market move and thus may help to stabilize the market (potentially at the expense of the accommodating broker).

### Risk Management

- From a P&L perspective there were some large and/or non-recurring income items booked in November:
  - An approximately \$28 million profit on the IPO of Market Access, a corporate bond trading platform (developed by Bear Stearns??). The P&L was divided \$8 Million to the Equity Division and \$19.8 Million to the Fixed Income Division. Bear continues to own \$2.6 million of the company.
  - Bear recognized a very significant profit from the IPO of New York & Company, 81% owned by a merchant banking fund of Bear Stearns (owned

by both Bear and outside investors). This was a huge win as Bear had virtually no basis (approximately \$9 million) in these positions and the IPO was at \$17/share and currently stands at \$20/share. Bear has \$9.6 million shares in the new IPO but its investment is locked up for some time (how much???) and thus they have a large market risk tied up in this position. (See the Bernstein Research Call report dated September 30, 2004 for more details about this merchant banking gain. Bear Stearns also reported that they recognized \$160 million in realized and unrealized gains from merchant banking investments including the initial public offering of New York and Company (NYSE:NWY) during the 2004 4<sup>th</sup> quarter).

- Within the asset backed desk, there was an \$11 million recovery from a lawsuit against the trustee of an ABS (underlying were Helig-Meyers customer receivables) from approximately five years ago.
- Based on guidance provided in a G-30 paper issued within the past year, Bear did a one-time reversal of a large amount of accumulated reserves for potential administrative costs with respect to unwinding derivative positions. The reserve was built over many years to account for the cost to unwind derivative positions. It was stated that the G-30 paper stated that these administrative reserves are not warranted in today's markets.
  - In conjunction with the release of these reserves, Bear beefed up its bid/ask reserves. The result was approximately a \$20 million increase to income during November allocated between the equity and fixed income derivatives desk.
- There was a \$10 million increase on the mark of a convertible bond position.
- The firm took down a large single stock block trade (between \$60-70 million market value) of a pharmaceutical company. This block will be sold off in the typical manner. The risk manager noted that a \$100 million block trade would be within the firm's risk appetite and that the block put on in this case is of a very transparent nature and from a market risk perspective, he focuses more of his attention on the more non-transparent risks (e.g. in certain derivative positions). However, he noted that this size position does get flagged for senior management.
- The risk manager discussed a situation where a trader in the equity derivative desk was engaging in a bond relative trading strategy using JC Penny's bonds (long 30 year / short 10 year). The risk manager stated that he came across this exposure on his own and made it clear to his personnel that this should have been flagged for him.

This trade created two issues for the risk manager. First, it created some risk governance issues (i.e. mandate creep). Secondly, since this type of trading has not typically been done in the equity derivative book, there are no limits in place to capture this type of risk. In addition, they will need to make sure that they measure the risk in this book in a granular enough way to capture this curve risk.

The risk manager met with the co-heads of Fixed Income and raised this issue with them.

Version 12/17/04 JTG



## **Bear Sterns (Package Dated April 29, 2005; Discussion on May 18th)**

### Market Risk

- April was a unique month from a P&L perspective. Desks that typically have large gains had more moderate gains (e.g. ARMs and CMOs) and desks that have been bleeding P&L in recent months came through with record profits (i.e. Credit derivatives). In addition, there were a few desks with noteworthy, although not dramatic, losses (e.g. risk arbitrage, muni derivatives, REITS).
- The funded Bank Debt net market value position increased by \$268 million to \$1.179 billion (while commitments increased by \$138 million to \$2.7 billion). The majority of the increase in commitments during the month came from a \$188 million commitment as part of a \$375 million facility to Hughes Network Systems.
- Regarding the outsized exposure to Metro PCS which was highlighted in the past two monthly write ups, we received a detailed explanation of the facility (purpose, issues, timetable, etc) as part of a CSE-flavored discussion on bank debt during this month's meeting.
  - The main details regarding the reduction of the original \$540 million in senior secured bridge loans (\$240 million Series A and \$300 million Series B) are as follows:
    - The loans were funded during Feb/Mar 2005.
    - In Mar 2005, BS syndicated out \$235 million of the Series B Bridge Loan at par (leaving \$305 million of exposure).
    - In April 2005, Metro PCS decided to seek permanent financing in the form of a \$950 million senior secured credit facility (a portion of which would be used to repay any outstanding bridge loans). Currently, BS is in the market with this "best-efforts" (i.e. BS has no market risk here) financing as sole Lead Arranger and Sole Bookrunner.
    - In May 2005, Metro PCS completed a sale of spectrum to Verizon and used the net proceeds to reduce the Series A bridge Loan from \$240 million to \$10 million.
    - As of the date of our meeting, BS's exposure stood at \$75 million.
    - For more details, see presentation "Corporate Lending".
- The net market value size of the ARMs desk positions increased \$1 billion to \$10.212 billion. The risk manager stated that this was just normal building up of inventory before securitization. The desk had a profit of \$13 million during the month down from \$65 million in the prior month.

- The CMO desk had a profit of \$17 million during the month down from \$43 million the prior month. Its net market value size of positions increased to \$14.106 billion (I believe a record amount).
  - The risk manager noted that the aged inventory was up in this business as well and that he was putting pressure on the Head of Trading for this desk. The Desk Head reasoned that the aging issue was due to a PAC bond trader leaving the group/firm? (will want more explanation of this)
  - The risk manager also stated that the Residential Subs Desk-Net MV has also been increasing over the past few months and appears to be at a record level as well. The risk manager stated that this has been an area of focus for him. (During the previous monthly meeting, the risk manager noted that the desk had an exception limit of \$1.8billion above the normal \$1.3 billion limit. However, as of the end of this month they were at \$1.736 billion in MV.
    - We will follow up on these exposures at the next month's meeting and will probably alert Bob prior to the meeting about our attention to have a focused discussion around this desk and specifically around aged inventory and any mark concerns they may have.
  
- The biggest P&L came from the credit derivatives desk (\$63 million) which had been short credit over the past several months. The desk profited from a combination of being a lot shorter than it normally has been (spread risk pop went from (7,594) to (14,917) at the end of April or a 100% increase in the short credit spread exposure) and thus profited from the recent credit spread widening. In addition, they made money on structured activities. However, they said that currently volumes are down in structured products (obviously, the allure of these products has been impacted by the recent breakdown of price relationships in the space).
  - The risk manager said that the book will be coming back much closer to home.
    - We will follow up on their credit spread positioning within their credit derivatives book at the next monthly meeting.
    - From a CSE review perspective, it would sure be nice to see spread risk (CS01 or spread risk pops) at an aggregate level. Obviously the are structurally long credit spread in the mortgage businesses (and probably other businesses), so the credit spread positioning within the credit derivatives book ought to be an offset (although with a lot of basis risk).
      - Does this sound like an issue to pursue/discuss during our next monthly meeting or maybe during the field work?
      - During the model review presentation, the issue around an aggregated interest rate DV01 was brought up. BS has

different pricing models (and different models to estimate Greek sensitivities) related to the various interest-rate sensitive products (thus hindering an apples-to-apples aggregation??). The risk manager stated that typically the interest rate risk is not the pre-dominant risk (and usually hedged out). Rather, pre-payment assumptions dominate the mortgage businesses and volatility and credit spread are the other material risk factors. With that said, he stated that they don't find having an aggregated interest rate DV01 very useful. (Is this the point everyone took away from this conversation?)

- The risk manager has consistently stated that the firm's trading strategies do not seek to profit from interest rate moves (they seek to profit from the creation of value through securitization; trading on volatility and credit spread, etc; bid-ask spread in customer facilitation; etc).
  - However, the risk manager noted an exception to this general rule during the past month with respect to the muni derivatives desk. The desk lost (4.9) million during April driven in large part by taking a directional view on rates (long rates).
- The risk arbitrage desk had its worst month in Bob Neff's tenure as the Head of Risk Management. They lost \$15 million during the month. While they lost (4.2) million regarding a particular equity, most of the losses were more systemic to the entire business. The desk took losses on stocks not formally the subject of an offer but in the news.
  - We will keep an eye on the performance of this desk next month.
- The risk manager again stated that they are basically shutting down the convertibles desk. The long MV is down to \$269 million from \$501 million in March (\$1 billion at the end of 2004). The desk lost \$1.6 million during April.

### Credit Risk

- Similar to last month, the only material change in counterparty credit exposure was due to increasing the number of bank accounts and investments in money market funds mapped into the counterparty credit numbers (in the Placement category). Placements (cash deposits) increased from \$6.6 billion to \$8.4 billion at the end of April.
  - The risk manager noted that they are close to having the full range of cash balances in these counterparty credit exposure numbers.
    - Just for perspective, numbers for current exposure related to placement of cash deposits is not discussed/presented by all the firms during our monthly risk meetings (or even discussed during exams).

- The Swap counterparty credit exposure bucket increased from \$3.47 billion to \$3.787 billion. The risk manager gave an update on the firm's counterparty credit exposures (especially regarding the credit and operational aspects) due to the recent losses suffered by hedge funds.
  - The risk manager noted that the majority of the strategies hurt during the recent re-pricing of correlation, etc. were counterparty credit exposures, rather than exposures in the PB business. He also stated that the PB business was doing fine.
  - From a counterparty credit perspective, the risk manager stated that there were definitely above-average margin moves due to the re-pricing of correlation and credit spread movements. However, since the hedge funds were on an over-collateralized basis the actual margin moves much less than if they had been unsecured exposures. He also noted that all margin calls are being met.
  - He noted that over the past month, 18 hedge funds had current exposure greater than \$100k on any particular day. Of those, 10 did not have any net exposure after moving excess collateral (through cross product relationships- where they actually move the collateral). The remaining 8 hedge funds were all large, multi-strategy hedge funds, none of which have been implicated in the recent news as having troubles.
  - The risk manager has created and subjected all the credit derivatives positions within the portfolio to a series of stress tests (shocking spreads (50 basis points for IG and 150 basis points for NIG) and moving correlation down and up (tranche by tranche).
    - So far, the spread widening scenarios- the max aggregate exposure to BS was \$5 million.
    - Spread tightening by the same stressed amount actually produced worse results (didn't give a figure).
    - The risk manager noted his concern that these stresses, although punitive, did not take into account the add-on effects that might occur based on forced sales due to margin calls or redemptions.
    - He noted that they are talking with their hedge fund counterparties on a daily basis (including asking them about their estimates on their expected redemptions after the end of the quarter) and "have both hands on the wheel".
- From an industry wide perspective, the recent bankruptcy filing by "Collins & Aikman", one of the largest U.S. auto parts suppliers, will test the industries operational (settlement mechanics) since it will be the first time a name included in a CDS index has defaulted.
  - The risk manager noted that there is a lot of work to be done by the industry in handling the settlement mechanics regarding this issue.

- This has been on the firm's Operations Committee agenda recently.

### Risk Management

- During the monthly risk meeting, BS gave some preliminary CSE-type presentations as well as supporting documentation and real life examples on the following topics:
  - Corporate lending- from deal origination through post-close monitoring & risk management. BS's approach to risk management in this business is similar in many ways to its peers. However, how the various functions are organized (regarding independence and functional area) are quite unique. See separate CSE write up on J: drive for more details.
  - Model review- personnel from Risk Management discussed the overall process for model review, including giving out minutes from the January 05 Model Review Committee meeting. See separate CSE write up on J: drive for more details.
    - This presentation was a follow up presentation to the one given in September 2004 to OPSRA.

### Follow Up

- During April, the CMO and Residential Subs Desks were at record levels of inventory. The risk manager noted that these desks were an area of focus for him. During the next monthly meeting, we plan to follow up on these exposures, specifically any concerns related to aged inventory or marks on the positions.
- During April, the credit derivatives desk had a significant short credit spread position. Although this position was quite favorable given recent spread widening, the risk manager noted that the business intended to flatten out this position somewhat. We will follow up this exposure to credit spreads tightening at our next monthly meeting.

*JTG, 5/19/05*

## **Bear Stearns (Package Dated December 30, 2005; Discussion on January 18, 2006)**

### **Market Risk**

#### **Bankruptcy/ High Yield Area:**

- The Distressed Debt Desk's net market value increased from the prior month's record high of \$966 million to \$1.054 billion. The desk made \$16 million profit for the month.
- Bank Debt Funded's-net market value increased \$213 million to \$1.361 billion still below the record level of October \$1.402 billion.
- Bank Debt Unfunded- net market value increased \$317 million related to relationship lending commitments. While the firm continued to syndicate down a Nextel commitment from \$445 to \$260 million at year end (and currently at \$162 million), this was more than offset by a few new exposures, such as commitments to Verizon and Time Warner.
- CLO Collateral Accumulation Desk's- net MV continued to increase from \$2.936 billion last month up to \$3.253 billion at year-end. The risk manager noted that demand was still robust and that they have 5 CLO deals currently in the works.

#### **Mortgages & ABS:**

- The ARMs Desk- had a profit of \$23 million during the month. Its net market value increased \$1.53 billion to another record of \$13.938 billion. As a result, its 1-week 95% VaR increased dramatically from \$37.8 million to \$44.9 million (against \$35 million limit which was recently increased from \$25 million).

Unlike last month, the growth in inventory this month was not in the Option-ARM product space as the balance for Option-Arm product remained at \$4.6 billion (\$4.1 billion in raw loans and \$475 million in securitized product) thus reducing the overall portion of the ARM portfolio in the Option-Arm product to 33% from 41% at the end of November.

We discussed the level of the positions of the ARMs desk and asked given the current shape of the yield curve did the risk manager expect this to be the peak inventory level for the desk. The risk manager stated that he would think so but was hesitant to state that given the Head of Arms past history of finding profitable opportunities.

The focus of risk is currently on aged inventory which went up during the month (*See Risk Management section for more details*).

- The Non-Agency Desk- had a profit of \$38 million. Its net market value increased \$119 million to a near record \$16.277 billion. Consequently, its VaR increased slightly from \$26.7 million to \$27.3 million.

- Asset backed (excluding CBO) desk- had a \$17.5 million profit. Its net market value increased \$532 million to \$1.012 billion. *(There was no further discussion about this desk during the meeting. We should follow-up on the cause for the large percentage increase in inventory at this desk).*
- The Commercial Conduit Desk- made \$16 million during the month. Its net market value decreased \$452 million to \$3.9 billion. As a consequence, it's VaR decreased from \$10.6 million to \$8.2 million.

### **Fixed Income Investments:**

- REITS Desk had a profit of \$11 million, of which \$9 million came from increasing the mark on its Preferred Shares of Freddie Mac's two REITs due to the revised tender offer discussed last month. The risk manager noted that not many investors tendered at this revised higher price either. (It was interesting that they took the mark up on the outside observability associated with the revised tender offer but didn't take a mark down on the initial tender offer which they viewed as ridiculously low).
- The Max Recovery Desk made \$16 million. The net market value increased by \$52 million to \$644 million. *(There was no further discussion of this desk).*

### **Credit Trading:**

- The Credit Trading Desk made \$32 million during the month. \$4 million came from positions in the auto sector (as discussed last month they have large position in GMAC (around \$500 million) and Ford Motor Credit). \$17 million came from structured credit deals.

The spread sensitivity of the entire portfolio decreased as they ended the month virtually flat (144) spread risk pops.

### **Derivatives:**

- Fixed Income Derivatives Desk- on a net basis had a slightly positive month (no hard figures given). However, the desk lost (\$4.5) million in December being long rate volatility (as volatilities decreased further in December's slow activity) and lost (\$6) million in a short delta position.

This was a large focus of one of RMD's bi-weekly risk meetings with the Co-Heads of Fixed Income. They are currently analyzing their positions with the dilemma of (1) cutting your losses vs. (2) selling at the bottom. With that said, they are currently in the process of reducing these positions. The VaR on this desk increased from \$4.6 million to \$5.2 million over the month.

- Equity Derivatives Desk made \$36 million across various product areas, including a large stamp/collar trade being upsized, a long dividend & gamma play on Pfizer, and

EITF 02-3 reserve release of \$4 million. The 1 week 95% VaR was down \$1.6 million to \$8.3 million.

### **Strategic Structured:**

- The Strategic Structured Desk had an extremely outsized gain of \$29 million in December. \$27 million was related to a transaction where BS locked in a forward price for Coke (spelling???) (a processed form of Coal) to be delivered from a battery it owns to the International Steel Group to be used in their operations (i.e. in their furnaces to forge steel).

The desk hedged the counterparty credit risk associated with the contract by shorting ISG bonds and buying CDS protection and thus the firm was able to take the present value of this new contract into P&L in December. They were basically left with only operating risk (i.e. can they deliver this product to the steel company).

The investment in this Coke battery was prior the creation of the Houston energy group.

- CalBear- CalBear's trading results are also included in this whitebook.
  - The credit risk manager stated that they have 10 new ISDAs signed in this space and have started trading through the CalBear operation.
  - Currently, the trades are all exchange traded products. They currently have a natural gas/power trade on and a long natural gas trade on (on which they have lost money as the warm weather has caused natural gas prices to fall).
  - The VaR limit is still at \$1 million and the desk is currently at \$700k of VaR.

### **VaR Specifics**

- Firmwide 1-week 95% VaR was up from \$64.1 million to \$71.4 million. Unlike previous months where there were changes in data feeds and methodologies that caused significant changes in VaR for various whitebooks, the changes in VaR month for the various whitebooks tracked the changes in underlying exposures (details provided by desk above).
- Generally speaking, the Credit Subtotal VaR and Equity Subtotal VaR were little changed. The big increase came from Interest Rate Subtotal VaR, specifically in MBS desk, which increased from \$47.7 million to \$53.6 million. As discussed above, much of this increase came from the ARMs desk which increased \$7 million to \$44.8 million.
- Firmwide 1 day 95% VaR increased from \$28.7 million to \$31.9 million (see Firmwide VaR reports).



- The Annual Statement 1day 95% VaR increased from \$21 million to \$26 million (see top of page 1 risk summary and on Firmwide VaR report). *Follow up with firm on the difference between these two numbers. Is the annual statement figure only on desks which use VaR for capital?*

### Scenario Analysis:

- The 1987 and 9/11 scenarios remain the most sever (one a one-day basis). The 1987 scenario decreased from an \$863 million one-day loss to \$818 million one-day loss. The 9/11 loss decreased from \$270 million one day loss to \$234 million one-day loss. On a one-week and one-month basis, the Russia/LTCM 1998 scenario produces large exposures \$468 million (one-week) and \$721 million (one-month) losses. Details by whitebook for both the 1987 and 1998 scenarios are included in the risk package.
- While there were no major changes in the results by whitebook or sub-total month over month, the risk manager highlighted that a fairly large portion (approx 15%) of the Merchant/Illiquid whitebook is BS' investment in NY &Co (an IPO from its private equity business). Restrictions are lapping soon and they expect this position to be exited. The current price is around \$20/share and the firm owns 9 million shares or \$180 million net market value. The Merchant/Illiquid white book is generally the largest single whitebook component of the 1987 scenario loss and is also a large contributor to the Equities sub-total and Firmwide VaR.

### Credit Risk

- Net current exposure increased by \$5.3 billion to \$24.7 billion.
  - The largest portion of the increase related to the recent inclusion of certain prime brokerage trades. Based on SEC request (**from who???**), BS has included in its counterparty credit calculations (CE and PE) trades on which it was relying on cross-entity collateral. Since this apparently did not meet the legal certainty standard required, these positions were brought into the credit positions in order to generate a capital charge other than zero.
  - The trades involved fall into two categories and total \$1.733 billion in CE:
    - The largest category is relates to the prime brokering of leverage loan positions where the loan is in one entity (BSIL) and the collateral held against the position is in another entity. These positions are given a risk weighting of 100%. This category is approximately \$1.657 billion.
    - The other category is related to enhanced stock loan positions where one side of the exposure is in BSSC and the other in BS&Co. The CE here is currently only \$76 million. However, these products would have a slightly higher PE.

- Additionally, there were \$2 billion more in placements this month.
- The final portion of the increase in CE was related to financing products, such as bonds borrowed/sold and repos, which increased somewhat. The risk manager noted that they are generally lower at quarter end (i.e. Nov). *(From a liquidity and funding perspective- it appears that both BS and LB are still actively managing their balance sheets at quarter end, whereas this practice seems to have been mitigated substantially at MS and GS based on the quarterly discussions with MS and GS Treasury departments).*

### **Risk Management**

- New Firm-wide VaR limit. The firm (I assume the Executive Committee) recently confirmed a brand new 1-day 95% Firmwide VaR limit of \$40 million. I believe this will be in the Firm's annual report *(we should check this when they are available)*.

The risk manager stated that while this doesn't change the way RMD manages risk (i.e. on a desk by desk basis), it will help to reinforce the firm's risk appetite which is one of pursuing opportunities where it can earn a bid-ask spread or a securitization profit and shy away from more volatile prop bets.

With that said, it appears that one of the main reasons for this new limit was probably the fact that OCIE stated in its findings that BS was the only CSE firm without a Firm-wide VaR limit.

- Aged inventory- biggest focus for RMD currently. The risk manager noted that aged inventory across the firm and in particular in the mortgage area was a big focus of RMD. Aged inventory across the firm increased \$1.6 billion to \$7.9 billion. Within the mortgage/asset backed area it grew \$900 million to \$3.6 billion. The risk manager noted that this December was a particularly slow month for moving product due to the timing of the holiday season this year coupled with the transit strike in NY. He also mentioned that the Head of Mortgages has stated to his traders that he will fine them \$1000 for every million of aged inventory over the limit by the end of January. (This fine isn't an actual fine but will affect trader's compensation in some respect). He has currently set the target for aged inventory in the MBS/ABS space at 50% of the current aged inventory amount. The risk manager noted that it was still early, but that so far this approach has had a good response *(no hard figures given)*.

### **VaR Model Modifications Tab:**

The Tab this month had a few VaR model modifications as well as a proposal to change PE methodology with respect to contract for differences ("CFDs").

The VaR Model modifications included the following:

- (1). Updated specific risk parameters for Govt. and Agency bonds.

- (2). Credit risk methodology extended to synthetic CMBS trades.
- (3). Proxy methodology for implied volatility surfaces where no historical data are available for equity derivatives is currently under review and is being modified.

*(OPSRA's BS market risk team will meet separately with Manoj/Gregg of the FAST RIO team to discuss the specifics of these VaR model changes within the next couple of months).*

### **Special Presentations:**

During the monthly meeting, we had follow-up discussions for the "Cross-firm Basel" project. The discussions revolved around both the Structured Funds (i.e. HF derivative products) and Leverage lending areas.

Materials are available if anyone is interested. The materials are laid out as responses to specific questions we had from initial presentations in the Fall.

The pertinent information from these discussions will be included in the BS cross-firm template and included eventually in a summary cross-firm document. When completed, these documents will be circulated to the group for comments.

### **For Memo**

- Mortgage and asset backed inventories across Bear Stearns' securitization businesses grew during December, particular with respect to the ARMs desk where net market value grew \$1.53 billion to another new record of \$13.9 billion. Additionally, the risk manager noted a sharp increase in aged inventory in the mortgage and asset backed area which grew \$900 million to \$3.6 billion. The risk manager noted that this December was a particularly slow month for moving product but that reducing the level of aged inventory is risk management's biggest focus currently. He also mentioned that the Head of Mortgages has instituted a target for the reduction of aged inventory in these businesses to a level 50% below the December month end aged inventory amount. We will follow up on the firm's progress in this area at the next monthly meeting.
- Limited trading has commenced in CalBear (Bear Stearns joint venture with Calpine). Currently the activity has been limited to exchange traded contracts in both the natural gas and power space. The market risk, as measured by VaR, remains below its \$1 million limit and the firm is yet to transact in any over-the-counter derivatives which would subject the firm to counterparty credit risk. We will continue to monitor the evolution of trading activity in this business and any bankruptcy court developments regarding affirmation of CalBear contracts with Calpine.

## **Bear Sterns (Package Dated January 31, 2005; Discussion on February 16th)**

### Market Risk

- The market value of the ARMs desk increased substantially from last month's all-time high of nearly \$10 billion to \$13.2 billion at the end of January as new issuance in ARM products continues to show strong activity.
  - The risk manager noted that they did a \$2.5 billion securitization in February and as a result the desk was back down to \$9.25 billion as of our meeting. The risk manager stated that this was evidence of their ability to move the product through the pipeline.
  - The risk manager stated that it is unusual to have such a large and lengthy institutional violation of a limit (the limit is \$6.5 billion). However, the firm wants to reinforce its willingness to place capital in profitable areas. In addition, the firm is reluctant to raise the MV limit for the ARMs desk, because they fear it would institutionalize this level of activity/exposure as commensurate with the firm's risk appetite. The firm might not be willing to have this level of inventory if say the ARMs market in total were much smaller and if the activity was less robust (in other words, they would rather operate above the limit while the market is benign than have to cut the limit when opportunities diminish).
  
- Within the ARMs desk, the firm had bought from a customer a \$150 million LIBOR IO tranche during the month.
  - As prepayments in ARMs have increased recently (due to the flattening yield curve), this particular client had not been hedged and as a result sought to sell the IO tranche to Bear. Bear bought this tranche as a market maker for its customer and not to express a view on rates or prepayments. They intend to sell this highly rate-sensitive position. In the meantime, the desk has attempted to hedge this position, which should be highly sensitive to changes in the shape of the yield curve, by putting on a curve flattener. However, the risk manager is not confident with the hedge (could be a lot of basis between the two positions) and is focusing on this exposure (it is "on his radar screen").
  
- The net market value of the CMO desk decreased from \$10.9 billion to \$9.9 billion as they moved a lot of product through the pipeline with a number of deals in January.
  - In addition, the desk was very profitable (\$46 million).
  
- The risk manager discussed a new development in the Derivatives market. A derivative market for ABS and MBS is starting to develop. This market will probably develop in one of two ways: standardization or customization. For example, 2 products being contemplated are as follows: (1) One would be linked to an Index and (2) another would be linked to a specific security (e.g. 5% 30 year MBS) or perhaps even a specific tranche of a security. One implication of such a development is that it would make it easier for traders of these products to get short. The risk manager

stated that an ISDA Committee has been formed to standardize terms for this type of instrument.

- Within the credit derivatives space, the firm flipped from long credit spreads to short credit spreads. The biggest move came in the BBB space where they went from a \$432 thousand CS01 to \$(492 thousand) CS01 (i.e. they would make \$492 thousand if spreads widened 1 basis point).
  - In addition, with respect to spread risk pops, they went from long 5000 to short 5000 and currently are short 10,000 (100 srp = +/- \$100 million per 10 bps spread movement).
    - This positioning was the result of the structured credit desk belief, based on their valuation models, that protection is quite cheap at the current levels. The desk bought protection at these levels and as a result the desk is significantly short credit spreads.
- Within the equity derivative space, the measured risk dropped from \$5.7 million to \$4.6 million as the delta decreased from \$97 million to \$32 million.
  - The risk manager noted that he was looking at equity derivatives with respect to hedge funds. They were over \$12 million longer hedge funds as the desk wanted to hold some hedge funds with favorable lock out periods. In particular, the desk decided to hold shares in distressed debt fund that it was originally financing for a client (one mode of thought was that another client might want a derivative on these shares). He also noted that the desk, which has exhibited some propensity for mandate creep in recent months, hadn't yet received approval to keep these positions.
  - This desk had a profitable month (\$27 million) resulting from a range of activity (e.g., some new collars and gamma profits from some big moves in a few single names).
- The convertibles desk continues to struggle as volatilities continue to decline. What the risk manager refers to as their premium, or value of their long call position, is now down to \$35 million.

### Credit Risk

- The credit risk manager discussed the effect (on its disclosed current exposure in the 10K) of two trades where Bear bought calls on the equity of a couple of its clients from the clients. The clients were BB rated but no collateral agreements were required because of the right-way risk of the options.
  - The stocks went up in value and resulted in over \$100 million of current exposure at year-end. This represented almost all of the firm's 50% increase in current exposure to non-investment grade counterparties from 2003 to 2004.
  - In January, the positions were closed out and the exposure is no longer there.

- The credit risk manager noted these two trades as an example where facility ratings may be used. This was the first time we had heard about the use of facility ratings to capture the fact that a particular credit exposure had a “right-way” versus “wrong-way” risk profile. Typically the facility ratings are used to capture better recovery rates due to favorable debt covenants or a favorable position in the capital structure or the impact of the credit quality of the underlying collateral in collateralized or asset based lending. We will follow up on this in more detail during our CSE review.
- Overall current exposure is down a little less than \$1 billion.
  - Most of the large exposures are in the financing area (e.g. repos, bonds borrowed, etc) to highly rated counterparties.
  - The dominate exposures are placements with highly rated Banks.
  - The big moves in current exposures were to AAA counterparties.
- The risk manager noted that they believe they are currently overstating their risk to monoline insurers for municipal transactions where the monoline insurer is insuring the bond deal. Therefore, they plan to move to a relative spread model which takes into account the fact that both the lender and the insurer most default to result in a loss on this “2-name paper”.
- In previous meetings, the credit risk manager discussed that they were moving towards Facility ratings. He stated, at this meeting, that they have not implemented this yet into their system and that currently the borrower and facility ratings are the same for all counterparties. He noted the firm may have facility ratings in place by the summer (have to get approved).
  - It is interesting that Bear is moving towards facility ratings since at least some of its peers are moving more towards a internal risk framework based on LGDs, where the recovery rates will be captured outside of the PD rating. Some other firms appear to be moving to the LGD concept for capital purposes under Basel II but not changing their internal risk framework (and PD ratings, including facility ratings). We will follow up on this issue in more depth during the CSE review.
- The risk manager noted that in the prime brokerage space they had a few large margin calls on hedge funds that were directionally betting on Treasuries or the dollar. However, he said that these accounts were resolved without incident.

### Risk Management

- At next month’s meeting, the risk summary report will show the VaR number for the Mortgage pass-through desk instead of the market value as the risk manager believes that the market value metric is not a good measure of the exposure of the desk.
  - For example, the desk was short mortgage basis and mortgages richened in January and as a result the desk had a small loss in January. However, none of this is seen by displaying the net market value as the risk metric.

- Bob Upton will give a presentation to the OPSRA staff at next month's meeting regarding Bear Stearns's liquidity and funding strategy.

#### Follow up

- We will continue to discuss with risk management the size of the Adjustable Rate Mortgage ("ARM") business as it continues to operate in excess of allocated limits and reach new highs with respect to the net market value of its positions. Also, during January, the desk purchased a \$150 million LIBOR IO tranche from a customer. Bear bought this tranche as a market maker for its customer (despite a recently flattening yield curve) and not to express a view on rates or prepayments. They intend to sell this highly rate-sensitive position and have attempted to hedge it in the meantime (but hedging is difficult). We will follow up on the status of this position at our next monthly meeting.
- During January, the structured credit desk flipped from being long to short credit spreads (i.e. the desk would make money if credit spreads widen). The desk was expressing a view that protection was extremely cheap at these levels. As of our monthly meeting the desk had doubled its short credit spreads positioning from the end of January, reaching a relatively large position by historical standards. We will follow up on where this desk stands at our next monthly meeting.

Version 02/23/05 JTG

## **Bear Sterns (Package Dated March 31, 2005; Discussion on April 20th)**

### Market Risk

- March was a record setting P/L month. Total profit was \$386 million, spread out across groups, with large gains in ARMs (\$65mm), CMOs (\$43mm), equity derivatives (\$65mm), and credit derivatives (\$42mm). The risk manager indicated much of the gains are attributed to “the origination franchise” and to “attractively priced risk positions” due to the demand for yield.
- The funded Bank Debt net market value position increased by \$68 million to \$911 million (while commitments decreased by \$79 million to \$2.5 billion). There were several new transactions, including a production company acquisition and other new commitments (details?). Regarding the Metro PCS loan discussed last month, Metro PCS has sold a cellular spectrum, of which the cash proceeds will go towards that loan (coming down next month right?). But as far as the high yield debt offering is concerned, the risk manager noted some concern with the current quality of the high yield market (is BS doing high yield underwriting?).
- The net market value size of the ARMs desk positions decreased by \$900 million to \$9.2 billion (I assume due to selling some securitized product given the \$65 million profit, didn't really say though). There was a \$7 million dollar loss on the Libor IO position discussed in previous months. The desk was able to sell a small portion of this position, but is still holding most of the risk.
- The CMO desk, which also had a very profitable month (\$43 million), increased the net market value size of its positions to \$12.9 billion. This consists of \$6 billion for the Agency Residential desk, which is over its allocated limits of \$5.5 billion, and \$6.9 billion for the Non-agency Residential desk, which is over its allocated limit of \$6.5 billion (didn't discuss either). The Residential Subs Desk, which has a market value position of \$1.5 billion (and had grown to \$1.8 post report I believe) is also over its allocated limits of \$1.05 billion, of which a substantial portion of the position (\$650 million as of the meeting day I believe) was in non-investment grade loans. As there has been some recent widening of credit spreads, there is apparently some pressure (from ?) to get this position down.
- There was a \$1.9 billion increase in the Special Situations desk net market value positions size. This was from a purchase of a portfolio of auto loans from Chrysler. These loans apparently were not purchased as part of a Walt deal but rather the purchase was driven by the need for the auto company to monetize some assets (for cheap, since the auto companies are against the ropes).
- There is currently talk of shutting down the convertible bond trading business. This desk has persistently lost money and shrunk in size over the past year. The strategy followed by the traders was a traditional one of hedging out credit spread



risk and attempting to buy cheap equity volatility. According to the risk manager, there is some feeling that this “game is up” (also reflected in the press, for instance, see 4/21/05 WSJ article “Have Convertibles Hit Bottom”) as arbitrage opportunities have been exploited away and many convertible arbitrage funds are incurring significant redemptions and/or shutting down (although should volatility pick up, might one sing a different tune?).

### Credit Risk

- While BS has little credit exposure to the auto companies, it has significant relationships with GMAC (primarily through mortgage businesses sounds like). The risk manager noted that BS does have large notional balances for GM residential mortgages (I assume this means they are warehousing/financing the mortgages for eventual securitization, will follow-up), which he is not concerned with b/c of sufficient collateral and servicing (wanted to follow up with this as well, was he saying GMAC does servicing or there is a good 3<sup>rd</sup> party servicer). He also noted that GMAC is currently pursuing a restructuring that would ring fence its mortgage operations. [We also talked briefly about WALTs, but didn't sound like there was any current activity there?]
- There were no new major transactions or major market moves. The only material change in exposure was due to a change in the approach to the reporting of placements (cash deposits) with several highly rated counterparty types (all single A and higher) – e.g. in money market accounts, clearing corporations, etc (wonder what old approach was).

SS, 4/29/05

## **Bear Stearns (Package Dated November 30, 2005; Discussion on December 21st)**

### **CalBear**

Calpine filed for bankruptcy late Tuesday (December 20<sup>th</sup>). Recall, the CalBear transaction centers around two primary agreements with Calpine: a Credit Enhancement Facility/Agreement and an Agency and Services Agreement. The former allows Calpine to transact on more advantageous terms than it currently can, basically granting Calpine Bears credit rating as Bear guarantees the trades with 3<sup>rd</sup> parties. The latter defines the P&L sharing between Bear (CalBear) and Calpine, with Bear incurring any initial losses. In order for the CalBear venture to proceed, the bankruptcy court must affirm the Credit and Service agreements within 45 and 90 days respectively (I am not sure what this involves, Calpine makes an argument to the court that this is in everyone's best interest I guess). If these key contracts are not affirmed, the deal will seemingly die. The risk manager also noted that a lot of people seem to think that the bankruptcy proceeding could take a long time (also see WSJ article dated 12/28).

It would also seem that should trading commence, it will be in a more paced manner than initially considered. Risk management explained that Phase I of trading will involve trading only with exchanges (NYMEX and ICE) and will be cleared through BS, for which the initial VaR limit will be only \$1 million. Phase II will involve physical trades with other counterparties. However, the (more structured trades that involve providing liquidity to customers are not currently approved. Right?). Furthermore, the risk manager explained that should trading commence, Bear will receive payment/service one day before Calpine (I interpreted as basically taking out the settlement risk, as Bear Stearns is basically an intermediary between Calpine and customers).

On the market risk side, the credit traders did have Calpine positions via credit derivatives and distressed paper<sup>1</sup>, and the risk manager seemed optimistic the traders would have a profitable day on Wednesday (Calpine filed late Tuesday, which apparently has also caused some concerns over whether CDS expiring on Tuesday expired before or after the default event.)

As far as counterparty credit risk management is concerned, the Credit Risk Measurement Group (Rupert Cox) has yet to finalize the intended PE methodology.

### **Market Risk**

- The Distressed Debt Desk's net market value has reached a new high of \$966 million. Apparently management is considering raising the limit to \$1.25 billion.
- Bank Debt Funded's net market value came down by \$254 million, with the largest reduction coming from the Saber facility being sold further down (last month a large portion of the unfunded commitment was sold down). The desk's profit for the month was \$13 million.

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<sup>1</sup> The distressed desk was long \$20 million in secured/second lien paper, expressing a view that recovery rates will be higher post filing than implied by current prices. In fact, this debt was trading higher post 12/21.

- The EMC/MVH Desk had a large loss of \$11 million, however, only due to some year end intra-company profit reallocation between various mortgage desks. During the month, there was a \$7.5 million intra-company transfer of expense related to Katrina reserves from the Special Situations desk. In addition, there was a \$21 million year-end “true-up”, which related to servicing income transferred from the EMC desk to the ARMS and Non-agency CMO desk. Excluding these intra-company transfers, the economic P/L for the desk for the month was actually \$18 million.
- The Pass Throughs Desk had a small loss (\$700 thousand), of which there was no one notable driver. The risk manager noted the desk gets put into a lot of positions by customers (and is a very competitive market). The VaR fell from \$1.6 million to \$530 thousand.
- The ARMs Desk had a profit of \$30 million, and its net market value position climbed back to \$12.4 billion, its second highest level. The risk manager noted that Option ARMs have increased as a proportion of total net market value, to 41%. Otherwise, he gave no real color on the current state of the mortgage market other than to say the attractiveness of ARMs to homebuyers is diminishing as the yield curve flattens. While this flattening yield curve has not seemed to have affected BS ARM deal volumes yet, it has clearly affected the composition of the mortgage portfolio.
- The Commercial Conduit Desk’s net market value decreased by \$306 million as a deal was completed. The desk’s profit was \$13 million.
- The Commercial Secondary Desk had a loss of \$5.5 million. However, the loss was essentially made up through a CBO deal the position in question went into. In short, the Commercial Secondary desk was holding a position that was going into a CBO, and the CBO desk had a Circle agreement in which a client had already agreed to purchase the risk (my understanding is that these Circles are economically forward sales, but that there is less legal certainty in terms of the client truly being on the hook). Apparently this agreement was not hard enough that the desk (and others) felt comfortable in booking an offsetting short trade; so when spreads moved out there was no offsetting gain. However, when the deal closed the counterparty stood by the Circle, resulting in essentially \$5.5 million dollars in additional profit/arb on the CBO. The risk manager explained this issue of how to deal with Circles is an ongoing challenge (which was also mentioned for the CLO desk two months ago).
- The REIT Position had a \$200 thousand gain. During the month Freddie increased its tender offer by 18% from \$2.58 per share to \$3.05 per share. Bear Stearns did not tender its shares, as it believes this revised tender offer is still below the economic value of the shares.
- The Risk Arbitrage Desk had a \$12 million profit, half from a single position.

- The Equity Derivatives Desk had a very big gain of \$47 million. Part of this was related to reserve releases, bid-offer and EITF 02-3 related profit (\$9 million) and a notable chunk came from a position in the ISE exchange (\$4 million). The risk manager also noted the business had an extremely strong year, doubling its 2004 profits. Weekly VaR is up from \$8.3 million to \$9.84 million.
- The Strategic Structured Desk had an \$11 million loss, but this was described as another intra-company accounting issue. The risk manager explained that over the year the desk was being undercharged by Treasury for its carry (for its unsecured funding).

### VaR Specifics

#### Credit:

- The Distressed Debt VaR increased by \$1.4 million, consistent with their increase in positions and net market value.
- The CLO Collateral VaR also increased by \$1.4 (no real story, just more positions).
- Credit Trading VaR came down from \$19.6 million to \$16 million, mostly attributable to the cleaning up of some bad correlation histories that were inflating the VaRs as well as a flatter net spread position.

However, the desk has significant positions in the auto sector, where spreads have widened resulting in greater VaR in that sector. The highest single name VaR is now \$5 million to (GMAC), and some of this large single name positions have required limit exception approvals (e.g., GMAC \$5 million and Ford Credit \$3.5 million).

- The Emerging Markets VaR increased from \$1.6 million to \$3 million, as the desk added a Brazilian corporate trader that put on some new positions.

#### Interest Rates

- Interest Rate Derivatives VaR decreased from \$10.9 million to \$6.8 million. This was the result of them getting longer short dated gamma.
- The ABS/Auto desk's VaR decreased from \$2.6 million to \$1.5 million, as they sold \$100 million worth of auto loans.
- The ARMs desk got a new VaR limit of \$35 million (from \$25 million), which it is over as its VaR is \$37.9 million.
- EMC- VaR decreased \$1.9 million to \$4.7 million-mainly as a result of VaR model modifications. (See VaR model modifications section of the monthly report for detail).

### Equities

- The Equity Derivatives Desk VaR increased from \$8.3 million to \$9.8 million, due to the ISE position discussed above and the desk being less long gamma.
- Block Stock Trading VaR increased from \$193 thousand to \$1.3 million, due to one stock position, \$23 million, (nature of block trading obviously).
- The Merchant/Illiquid VaR rose from \$38.3 million to \$42.5 million, but the risk manager simply attributed this to the fixing of data/mapping problems discussed last month.

#### Scenario Analysis

- The 1987 and 9/11 scenarios remain the most severe. The 1987 scenario increased from a \$623 million one-day loss to \$863 million one-day loss. The Equity white-book sub-total counted for most of the increase as it grew from \$497 million loss to \$708 million loss. The primary drivers were the Merchant/Illiquid desk (\$306 million loss) and Equity Derivatives (\$279 million loss). The Merchant/Illiquid desk VaR had increased from the fixing of data/mapping issues and I assume this was the cause for an increase in the scenario result as well. The increase in Equity derivatives was due to the loss in positive gamma from the previous month.

### **Mortgage CDS Presentation**

John Schrader, MDP Mortgage Group within RMD and Scott Eichel, Trader- Non Agency Fixed Desk (including running the residential sub desk) gave us a presentation on the use of Mortgage CDS with Pay-As-You-Go or Physical Settlement (or Pay-as-you-go Swaps) (PAUGs).

The presentation focused mainly on the nature of BS' portfolio of PAUGs and the various uses of this product.

#### BS Portfolio Summary of Mortgage CDS:

BS did its first PAUG trade in Mid-January by its Non-Agency CMO Desk and has since executed 1100 of these contracts on over 575 different underlying securities (i.e. different CUSIPS). The volume of trades grew substantially after ISDA published its standard confirm for PAUGs in June 2005 along with the standard confirm for "CDS on ABS with Cash or Physical Settlement" (Non-PAUGs)<sup>2</sup>.

The vast majority of the PAUG transactions (in gross CDS exposure) are done on the Non-Agency desk, focused on subprime collateral based securities, (55% of the portfolio)

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<sup>2</sup> During the end of 2004, Deutsche Bank and four other banks, including Bear Stearns, shared confirms and created one standard confirm to trade this product. By June 2005, there was an industry-wide standard when ISDA created the standard confirm.

and on the CMBS desk (34% of the portfolio)<sup>3</sup>. The remaining trading areas where the contracts are used are: 5% in CBO secondary (CLO backed by mortgage loans), 5% in ARMs, and 1% in ABS.

In general, BS is a buyer of protection. Most of the swaps have been on BBB rated and AAA rated securities (66% on BBB on Non-Agency/CMBS). An additional 15% in CMBS AAA which Scott stated was a core hedge against spread risk for the CMBS book. Across all rating bands, BS is net short PAUGs for a combined net short of \$922 million (again mostly in BBB and AAA). The gross exposure stands at \$8.22 billion and the net spread pops (Spread DV01/100) are short (\$2,366).

### Uses of PAUGs:

These trades began as a way to hedge credit spread risk for mortgage securities inventory more effectively (i.e. less basis risk).

#### (1). Hedging purposes

BS uses PAUGs as well as other instruments to hedge the credit spread risk in its mortgage desks. Based on our discussions during the CSE market risk review, the general breakdown of the instruments used to hedge credit spread at BS for the various mortgage desks were as follows:

##### Hedging loan pipeline:

The PAUGs are referenced to CUSIPs and reference only bonds that already exist. As such, they are not typically used by BS to hedge its loan inventory pipeline, but rather to hedge the securitized product coming out of the ARMs, Non-Agency CMO, CBO, and CMBS desks.

BS typically hedges its Non-Agency fixed pipeline by using pre-sales and hedges its commercial conduit pipeline by using total return swaps referencing CMBS indices<sup>4</sup>. The ARMs and CBO loan inventory are not typically hedged from a credit spread perspective. For example, during the CSE review, the Mortgage Group risk managers in RMD noted that there the ARM product shelves change too frequently to lend themselves to being good candidates for large pre-sales activities.

##### Hedging securitized product:

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<sup>3</sup> The subprime RMBS and CMBS area also seem to be the largest underliers for these contracts industry-wide per the November 11, 2005 "Fitch Ratings Credit Products Special Report "Fitch Examines Effect of Pay-As-You-Go (CDO and Single Name).

<sup>4</sup> At one point, during the CSE review, the CMBS origination desk had \$2 billion of TRS against a \$7 billion portfolio of loans.

BS uses the PAUGs to hedge the credit spread risk of securities in all the following desks: (1) Non-Agency CMO, (2) CMBS secondary, (3) CBO Secondary, (4) ARMs, and to a very limited degree (5) ABS<sup>5</sup>.

The Commercial Conduit (or primary CMBS securitization desk) does not use any credit hedges against its product as much of the lower-rated product is effectively pre-sold upon securitization<sup>6</sup>.

## (2). Securitization activities

The PAUGs are now being used as collateral for CDOs. As opposed to the 6-9 months it takes to accumulate cash mortgage collateral for a CDO, it is much quicker to accumulate synthetic exposure for a CDO deal backed by PAUGs. In addition, another key advantage of using the PAUGs for CDO product is the ability to get exposure to the lower-rated tranches. The typical securitization of a RMBS or CMBS will generate large AAA tranches and not a lot of A or B notes. The use of PAUG referenced to these lower rated tranches of previously issued securities creates more of this yield enhancing product that is in demand. The largest amount of activity of PAUGs both in hedging and for CDO collateral is in the BBB rating bucket.

## (3). Market making activities

If someone wants to make a call on spreads, they can do it quickly with Mortgage CDS. Before Mortgage CDS, there was no real way for hedge funds or other participants to take a view (i.e. go short) on the credit quality of mortgage borrowers or on a potential housing bubble. Scott also stated that he believes that the Mortgage CDS is a leading indicator of what is going to happen in the cash product. However, one caveat is that the CDS market is still much more thinly traded than the cash product and as such it is much more volatile<sup>7</sup>.

## (4). Future developments

There was a discussion that in January 2006, Mortgage CDS indices would be created and Markit Group Limited would be the administrator. There would be different indices for different ratings and all members would submit 20-25 names (CUSIPS) to be included in the index.

Scott believed that this would be a highly demanded product for the macro hedge funds and others who are currently are using the single-name PAUG market to express views (e.g., shorting spreads if they view there is a housing bubble or if they view homeowners')

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<sup>5</sup> For more details of breakdown on net shorts by desk, see Mortgage Hedge Graph in the CSE folder on ORA. For detail of net shorts by rating bucket see the *Mortgage CDS (PAUGs)* presentation materials from this month's meeting.

<sup>6</sup> See the *Commercial Mortgage Group 09\_21\_05* write up for more details.

<sup>7</sup> See WSJ Article on CDS on ABS dated 12/12/05 that Matt send around for more details.

credit is deteriorating). The index would provide the same ability to express a macro view without having to have the expertise to short specific single name issuances.

Once this develops, more bespoke tranches of indices will probably start to emerge. As this starts, the mortgage group within BS will probably start looking at a joint venture with the corporate correlation desk as this type of trading becomes available in the mortgage space.

## **Max Recovery**

The Max Recovery business at BS has traditionally been focused on purchasing unsecured Chapter 13 receivables from banks and other financial institutions<sup>8</sup>. The chapter 13 receivables are basically payment plans worked out in a bankruptcy court proceeding (and as such BS views the bankruptcy court as the first servicer). The banks are typically happy to sell off these receivables at a deep discount (e.g. 10 cents on the dollar), since they have generally already completely charged off these accounts and can immediately recognize a positive profit (*sounds like a potential earnings management machine*). Typically, the petitioner will either have his/her wages garnished or will send a periodic check to the court. BS is in effect buying this stream of cash flows.

BS has run this business successfully in the U.S. for a decade. As the market has developed, BS' ROE for this business has dropped from the 30% range to in the teens.

As the margins started to compress, the business started looking to expand internationally. In the past two years, the business expanded into Europe, and now the UK Insolvencies receivables represent approximately 17% or \$98 million of the \$594 million portfolio. The UK business revolves around Individual Voluntary Agreements ("IVAs") which is similar to the wage-earner Ch. 13 bankruptcies in the U.S. However, the deals purchased by BS in the UK tend to be less diversified and with larger individual balances than the Ch. 13 business. They have a local servicer in Leeds for the UK business. John also stated that they are working with a trustee in UK to build a UK based model, similar to the model used for the U.S Ch. 13 business.

Just recently, they have gone into Poland and have plans to go into other areas such as Japan and Canada. See the Max Recovery presentation for a more detailed breakdown of the portfolio. Similar to the U.S. and U.K., the Max Recovery group will utilize locally-based servicers for each of its international operations.

## **Going forward**

As a result of the new bankruptcy bill in the U.S., BS has really stepped back its new purchases of Ch. 13 receivables. While the business/risk management is confident in their projected cash flow model for existing Ch. 13 receivables post the new bankruptcy

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<sup>8</sup> The portfolio also has a small amount of U.S. Chapter 7 receivables, U.S. secured receivables, U.S. tax liens as well as a large and growing UK Insolvencies receivables.



law, they are not nearly as confident regarding new Ch. 13 receivables post the new bankruptcy bill. The reason for this discomfort is that the make-up of the Ch. 13 petitioner. They feel that they will not have natural Ch. 13 filers, that many of the filers would have filed under Ch. 7 under the old law but now will be forced into Ch. 13 and might not qualify as a receivable they would be interested in.

As a result, the focus of new growth will be internationally as stated above.

### Cash Flow projection model

BS uses a regression-based cash flow projection model to run the Max Recovery businesses in the U.S. and U.K. Regarding the U.S., BS has a decade of performance data on which to run the model to forecast or project future cash flows. The model does not include economic variables but rather regresses based on factors such as location, age of receivables, and balance adjustments.

As necessary (i.e. as new data comes in), the model will be recalibrated to adjust Market value of the positions. To date, these recalibrations almost always result in additional mark-ups in the portfolio. For example, over the past year, for each month, the actual cash flows were always greater than the projected cash flows from the model, sometimes dramatically better<sup>9</sup>. As a result, there is some conservatism in the marks of these positions.

### Capital charge overview

BS calculates a market risk capital charge for the max recovery business. However, these positions are generally purchased in bulk and held to maturity and a liquid market doesn't seem to exist for trading these positions. As a result, VaR is not an acceptable risk measure to base a capital charge on for this business; rather it uses a stress test based add-on. The stress based add-on is based on a scenario that assumes that fails (cash flows not being received on the receivables) occur at 150% of the projected curve over the modeled life of a claim. This scenario has consistently yielded about an 11% shock to the book's NPV. As a result, BS uses the 11% shock as the capital charge for the Max Recovery business.

### Credit Risk

- Not much discussion again this month-Mike Alex was out again.
- The net exposure changed very little increasing from 18.8 to \$19.5 billion. However, placements were the driver. There was also no notable change in the top 20 exposures.

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<sup>9</sup> See Max Recovery Performance graph in *Max Recovery* presentation for more details.

## **Risk Management**

- This month's report included the first VaR Model Modification Section which will be a regular part of the monthly package going forward. This section is meant to highlight changes to the VaR model as they occur. This month, there were changes to both the Mortgages VaR model concerning the order of the principal components and regarding EMC mortgages, regarding the move to running a significant portion of the securities through analytical models versus proxying based on their non-agency mortgage runs. As this list grows and reaches a critical mass, OPSRA will have further discussions on the details with Manoj and Gregg (i.e. Fast RIO team).

## **For Memo**

- The net market value of the adjustable rate mortgages ("ARMs") desk's positions increased to \$12.4 billion, its second highest level ever. It is noteworthy that Bear's ARMs securitization deal volumes have remained strong despite a continually flattening yield curve. However, the ARM loan portfolio has recently become more heavily skewed towards Option ARM products. The net market value of the Option ARM loans held by the desk grew from \$2.7 billion to \$4.6 billion, or by 70%, from the previous month. We will continue to monitor activity in the ARMs space, including this trend into what are potentially less well understood and more credit sensitive products.

## **Bear Sterns (Package Dated August 31, 2005; Discussion on September 21st)**

### Market Risk

- The CMO desk, hit a new record high net market value of \$16.656 billion. The risk manager stated there was no particular story around the growth in inventory. (If the positions remain at or near this level we will follow up again next month). The desk made a \$53 million profit on the month (a big month). The risk manager noted a couple of unusual contributors to this profit:
  - Sale of servicing (related to non-agency loans)- sold the servicing rights on these high quality loans-to a large bank at \$10 million above carrying value (ask next month what the typical case is regarding servicing- do they typically buy loans with servicing or servicing released)
  - Sale of non-economic residual (this is a tax liability out of a REMIC (i.e. CMO) structure and thus not included in the residential subs desk, which includes all below AAA rated tranches. This sale resulted in a \$7.3 profit as they had to pay \$7.3 less than the previously recorded liability to get someone to take the liability.
- The ARMS desk market value decreased \$776 million to \$10.165 billion from the previous month's level of \$10.9 Billion (the highest since Jan 05). The desk made \$20 million. The risk manager also discussed the increase last month in Net MV limit for the desk from \$6.5 billion to \$10.5 billion. The view was that Mike (Head of Arms) will run up against a limit and that they wanted to wait a while before increasing the limit. In addition, he had been above the limit for over a year.
- The residential subs desk net MV came down slightly (\$80 M), the third straight monthly decline. However, the position-level (\$1.473 billion), is still relatively high historically speaking. (A future discussion of the aged inventory positions (by rating bucket and product type (i.e. subprime, 2<sup>nd</sup> lien, jumbo/alt A)) might be worthwhile to compare to the presentation we were given a few months back).
- The Passthrough desk lost \$4 million, mostly related to the final unwinding of the coupon relative value trade discussed last month. The Passthrough VaR which spiked to \$7.9 million last month when this trade was put on came back down to under \$2 million.
- Special Situations/Desk Hedge (under mortgages)- had a \$15 million loss across various businesses. The loss was the result of various reserves taken for Katrina.
  - \$7 million- related to reserves for EMC and residential conduit-desks took reserves for loans in FEMA high risk zones- 50% write off of 1<sup>st</sup> lien loans and 100% write off of 2<sup>nd</sup> lien loans in high risk zones.
  - No provisions were taken for ABS auto loans, CMBS (however 1 loan on a property in New Orleans had to be restructured to be kept in a deal (the

property had business interruption insurance for 2 years of cash flows and wind and flood insurance), or max recovery (Ch 13 receivables).

- It wasn't clear why these reserves were put on this line vs. the actual desks they related to. The risk manager agreed that he would have rather seen them in their respective desks (e.g. EMC).
- The Commercial Conduit net market value position increased by \$1.8 billion driven mainly from a \$1.4 billion loan to Blackstone in its purchase of Wyndham's resort hotels. BS originally committed to \$2.8 billion. However Wyndham only wanted the resort properties and thus immediately sold the non-resort properties and thus only needed \$1.4 billion. This loan(s) backed by the resort hotels (i.e. a single-borrower, multi-asset discrete on-off securitization exit strategy) were booked in August. In addition, the purchaser of the non-resort hotels is coming to BS for financing and this should show up on the September monthly report. In other news, the business stated that the riskiest pieces of the Extended Stay Hotels CMBS were sold off immediately (more like "hard circles") and that they are currently in the securitization process now on that deal. They also said the only unique thing about the Extended Stay deal was the size.
  - The risk manager discussed the risk/reward rationale of the business "need to turn your inventory over enough and profit from that turnover enough to justify the risk to a credit spread event". He stated the business remains "positively skewed" on a risk/reward basis.
- Within the bankruptcy/high yield desk, the distressed and bank debt funded desks made \$21 and \$25 million respectively. The risk manager stated that this was on good activity and no particular big story.
- Credit Trading made \$16 million. The desk was positioned close to flat for the 2<sup>nd</sup> consecutive month after being short credit spreads in mass during the April-June time frame.
- Equity derivatives desk made a very large \$40 million profit. The risk manager stated that this was made across many products (exotics, structured finance, etc). He did state that around 6-7 million might have been from EITF reserve released. The interesting part of the report was that the VaR went down dramatically as the desk made an outsized profit. When asked about this, the risk manager stated that there wasn't any thing that particular hit his radar screen related to the drop in VaR. When questioned again about the strangeness of this occurrence he stated that "he doesn't see a connection between P&L and contemporaneous VaR." However, he later stated that there would be a connection if just looking at Positional P&L against VaR.
  - We asked for the Equity risk manager to email us a breakdown of the P&L and what caused the corresponding large decrease in VaR. It could be looking at an end-of-month VaR against monthly P&L.

## Credit Risk Management

- Total Net (Current) Exposure decreased by approximately \$1.6 billion. This was driven mainly by decreases in placements and bonds borrowed. TVA remains the firm's largest (non-placement) counterparty exposure.
- The risk manager briefed us on a new addition to the monthly report (for Basel II/CSE purposes). Within the Net Exposure Report, there is now a column for "CTC". BS has a small Princeton based Custodial Trust Company from which it has loans secured by a variety of non-standard collateral (i.e. not liquid readily marketable securities). These loans are related to the Global Clearing Service business. They are currently taking all these loans and putting them in the report at their notional values.
- The risk manager briefed us on their review of the impact of Katrina on credit exposures. From a counterparty credit perspective, it was a non-event. No real impact on counterparty risk; however, they clearly have exposures to P&C and re-insurers. The risk manager believes that based on the insurers' reported potential exposures related to Katrina, at most, the rating impact for these insurers would be a ½ notch credit rating decrease. He also reviewed muni exposures and most were outside FEMA zones and nothing to the City of New Orleans. They do have some trades with Tulane University.

## For Memo

- During the current monthly meeting, BS gave OPSRA personnel a presentation<sup>1</sup> on its new Energy Trading Venture with Calpine Corporation, CalBear Energy LP. The focus of the discussion covered the business rationale for the venture, the structure of the venture, and Bear Stearns' controls around the credit, liquidity, and market risks associated with this new business. Bear Stearns anticipates that trading will begin in this new entity sometime in the forth quarter of this year. OPSRA market and credit risk review teams plan to have targeted follow-up discussions with BS risk management as this new business is integrated.

## Additional Presentations:

- The Commercial Mortgage Group gave a presentation on their business. In addition, the risk manager within RMD that covers the group discussed how he monitors the business. (Please see additional write up on J: drive BS CSE Market risk for details.)

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<sup>1</sup> Please see separate CalBear write up on J: drive BS CSE Market risk for additional detail.

*JTG 09/22/05*

## **Bear Sterns (Package Dated February 28, 2005; Discussion on March 16th)**

### Market Risk

- As predicted at last month's risk meeting, the market value of the ARMs desk decreased from the all-time high of \$13.2 billion at the end of January to \$10.1 billion due to some large securitizations taking place during February.
  - The ARM's desk was very profitable (\$51 million).
- Within the ARMs desk, the significant LIBOR IO tranche purchased last month from a client in a market maker role rather than proprietary risk taking role, remained on the books.
  - The risk manager noted that recently (post February), the market conditions for this position have turned positive (i.e. lower prepayment speeds and the flattening of the yield curve has somewhat abated).
  - We will follow up again next month to see if this position has been unloaded.
- The net market value of the CMO desk increased from \$9.9 billion to \$11.1 billion due to increase in inventory after a lot of securitization activity in the previous month.
  - In addition, the desk was very profitable (\$46 million).
- With respect to credit spreads, the firm remained net long MV, but was short credit on both a CS01 and spread risk pop basis. These exposures were the result of being short credit on some high beta (with respect to credit spread) names.
  - As opposed to previous months, they expect to make money in this current spread widening environment given the GM results and impact on the credit markets as seen the morning of our meeting (March 16<sup>th</sup>).
- Within the equity derivative space, the measured risk increased from \$4.6 million to \$7.4 million as the delta increased from \$32 million to \$98.7 million (approximately where they were at the end of December).
  - We did not address this area, but we will follow up next month to see if this was from loading up on options based on the low price of volatility currently or if the directional exposure came from cash equity positions (and if any concentrated positions).
    - Positive gamma and vega increased dramatically as well (Gamma went from \$56 million to \$124 million and Vega increased from \$896k to \$3.9 million).
- Within the fixed income derivatives space, the measured risk increased from \$7.9 million to \$11.5 million.
  - We did not address this area, but we will follow up next month.
  - Bob Neff briefly mentioned an enhancement had been made to the interest rate derivatives VaR model to improve how correlation between volatility and rates is modeled, which caused a spike in VaR. We will follow up to see if

this is related to the same yield curve modeling issues that arose last year (with modeling volatility at the short end of the curve), as well as whether this is just a VaR issue or a pricing issue is well.

- The convertibles desk continues to struggle as volatilities continue to decline.
  - The desk lost \$2.8 million during February.

### Credit Risk

- Two new bank debt facilities were the primary cause of a more than \$800 million increase in the net market value of the Bank Debt desks (“corporate lending”) positions (these are obviously trading book assets, we should follow up in the summer with regard to how such positions are managed/decisions made about in terms of market v. credit).
  - A \$540 million funded facility to Metro PCS was made during the month. It represents by far, BS’s largest lending facility. They were the lead and sole banker on this facility. BS expects this facility to be paid off by the proceeds of two events. First, they expect Metro PCS to sell a spectrum to pay down some of this loan. Secondly, they expect there to be a high yield debt offering to pay off this bank debt. However, the risk manager described this deal as having some “hair” on it, as the CFO recently left the company (however, the risk manager did not state anything further, such as earnings restatement, etc.).
  - BS also made \$150 funded commitment that was being used to finance the purchase of aircraft. The risk manager stated that the haircuts involved on this collateralized loan were in the 40-50% range.
- The only material change in next exposure was due to large placements with financial institutions (went from \$2.33 billion to \$2.69 billion).

### Risk Management

- We discussed with the risk managers the Firm’s view on MBIA, the monoline insurer that recently announced an earnings restatement. BS is a significant player in the Municipal Bond market and as such as significant exposure to MBIA related to “wrapped” Municipal bonds. As of 02/28/05, BS had \$151.6 million of CE to MBIA (9<sup>th</sup> largest CE for the Firm) of which \$131.3 million was related to swaps on wrapped municipal bond deals, where the risk manager viewed the municipals as being “strong credits” even without the monoline guarantee. While they are always more skeptical on monoline insurers, the risk manager went on to say that they hadn’t changed their view on MBIA and that the restatement was just the conclusion of already known accounting issues ( and that it would probably be a positive going forward). They also reasserted that they are comfortable with their municipal business.



- Bob Upton gave a presentation on Bear Stearns's liquidity and funding strategy, including a focus on the parent company's access to liquidity.
- Mike Alix handed out an *Overview of Credit Risk Management* at the meeting.
- We are planning to have additional CSE flavored presentations at the next few monthly meetings to facilitate an efficient and effective review once we start at BS in the late summer. We will update the J: drive, once the presentations are known.

Follow up (for summary report)

- During February, BS was the lead and sole banker on a \$540 million funded bank facility for a telecommunications company. The risk manager noted that there were two near term events that should bring down this outsized exposure (a planned asset sale and a high-yield debt offering). We will continue to monitor this exposure.
- CRMPG II discussion- not BS specific but maybe include in themes.

Version 03/28/05 JTG

## **Bear Sterns (Package Dated July 29, 2005; Discussion on August 17<sup>th</sup>)**

### Market Risk

- The net market value of the ARMs desk's positions increased to nearly \$11 billion (\$10.94 billion), which is the largest month end position since January 2005. The risk manager described activity for the month as "business as usual", as the desk made a profit of \$31 million. Although the risk manager did not mention the change, OPSRA staff noted (in looking in Tab 3 of the risk package) the limit for this desk was increased from \$6.5 billion to \$10.5 billion from May to June. Next month we will discuss this limit change and its reflection of any longer run change in risk appetite (this limit has been discussed in previous OPSRA notes). In addition, during July's meeting the risk manager discussed how prepayment speeds had come in fast during June, which was something he was continuing to monitor. However, this apparently did not persist in July (Bob kind of acted surprised by the question, but he definitely had flagged this as being on his radar screen the previous month).
- The CMO desk, which hit a record high net market value last month (\$15.4 billion), was reduced to \$12.9 billion as the desk reaped a \$37 million profit (I didn't catch if there were some securitizations, I assume so). The residual subs desk also decreased its net market value position, albeit only by roughly \$100 million (I didn't get the breakdown in terms of the loan mix within this or any color on aged inventory, should ask next time).
- The Commercial Conduit net market value position increased by approximately \$1 billion, driven by a \$1.2 billion loan to Extended Stay Hotels (Merrill is also in on this deal, addressed in that note as well). During August, the business sold \$200 million of the mez piece, reducing the position somewhat. The basic idea behind this transaction sounded sort of like a dividend recap. A private equity firm (Balckstone) had purchased Extended Stay 1.5 years ago (we think?), originally putting in \$900 million in equity. Now it is basically pulling out \$1.8 billion. In addition to the loan, which is secured by the underlying properties, Bear is doing a securitization of the hotel properties into CMBS (of which we assume part of the proceeds will be used to repay the loan? We are not completely sure on the logistics here. If the company is leveraging back up, either the Bear and Merrill loans need to be going into the securitization or they must be taking out new commercial loans at the individual properties?). OPSRA staff are reviewing this business for CSE in September, and have requested specifically to walk through this deal<sup>1</sup> (although it also sounds like this particular transaction may not be typical, but we will explore).
- The Bank Debt Commitments increased moderately, from \$3.37 billion to \$3.6 billion. This was driven by the Residential Capital Corporation offshoot from

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<sup>1</sup> The risk manager also explained this deal was particularly interesting because the capital markets are placing higher value on this company as a portfolio of real estate assets than as an operating company (which basically sounds like investors are pricing in future expected real estate appreciation instead of looking purely at the cash flows that the properties can generate).

GM/GMAC (basically ring fenced GMAC Mortgages into a new entity right?). [I didn't get exactly what the commitment was. I believe ResCap issued their own senior notes, was this a back-up facility? Also, Mike said the goal was to raise money to repay GM receivables, and returned some liquidity to GMAC – not sure on all the logistics there].

- The Distressed desk took some chips off the table, as the net market value size of their position declined for the third consecutive month. The risk manager noted the P/L for this desk is largely driven by independent power projects (“old busted stuff”), and that it is still holding some Enron positions which should continue to be reduced with settlements.
- The High Yield desk's net market value decreased to just \$31 million. The risk manager explained that these “cash guys” have gotten more comfortable using a CDX index hedge. Thus their current strategy involves a couple individual long positions they like with a short index hedge.
- The CLO Accumulation decreased slightly month-over-month, although the risk manager noted that demand for credit assets/tranches from hedge funds remains quite high. Further, he explained funds that are familiar with the underlying assets are willing to accept risk while Bear is accumulating the loans and structuring the securities. However, there is a wide spectrum in terms of the firmness of commitments from these customers and that it takes some work to properly specify the derivative (forward sale) with them. In addition, there are apparently some issues over the level of recourse Bear might have with the funds (with one issue possibly being that Bear may simply have recourse to a shell entity with no assets?). We will follow up to see when these sales are reflected in the risk numbers (reported net of forward sales?) and will talk with the hedge fund risk managers during the CSE review in September regarding their concerns here.
- The Passthrough desk got short the mortgage OAS and put on a coupon relative value trade (4.5s versus 5.5s I believe) that it took a loss on (Bob said the desk lost \$2 million on the coupon trade, but I don't think he gave the desk's overall P/L). In previous months the risk manager has discussed how this desk is mostly a customer facilitation desk (there for clients' hedging needs) that doesn't take many views, and he confirmed this month that this positioning was not typical. He also said the position was brought down within 2 to 3 days of when it was initially put on (sounded like the desk head told the trader to take it off and was not very pleased that it had been put on in the first place). However, he also expressed some satisfaction with the VaR model in capturing these basis risks when the trade was put on.
- The Fixed Income Derivatives business had a \$29 million dollar profit for the month. The risk manager explained there is a continued expansion of this franchise and said the profit was spread across a number of desks.

- The Municipals desk made \$21 million, including \$6 million on a deal securitizing future claims on tobacco tax proceeds (we are meeting with Kristen Reifsnider in September to talk about munis credit risk management, so we can learn about the product mix here). Somewhat interestingly, the risk manager noted the desk had been using Phillip Morris bonds (short) as a hedge for this position, as the risk was literally to a decline in smoking.

### Credit Risk Management

- Total Net (Current) Exposure was down by approximately \$2.7 billion. This was driven by a \$1.3 billion decrease in placements. Also, repo exposure came down as some marks moved in counterparties' favor in instances where Bear had posted excess collateral. In addition, swaps exposure decreased some as rates increased (which is typically the case).
- The risk manager briefly discussed an industry issue regarding the Custodian Banks (e.g., State Street) that do business with securities firms on an agency basis for thousands of underlying counterparties. Bear is currently working on an initiative to directly identify and monitor each of those underlying counterparties (said would be a lot of mutual and pension funds). Apparently there is ambiguity over what sort of recourse Bear would have if a custodian bank were to try to pass credit losses through to Bear for a particular default. This doesn't seem like something they are highly concerned with though, perhaps worth following up with other firms?
- The risk manager also briefly discussed Bear initiatives to address some of the derivative markets confirm and assignment issues that have gotten recent attention. We will follow up in detail in September as part of the CSE review.

### For Memo

- The Commercial Mortgage business extended a \$1.2 billion loan to a hotel chain, which was used to pay a dividend to the chain's equity holders. As of the August meeting, the desk had sold \$200 million of mezzanine risk, and the remainder of loan, which is secured by the underlying hotel properties, is intended to be securitized into CBMS. OPSRA staff will follow up with regard to the status of this somewhat chunky exposure next month.

Or,

- The Commercial Mortgage business extended a \$1.2 billion loan to a hotel chain. As of the August meeting, the desk had sold \$200 million of mezzanine risk. The remainder of loan, which is secured by the underlying hotel properties, is expected to be reduced through securitization. The additional debt is being used by the hotel company to pay a dividend to the chain's equity holders. OPSRA staff will follow up with regard to the status of this somewhat chunky exposure next month.

*SMS, 8/30/05*

## **Bear Sterns (Package Dated June 30, 2005; Discussion on July 20th)**

### Market Risk

- The ARMs desk increased back up above \$10 billion (\$10.132 billion Net MV @ 06/30/05). The desk made \$16 million after deducting \$8 million for the allocation to June for the change in mark on the large IO position discussed last month. In addition, the risk manager noted that subsequent to the production of the monthly report, prepayment speeds came in faster than originally assumed in their model. Therefore, there may be future mark-downs in this prepayment sensitive area.
  - We will follow up next month on any additional write-downs due to prepayment speeds.
- The CMO desk hit another record in June, \$15.404 billion Net MV, an increase of \$1.342 billion. Close to \$11 billion of this is in the Non-Agency CMO desk which is comprised mainly of subprime, jumbo Alt-a, and second lien residential loans.
  - Within the Non-Agency CMO desk, the aged inventory, between 121-180 days, at 06/30/05 stood at \$34 million (out of a \$11 billion portfolio). The total aged inventory for the Non-Agency CMO desk is \$281 million, of which a large portion is in the 90-149 day range (\$114.14 million) and a large portion that relates to inventory from deals securitized in previous years (i.e. not from the past 12 months of production) and that is in the 270+ day range (\$113.20 million).
  - During this month's meeting, we had a CSE Market Risk presentation on the Non-Agency CMO business. The presentation and discussion was with both the Head of the Non-Agency CMO desk as well as the two most senior product-line risk managers within RMD that cover the mortgage space (see separate CSE write up on J: drive).
  - The CMO desk made \$21 million during the month.
- Regarding the residential subs desk (all tranches under AAA for both the ARMs and CMO desk), the overall Net MV decreased from \$1.939 billion to \$1.698 billion at 06/30/05. However, the aged portion of the subs went from \$475 million at the end of May to \$689 million at 06/30/05 (actually less than the \$800 predicted at the last monthly meeting).
  - Of the \$689 million in aged subs, \$408 million are related to the ARMs desk and \$281 million are related to the Non-Agency CMO desk. Within the ARMs desk roughly between \$160-\$240 million are non-rated (i.e. first loss) *(part of the \$160-240 might be excess servicing and not first loss pieces-the excess servicing being ultra sensitive to prepayment speeds vs. the first loss*

*piece I believe sensitive to defaults*) and \$132 million of the Non-Agency CMO desk are non-rated.

- The product-line risk managers seemed comfortable with the level and granularity of the aged positions given the size of the ARMs and CMO books. They also stated that the marks are generally conservative and have to be written up typically at year-end (because too conservative some times). However, the one caveat being the adjustment to marks for changes in prepayment speeds which is affecting the ARMs products (maybe the Agency CMO business as well) but not the more credit-sensitive Non-Agency CMO business.
  - The Head of the Non-Agency CMO desk and the RMD risk managers noted that in the last 12 months they have been able to sell out the vast majority of the entire capital structure for the Non-Agency CMOs. Of the non-Investment grade and residual pieces coming through the pipeline during the last year, only 3 ½ % remain unsold. For the Non-Agency CMO residuals created in the past year ending on 06/30/05, BS retains the following:
    - 2<sup>nd</sup> liens: \$38 million – of which \$30 million came in the past two months and the desk is keeping as a rating agency arbitrage play; they are currently working with the rating agency; of the \$30 million, roughly \$11 million will pay off in the next 6 months-AAA rated.
      - Alternative view might be that 2<sup>nd</sup> lien residuals are not moving off the shelves as quickly.
    - Home equity (i.e. subprime): \$34.3 million- the more credit sensitive area.
    - Jumbo/Alt-A: \$7.6 million
  - A large portion of the residual and first loss pieces that are on the aged report are from securitizations done in previous years, not the result of recent activity (See 06/30/05 Mortgage Department aged inventory report).
    - The product-line risk managers noted that it is easier and more profitable to sell off of new collateral and thus the business area will concentrate more on getting a new large deal sold out than looking back to sell out a small piece of an old deal that remains on the books. However, although older issues are not getting the focus of traders compared to the new product, the risk managers stated that the marks are generally quite conservative.

- Bank Debt Funded came down from \$1.068 billion to \$707 million MV as a few of BS larger deals have been syndicated down (e.g. Hughes). Bank debt commitments remained relatively unchanged.
- Distressed Net MV came down from \$898 million to \$751 million as the desk took some profits (\$24 million), including a liquidation in independent power trading (*confirm if any of this relates to the own independent power contracts we have discussed before*).
- CLO Collateral Accumulation, a new line on the monthly report, grew dramatically from \$1.7 billion to \$2.3 billion. The risk manager stated that this business has become a focused product of the firm and is expected to continue to grow. The main source of the collateral to be securitized into a CLO is loans purchased rather than from their leverage lending transaction business.
- Credit Trading- The business and risk management formally combined cash corporate credit trading with credit derivatives business as to facilitate working with clients (as same clients want exposure in both the cash and derivatives markets). The desk made \$15 million, net of a \$16 million mark down in credit derivatives.
  - On the risk management side, a separate product-line risk manager group is focused on the combined credit trading group. The remaining credit products, such as bank loans, High yield, Emerging Markets group, etc are covered by a different product-line risk manager group. However, there is a high degree of communication between the two groups when it comes to issuer specific risk (e.g. concentration risk to a particular name).
  - See Risk Management section for discussion of miss-marking issue in credit derivatives.
  - The credit derivatives group is still running a large short CS01 position (\$18.5 million spread risk pops), partially offset from a longer CS01 position in the cash products (\$8.1 million spread risk pops). However, according to the product-line risk manager for Credit Trading, this risk to spreads tightening is not a big focus of senior management considering the much larger exposures to spreads widening that other businesses, including the mortgage businesses generate.
- Equity Derivatives-
  - The VaR numbers on the report seemed incorrect and I verified this with the product-line risk manager for Equities (I asked Elaine to send me an email with the correct numbers).

- The total delta increased from \$42 million to \$85 million. However, the gamma increased from \$87 million to \$157 million. The risk manager noted that a large part of this gamma was in the exotics space and he discounted the potential benefit of this gamma in that he felt it would not fully materialize in an event due to the cross gamma effects. However, he stated that these cross gamma effects are picked up by the VaR calculation and thus do not understate VaR.

## Credit Risk

- Within the Credit Risk section of the report, the counterparty credit risk associated with placements has been segregated and put on its own page. This will help facilitate the ability to spot large exposures that actually create credit risk.
  - The items on the top list of exposures (i.e. > \$25 million) (without placements) were all to Investment grade counterparties and the counterparties were mainly large commercial banks and broker/dealers.
  - The only volatility in the numbers came from volatility in the F/X markets as typically collateral is not posted in that product space (due to the short nature of the trades).
- Mike alerted us to a firm initiative to move more into Asia and he expects counterparty credit exposure to increase from its now 3% share of the exposure. Also, as opposed to most of the counterparty exposure in the U.S., where the counterparty has typically been a highly rated financial institution, this business will have more corporate customers in places like Korea, Taiwan, and China).
- The credit risk manager gave us another update on Hedge funds.
  - The credit risk manager discussed the demise of many of the convertible bond funds as a result of continued poor performance and subsequent redemptions and/or prospective decisions to close up shop (e.g. Marin and EBF). Similar to comments we have heard from the other investment banks, this process of unwinding positions has occurred for some time and was an orderly process. The risk manager said he hadn't observed any "doubling down" type mentality in the convert bond space.
  - The credit risk manager stated that he hadn't seen redemptions impairing either BS or any other creditors on the street and that the poor performance and redemption in the convertible bond space hadn't caused any systemic concerns.
  - That being said, there is significantly less money in the convertible bond space now (although some of the firms we meet with are using this exodus as a buying opportunity).



- The risk manager again discussed the use of NAV triggers. He stated that if a NAV trigger has been tripped, BS will do something, including renegotiated for higher initial margin, adding 1-3% to the collateral schedules they have in place, unwinding trades, etc. (This seems to be the most proactive of the various reactions to NAV triggers across the firms we cover).
- Regarding redemptions, the risk manager noted that most of the credit fund investors were locked up past the May/June redemption window due to the timing of the turbulence in the credit markets. However, the performance in the credit funds were better during the end of May and June. He pointed to the August/September time frame as the next big opportunity for investors to redeem out of Credit funds.
- The credit risk manager also noted that he has not seen an increase in risk or leverage that would be troubling.

### Risk Management

- The risk manager discussed a recent egregious miss-marking of the Latin American book within Credit Derivatives by one trader. The risk manager also handed out a subset of the report given to the Executive Committee concerning this issue. The trader involved has since been fired.
  - The senior trader for the Latin American credit derivatives book left in the Jan/Feb 2005 time frame and a more junior trader had been trading this book since. Through the price verification process, the product-line risk manager within RMD discovered that the trader had unsupportable marks in the following type trades: (1) single name liquid EM credit derivatives, (2) bond vs. swap basis trades in EM, and (3) curve play. To illustrate the magnitude of the price discrepancies, the trader's marks on the liquid credits were much more favorable than those quoted by Markit, an outside pricing source, or those the trader himself quoted in offer sheets (per discussion with Credit group product-line risk managers, they have access to what the traders are quoting outside parties through "Bloomberg Blast").
  - The total mark down from June 28-the week before our meeting was just over \$16 million. The risk manager considered this to be the largest mark problem of this sort that he could remember (i.e. this wasn't an intellectual disagreement where intelligent people could differ on what should be the correct mark).

- The market and credit risk managers discussed again the big focus (industry-wide) on improving the processing of credit derivatives, especially concerning the confirmation and assignment process. This was discussed in more detail the week earlier at G.S.

#### For Memo

- The risk manager indicated that the recent prepayment speeds were greater than what was reflected in the pricing models at the end of June. We will follow-up on the impact of the continued increase in prepayment speeds on the pricing of the more interest rate sensitive products within the Firm's adjustable rate mortgage ("ARM") business, which at the end of June had over \$10 billion of loans and securities in inventory.
- At the end of June, the CMO business stood at an all-time high of over \$15 billion in loans and securities in inventory. \$11 billion of the \$15 billion was in the Non-Agency CMO business, which includes subprime, jumbo/alt-a, and second lien residential mortgage products. During this past meeting, OSPRA personnel met with the Head of the Non-Agency CMO business and the independent risk managers covering the CMO business. The meeting focused on the detail of the inventory positions themselves and on the products the firm utilizes in managing the credit spread risk of this portfolio. We also reviewed the aged inventory report for this business. We will continue to monitor the status of this large portfolio, especially concerning any building up of lower rated tranches.
- Recently, the firm has made a concerted effort to grow its collateralized loan obligation ("CLO") securitization business. During June, the desk grew its inventory of leveraged loans from \$1.7 billion to \$2.3 billion. We will monitor the growth and risk management of this business.

JTG 07/26/05

## Bear Sterns (Package Dated May 31, 2005; Discussion on June 15th)

### Market Risk

- For the first time in many months, the ARMS desk experienced a loss in May (didn't get aggregate number?), due to a \$28 million "write down" on the large IO position discussed in recent months. Apparently two factors drove this mark change. First, several similar trades that the desk was asked to bid on traded at prices cheaper than where the position was marked. Second, as the yield curve flattened prepayment speeds increased. \$20 million of the mark down was booked to May and \$8 million in June. When asked if he thought this represented an egregious mis-marking by the desk (I couldn't quite differentiate between how much of this was simply moving the mark as the market moved versus saying this mark was wrong ex-ante), the risk manager replied no. However, he noted the trader/desk did push back some on the mark down whereas he would have liked to have seen them be a little more proactive in recognizing the need to address the mark. The net market value of the ARMs positions is down somewhat month over month, albeit modestly from \$10.21 to \$9.85 billion. The risk manager did not seem concerned with the overall flow being affected by market changes, but we will follow up next month.
- OPRsRA staff asked for an update on any concerns regarding the building up of positions in the CMO and Residential Subs desks, specifically concerning aged inventory (as discussed in last month's memo). One issue previously pointed out was that the Residential Subs Desk net market value has been increasing over the past few months and appears to have reached a record level. The risk manager explained that all securitized pieces below AAA go into the subs desk (so the CMO excluding subs line is just AAA). He explained that this had become the normal way for the business to draw the line in thinking about the different pieces because AAAs were very homogenous and liquid and everything below AAA had the ability to take credit losses. He also mentioned that the subordinated notes are not going to trade right away (after being securitized), because they had to wait for collateral (not sure I follow, is the idea they have bought forward and have to wait for loans to be delivered?), so those are all expected to age some. The way the aging works is that the clock starts ticking after loans have been converted into securities/tranches and are considered aged after 90 days<sup>1</sup>. Of the current \$1.9 billion in Res Subs desk, the risk manager stated approximately \$475 million is aged, but that he expected that number to increase to approximately \$800 million (next month I believe?). Also, of the \$1.9 billion \$350 million is first loss exposure. (The question we should have asked was how much of the first loss was aged). The risk manager noted he did not think this \$350 million was large relative to the current pipeline, especially given the recent increase in subprime business and the still high demand amongst hedge funds for yield (said usually can sell the residuals outright, but also mentioned something about the NIMS structures). However, he did not really comment on how comfortable he felt with the projected aged number, and given that he has previously

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<sup>1</sup> Positions only move over to this line of the report once they have been securitized. Raw loans are reflected in the ARMS and CMO desks' inventory (where a similar aging process is used).

mentioned this as something that was on his radar screen we will certainly follow up with respect to the aged number next month.

In addition, we asked how BS thinks about risk managing/hedging the different tranches they are holding. In terms of ability to manage the lower pieces of the capital structure, the risk manager discussed the current developing market for CDS on ABS (which are pay as you go swaps) as well as total return swaps on specific tranches of specific issuances. The risk managers assert markets in these instruments are growing quite quickly and they feel this growth is going to continue. We didn't really get much color on the philosophy of how they think about spread sensitivities and basis risk across the capital structure, but this is something we will explore in more detail during the CSE review. Apparently, BS currently has \$1.6 billion in gross (mtm) pay as you go swaps, for a total net long position of \$100 million (\$850 by \$750). It was also mentioned that \$60 million net long is attributed to the Res Subs desk. This is actually counterintuitive, as one would expect to see net short positions if these were being used to hedge (although I suppose pipeline guys could be hedging and traders could be making markets and getting net long?).

- It appears as if the April total VaR was revised down from \$27 to \$18 million, but the risk manager did not mention the change. We will follow up next month.
- The Bank Debt Commitments increased from \$2.7 to \$3.3 billion. The risk manager did not give details on any new deals, we will follow up next month.
- The risk manager mentioned he was adding a Bank Debt line for CLOs, as this was becoming more material. (We should follow-up on this, I assume the idea is that they put loans they have made into CLOs instead of syndicating. Might be interesting to see which loans they choose syndicate versus put in CLO).
- The credit derivatives desk continued its short credit spread positioning, increasing its short spread risk pops to \$17.8 million (make \$17.8 million for a 10 b.p. widening). This represents a very large position by historical standards for this desk, however we are told the desk has come closer to home in June. The desk profited on their short in April as well as the first half of May, however gave back most of the early May P/L in the second half of May as spreads tightened (didn't give the monthly P/L)
- The Risk Arbitrage desk, which had its worse month in recent history in April, improved performance somewhat in May (also didn't get the P/L here either). The risk manager noted this desk is now organizationally split between merger arbitrage and relative value trading strategies.
- The risk manager reasserted that the convertibles desk, which is a prop desk, is basically shutting down.
- The risk manager provided an update on the Collins and Aikman situation. To quickly recap, following the bankruptcy of C&A, there was an industry push to amend credit derivative (index) contracts referring to C&A on a multilateral basis,

rather than through one on one negotiations, to cash settle positions (which was necessary given the relatively few C&A bonds available to physically settle). As a result of this industry push, a third party (Markit Partners and Creditex) was selected to administer an auction to determine the settlement prices (I still don't understand exactly how the auction works, I know it is on the bond?). Of Bear's 3,500 trades implicitly referencing C&A all but 40 trades will be cash settled at the auction determined price (\$43.625). BS also used Tri-optima, a company that provides dealer netting services, to unwind about half of the trades (I am sure the idea is that have a lot of index trades with some dealers, just netting them all out). Apparently another auction will be held high yield trust (which was always meant to happen in the event of default).

### Credit Risk

- Similar to previous months, counterparty credit exposure was up due to increasing the number of bank accounts (and also some asset backed commercial paper investments this month) mapped into the counterparty credit numbers (in the Placement category). Placements (cash deposits) increased from \$8.4 billion to \$10.9 billion. It seems this increase is a combination of actually increasing placements with large banks (excess liquidity does move around), but breaking out the true increases from new feeds seems a bit challenging and was mentioned as a Credit goal.
- FX exposure was also up from \$216 to \$649 million, due to the strengthening dollar. These are predominantly shorter term (less than 2 years) dealer exposures.
- The credit risk manager provided an update of events that occurred in May with respect to credit derivative markets and hedge funds, who have received much attention recently as active credit derivative players (who allegedly incurred large losses). In short, BS asserts its risk management practices proved effective in May, as no major credit events occurred. Bear incurred zero credit losses. While margin calls had to be made, all were met (I jotted down \$15 million, anyone else?)

As has been discussed in previous notes, some hedge funds had sold protection on synthetic CDO equity tranches and bought protection on mezzanine tranches, representing a sort of carry trade where the mezzanine tranche is intended to hedge the equity in the event of spreads widening. As spreads moved out in the wake of auto sector downgrades, spreads on equity tranches moved out considerably while mezzanine did not. When some participants had to exit their positions, the problem was exacerbated. According to Bear, while some funds had significant losses, none were of a magnitude that threatened creditor positions. The risk manager also notes these correlation trades may have actually been more popular with dealer prop desks than with funds, as fewer than 7% of their (CDS I believe) trades with hedge funds were of this nature. In any event, BS was not opposite the hedge fund carry trade that has gotten so much attention, and was "balanced" on correlation. As OPSRA staff have heard else where, the risk managers actually exhibit more concern over convertible arbitrage fund redemptions (versus credit strategy funds), as

approximately 1/3 of assets have left that strategy over the last year (according to Tremont).

During this period, Global Credit tracked how well margin requirements protected the firm, and also stress tested portfolios with CDS hedge fund clients to further assess margin adequacy going forward. Across all CDS hedge fund clients, current exposure hit a peak of approximately \$23 million. Further, this peak occurred as spreads were narrowing (on 5/26 looks like), as BS mostly sells protection (70% of trades) and receives less margin selling protection than when buying. The risk manager notes that, from a systematic risk viewpoint, it is desirable to have higher exposure in tightening versus widening scenarios. Further, the exposure exceeded \$20 million only twice and was relatively stable in the \$10 to \$15 million range most days.

The scenarios applied were 50 basis point spread widening and narrowing scenarios, assuming instantaneous shocks where no additional margin is posted. Under the first scenario there were 12 funds with positive exposure totaling \$4.8 million, and the largest single exposure was \$1.2 million. Under the second scenario there were 190 funds with positive exposures totaling \$98.3 million, and the largest exposure was \$13.1 million. When asked if they had applied correlation shocks, or spread shocks tranche by tranche, the risk manager responded they had done this for particular clients, but not across the entire book. He explained (as mentioned above) that correlation trades were actually a relatively small portion of the CDS (right, or overall with funds?) trades and that applying such stresses systematically is much harder to do because one must identify where each counterparty is long and short and shock accordingly.

The risk manager noted that prior to these market events, the business had been complaining that BS was not competitive in terms of the margin terms it was willing to offer on structured credit. Following these events, he feels the margin terms were just about appropriate (and expects maybe BS will become more competitive simply by standing still, as others on the street must reassess the adequacy of their requirements). He did mention, however, that they have reassessed their willingness to give offset. For instance, for an instrument by instrument margin approach, BS may have required (say) 15% margin from a counterparty selling equity protection, but only 10% margin per leg for one selling equity protection and buying mezzanine protection (under the assumption the two trades are highly correlated). The willingness to provide such offset is being reconsidered<sup>2</sup>. When asked if the fact that BS requires more margin when buying protection than when selling protection (and in fact sometimes does not require initial margin when selling protection) became problematic for some of these equity-mez carry trades (where the fund loses money on both legs), the risk manager (actually Bob Neff) responded there was enough cushion but had markets move further there could have been an issue.

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<sup>2</sup> Mike Alix explained that for some derivative counterparties margin requirements are computed trade-by-trade and for others portfolio margining is used. Obviously, one would have to reconsider the amount of offset given for a portfolio margining approach as well. As an aside, Mike mentioned BS does wish to do more portfolio margining. Apparently their approach uses a “liquidity factor” for which risk management can “turn the knob on” when necessary. We will explore these issues more detail during the CSE review.

Note the above discussion has been focused on the derivatives trading side, versus prime brokerage. Although it sounds like there were even fewer issues on the prime brokerage side, where margin terms are usually not locked up as with derivative contracts.

*SS, 6/22/05*

For Memo

- The adjustable rate mortgage (“ARM”) business incurred a loss for the month of May, driven by losses in a large position in a Libor interest only (IO) security, which the desk purchased to facilitate customer demand in January. The risk manager had flagged this position for OPSRA staff in recent months as something he was monitoring, given the difficulty in hedging a position with such concentrated interest rate risk. The losses were driven by the flattening US yield curve as well as a reevaluation of the position’s mark in light of new (market) price information. OPSRA staff will follow-up with respect to the status of this position at our next monthly meeting.
- During May, the credit derivatives desk had a significant short credit spread position, as it had positioned to make \$17.8 million for a 10 basis point widening in spreads. This position is quite high by historical standards for this desk, however, we are told the exposure was since been reduced (in June). We will follow up on this exposure to credit spreads tightening at our next monthly meeting.

## **Bear Sterns (Package Dated October 31, 2005; Discussion on November 16th)**

### Market Risk

- The Distressed Debt desk made roughly \$22 million. A large portion of this profit (\$12 million) came from its concentrated position in Enron Trade Claims. The profit on these claims came both on actual sales and corresponding mark up on remaining positions. The Desk has built up a large position in these Enron claims based on a trading strategy around the JP Morgan settlement. The position size has increased to \$145 million of the total \$920 million distressed desk net MV.
- Bank debt commitments-net MV came down as a large part of the \$320 million Saber facility was sold/hedged down (to \$145 million) by month end. Total Bank debt commitments were down from \$3.2 billion to \$3.0 billion.
- CLO accumulation -had been increasing for many months and finally came down to \$1.2 billion from \$1.7 billion as the result of a securitization deal in October. (P&L for the CLO business shows up on the ABS-net MV line on the Risk Summary report).
- Mortgage-backed and Asset-backed desks:
  1. ARMs- The desk decreased its Net MV slightly from \$11.7 billion to \$11.3 billion. The desk made \$26 million for the month.
    - The big risk issue for the month was around the valuation of the SAMI Libor IO positions. These were the positions that earlier in the year were marked down approximately \$20 million. The risk manager stated that they had spent a lot of time around the valuation and particularly around the prepayment model (these positions obviously are quite sensitive to prepayment speeds) and have a better comfort with the current mark. *(The SAMI Libor product was a monthly reset Libor + Spread ARM product. With rates increasing and a flattening yield curve, it was noted in our CSE exam that this product was effectively “dead”. At the same time, BS’ moving treasury average “MTA” Option ARM product shelf has become much larger. During our review, the MTA Option Arm product became approximately 25% of the new ARM pipeline. The rest would be made up of hybrid-ARMs.)*
  2. Non-Agency CMO desk- Net MV increased from \$15.5 to \$16.2 billion (close to the all-time record). The desk made \$20 million for the month. The biggest risk issue was the widening of the BBB spreads. The risk manager stated that the MBS subprime desk lost \$3.5 million on the BBB spreads widening. The risk manager noted that the spreads came back in 75%. The actual widening of the numbers quoted by this firm appeared to be somewhat muted versus our discussion at MS (and the WSJ article). *(All positions under*



AAA actually fall in the Residential subs line of the Risk Summary by Trading Desk).

3. Residential Subs desk-The risk manager noted that this desk was on their radar screen. The desk originally was set up as a way to keep track of all the sub positions left over from ARM and Non-Agency CMO securitizations. The positions had one thing in common in that the customer would be a client looking for yield.

The desk has now transformed itself into more of an accumulation (“warehousing”) activity where it accumulates long MBS exposure synthetically (through going long pay-as-you-go swaps???) and then doing a securitization.

It sounds like there are thoughts to separate the two operations (selling off of residual pieces of cash deals vs. accumulating exposure synthetically for ultimate securitization). *We will follow up on this area.*

4. Update on pay-as-you-go swaps- the business area continues to evolve from using these products as hedges for securitization activities to making markets in these products (i.e. going long and short the exposure) to facilitate customer demand. Currently they have over \$6 billion (gross) in pay-as-you-go swaps in the MBS/ABS areas. CMBS continues to be a focus for the market making activities, particularly in the BBB space (yield buyers looking for exposure synthetically).
- Max Recovery- funded position remained basically the same at \$582 million and the desk made \$10 million. However, the desk is down beat about the new bankruptcy law and is currently looking at other “charge-off” type businesses to potentially pursue. (*We will keep an eye on any change in mandate for this desk*).
  - REITs- There was no significant change in positions or P&L event to discuss. However, a potential large mark issue regarding Preferred Stock BS holds on two REITS majority owned by Freddie Mac. Freddie recently announced a tender offer at a price that the risk manager quoted as “egregious”. If preferred shareholders actually redeemed at this price, it would result in a significant (approximately \$51 million) mark down for BS on its preferred share position.
  - Credit Trading- The desk made a very large profit of \$35 million. \$20 million of the profit was the result of trading in the Autos. Much of this was particularly related to going long GMAC in large size ahead of the spread tightening on the announcement of GMAC being sold off.
    1. The desk appeared to go short credit in large size (with the desk going short (10,985) spread risk pops and increase of the short by \$8000. However, the risk manager noted that they were short the lower beta names, so he feels that they are not as short the market as the headline POP # would suggest.

- Emerging Markets- The long credit spread (as measured by Spread Risk POPs) decreased significantly from \$1,568 to \$324 POPs.

The major risk management issue has been an operational/credit issue around some very old Venezuelan oil warrant positions. The oil warrants were originally part of Brady bonds Venezuela issued in the early 1990s. Around 1996, there became a market to trade the oil warrants (payoff tied to oil prices increasing dramatically) separately from the bonds. This is when BS began having positions (both short and long). The oil warrants at the time were significantly out of the money and as a consequence the Street, in general, did not do a great job in keeping track of their records on these positions. As oil prices have increased dramatically, there have been many fails to receive and deliver. Currently BS is going back through its records to clean up these trades.

- Risk Arbitrage-The Risk Arbitrage desk had a very bad month losing \$13 million. The loss was due to multiple risk arbitrage positions, but the largest was the Guidant/J&J merger (due to Guidant's major product recall issue) on which BS lost \$3 million during September and \$9 million LTD on the transaction. As a result, the desk decreased its position in Guidant from \$60 million to \$13 million.
  1. The fact that this was BS's 2<sup>nd</sup> largest risk arbitrage position was noted in Business week and will not be good pub for its big customer based- research and commission risk arbitrage business.
- Equity Derivatives-The Desk VaR (1 week-95% level) increased \$3.3 million to \$8.3 million. The desk made a very large profit of \$48 million. \$16 million of this profit came from a single large Stamp (i.e. collar type) trade where much of the origination P&L was at first reserved but subsequently released as the desk was able to hedge out 75-80% of the risk.
- FI Derivatives-The desk VaR increased from \$2.7 million to \$7.9 million. (*I believe this was related to increase PRDC activity-follow up on this*).
  1. The desk made \$24 million before the controllers/risk managers took a reserve of \$13 million on PRDC trades out of Tokyo as they were unable to get hedges from counterparties as the BS desk has gotten much bigger in this space (i.e. a competitor now to the firm's that have previously sold them protection). However, the risk manager stated that they have conducted stress tests by shocking volatility, correlation, \$/yen f/x rates and are comfortable with the positions. (*Follow up on these exposures*).
- Merchant/Illiquid-The risk manager stated that two of its largest positions- (NY &Co. and Market Access) in the merchant/illiquid desks were down over \$30 million (I assume month over month??). Both of these stocks were huge private equity (and subsequent IPO) successes last year for BS and include some trading restrictions around them. (Reminder- these positions are not in the trading book and currently receive a 100% risk weight and subsequent 8% capital charge).

## VaR Specifics

This was the first month of being able to fully compare VaR by desk to the previous month's exposure. The risk manager noted that this approach will probably lead to more discussions of issues concerning VaR methodology (*We agree and that was the primary point in starting this type of dialogue at the monthly meetings.*)

We asked for and received clarification about the VaR measures reported in the monthly package. The VaR on the Risk Summary by Trading Desk (Tab 1) as of July 05-forward the numbers represent-1 week 95% VaR numbers and thus correspond to the figures on the Firm-wide VaR summary (new Tab 5). However, the VaR numbers on the Global Summary (Tab 4) are still 1 day 95% VaRs. These have been the numbers used on the monthly tables included in our DPG monthly memo. The categories include Equity Derivatives, Fixed Income Derivatives, Credit Trading, and F/X. **I propose we start disclosing the 1 week 95% VaR numbers from the Firm-wide VaR summary for the following categories (this would be much more comprehensive and would include BS' large securitization businesses): (1) Firm-wide Total, (2) Credit sub-total, (3) Interest rate sub-total, (4) Equity sub-total, and (5) Foreign Exchange sub-total. What are your thoughts???**

- Firmwide VaR (1 week 95%) was up slightly from \$59 million to \$60 million. However, this included a large jump in VaR related to the Merchant/Illiquid desk<sup>1</sup> which increased from \$30.7 million to \$38.3 million VaR.
  1. At some point, there was a data feed problem on some of the positions in the Merchant/Illiquid book and as a result, it was not showing any price volatility for these positions. Gregg (FAST RIO) addressed this error this month and has instituted more "check and balance" reports for the desk to address this type of issue going forward. Additionally, Gregg changed the mapping of these positions from mapping to price changes on a Hedge Fund Index to the S&P which created more volatility and thus caused much of the spike in VaR for this desk during October.
- Leverage Finance-The VaR came down significantly from \$13.7 million to \$9.8 million. The decrease was the result of a change in methodology related to the credit spread time series used. The change resulted in reducing the volatility of spread changes for Bank debt vs. (corporate bond???) given its senior subordinate nature. Helen Wong (Credit Group-RMD) and Manoj (FAST RIO team) worked on this issue and the end result was lowering the factor the used to dampen the volatility of the proxied index (I assume non-investment grade corporate bonds???) for the non-investment grade bank debt (i.e. leverage lending). They reduce the volatility for the non-investment grade bank debt from .85 X the proxy index to .60 X the proxy index.
  1. We alerted Bob that we would be wanted a deeper dive into the specifics of the VaR methodology related to leverage lending (as well as follow up items related to fund derivatives).

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<sup>1</sup> This desk is considered a banking book asset and thus capital is not based on VaR.

- Equity Derivatives-The VaR increased from \$5.0 million to \$8.3 million. The largest part of this increase resulted from the large Stamp trade discussed earlier. However, the hedge that the desk put on (and subsequently allowed them to recognize P&L on the trade) did not seem to lower VaR as they expected. They are currently looking into this. *We will follow up on this next month.*
- Credit Trading- The Credit Trading VaR increased \$2 million to \$19.5 million. This increase was mainly for Interest Rate VaR rising from \$1 million to \$4 million. The risk managers are still looking into this as it was unexpected. In addition, as was discussed last month, the correlation VaR had spiked up erroneously (due to data problems in the time series). Post October, the risk managers corrected the bad data in the time series and as a result the VaR for Credit Derivatives currently stand at approximately \$13 million.
- Agency CMO – the VaR reduced from \$13.6 million to \$8.2 million as the desk reduced its IO positions significantly- which reduced both the specific risk and Vega VaR contributions.
- Risk Arbitrage- the desk reduced VaR from \$8.7 million to \$7.8 million as the desk reduced its large Guidant position as discussed earlier.
- Firm Investments (Ace's book)-Ace lost \$3.1 million during the month, half coming from a large positions in a couple of energy stocks. As a result, he reduced his portfolio from \$34 million Long MV to \$18 million. Corresponding, the VaR decreased from \$1.3 million to \$694k.

### Scenario Analysis

The one noteworthy change in the scenario analysis results was with respect to the SEP desk (i.e. Equity Derivatives). The desk, primarily related to the exotics business, purchased some hedges to reduce its exposure to the 1987 Stock Market scenario results. As a result, the scenario result for Equity Derivatives decreased from \$214 million loss to \$160 million loss.

### Credit Risk

- Not much discussion this month-Mike Alex was in Basel. Judy Monica gave the overview.
- The net exposure changed very little increasing from \$18.6 to \$18.8 billion. However, similar to the past, the placement category was roughly 50% of this total (\$9.2 billion to mostly very highly rating banks).
- The breakout of exposure by industry and geography remain similar:

- 48% of the exposure was to Banks followed by 22% to mutual/pension/advisors/as agents and 10% to other financial institutions.
- 75% of the exposure is in North America.

### Risk Management

- We discussed adding a new tab in the monthly package that would include in a bullet point form changes in risk measurement methodology (e.g., VaR). This would provide a good reference point and would promote discussion of the issues and determination of whether additional documentation (and potentially follow-up discussions) was warranted.

### For Memo

- OPSRA discussed the recent downgrades to Calpine prompted by accounting errors and the freezing of asset sale proceeds (intended to repurchase outstanding bonds) due to litigation with bondholders. The risk managers re-iterated that the joint venture with Calpine was structured envisioning that there was a real possibility that Calpine might enter bankruptcy proceedings at some point. The risk managers noted that their exposure to a Calpine bankruptcy was limited to “sunk costs” associated with getting the joint venture up and running (i.e. no market or credit risk solely as a result of a Calpine bankruptcy). As of the meeting, BS personnel were still working on operational and logistics issues and trading activities in its new energy trading operation, CalBear, had not commenced. We will continue to monitor this situation.
- The risk manager noted that the business proposition for the residential subs desk, which typically has held all the below AAA tranches left over from both Bear Stearns’ ARM and Non-Agency CMO securitizations, has evolved from simply distributing out the remaining pieces of Bear residential MBS tranches to becoming a securitization desk into a securitization activity where it accumulates MBS exposure synthetically (i.e., through derivatives referencing specific MBS CUSIPS) for securitization. We will continue to monitor and discuss this new activity with risk management.
- (If we decide to switch the VaRs we are displaying on the monthly graphs should we put this in the memo?)

Jim 11/18/05

## **Bear Sterns (Package Dated September 30, 2005; Discussion on October 19)**

### Market Risk

- The Distressed Debt net market value position increased by \$109 million, related to some new independent power, Enron, and other distressed positions.
- The CLO desk's net market value position size decreased by \$293 million to \$1.74 billion. In addition to the desk having done some deals, the risk manager noted that in the past month Bear has made some changes to reflect short positions resulting from customer commitments to purchase equity tranches of upcoming deals. He explained that the business has increasingly gotten the equity buyers involved early in the loan accumulation process. In order to allow the desk to offset these shorts, Risk Management (I think?) has required the business to get something booked in the front office trading system as a short trade. Although, it was not clear how these transactions were documented and whether they were flowing through to GRMS for counterparty credit purposes (in other words, are they showing up as a customer trade or simply a short loan/bond position). The risk manager (market) did note that the customers got to share in the carry during the loan accumulation stage, which makes the trades look more like swaps and gives Bear some confidence that the customers are actually on the hook (since they are receiving payments), but we will follow up with GCD (Mike had left at this point) regarding the counterparty issues arising from this activity. Along these lines, we will investigate exactly what the customers are committing to purchase, as it seems it would be difficult to lock in a forward purchase on a junior tranche of some yet to be determined pool of loans (where the contractual spreads for senior tranches have yet to be determined).

(see 10/26 email for Mike Alix clarification)

- The ARMs desk's net market value position increased to \$11.7 billion, remaining above its (recently raised) limit of \$10.5 billion. The risk manager did not note anything out of the ordinary with respect to activity in this space. P/L was \$32 million.
- The CMO desk's net market value position size decreased by \$1.1 billion, to \$15.5 billion. The desk made \$24 million.
- The Residential Subs desk has a net market value position of \$1.76 billion, which is over its limit of \$1.05 billion. The risk manager explained this desk is building up for a structured deal buy getting long through derivatives (**Jim, do we understand exactly what sort of deal this is?**).
- The Asset Backed desk, which made \$28 million for the month, exhibited a net market value position size increase from \$394 million to \$1.2 billion. The risk manager was not sure what to attribute this change to, as he explained their P/L is

driven by synthetic origination and that sometimes the P/L is reaped here while the inventory is held elsewhere (**Jim, do you follow?**).

- The Commercial Conduit's net market value position decreased by nearly \$2 billion to \$4.9 billion, as the desk did a couple of deals, one of which involved (either selling off or securitizing part of?) the Extended Stay loan discussed in July. The desk had a \$31 million profit.
- Although the Equity Derivatives desk had a profit of [REDACTED] for the month, the risk manager noted a mistake made by a trader in rolling a futures hedge, which resulted in a naked exposure and thus a \$1 million loss following a market move. He explained that since this was the second time this has happened, the situation will be addressed.
- The Municipals Derivatives desk's VaR increased from \$1.9 million to \$4 million, which the risk manager attributed partly to new credit risk factors being introduced into the VaR methodology.
- For Fixed Income Derivatives, the risk manager noted a growth in exotic interest rate derivative activity, particularly in power reverse dual currency notes.
- The FX VaR increased from \$0.954 million to \$2.87 million, attributed to a \$/Yen barrier trade.
- In the monthly risk package, the market risk manager has included an additional tab which has detailed VaR and Scenario results (by business and sub-desks). **Jim, how much do you want me to go into this, and would you like me to include the info from your email?**

### Credit Risk

- On a fully netted basis, Bear's current exposure to Refco was negative. However, Bear has transactions booked in three different Bear entities (all with the same Refco entity, which is Refco Capital Markets). There are FX positions that have negative \$641 thousand in value from Bear's perspective, but stock lending and repo claims of \$345 thousand and \$130 thousand respectively. Bear's contracts do allow for cross entity netting, which Bear will try to enforce. Thus this will serve as a test of Bear's legal rights (Bear does not award such netting for capital purposes), although given the relatively immaterial numbers at stake, the bankruptcy court may simply overlook Bear's netting in this instance (in which case this wouldn't serve as much of a precedent). The credit risk manager explained that he has always thought of Refco as a "dicey" operator, but admitted he had more recently thought it was "turning the corner".

In addition to the above trades, Bear is an executing broker for some of Refco's clearance clients. For these transactions Refco serves as guarantor of its customers' trades, but Bear actually has recourse to the underlying clients in addition to Refco.

The risk manager explained these trades have been settling successfully (although there are some issues over who Bear points to in GRMS as the counterparty, they were pointing to just Refco but are now settling with the underlying customers). Finally, Bear also had some of its own clearance customers (FICC) who had accounts at Refco, and GCD did some analysis regarding the possibility of their customers' equity being trapped in the Refco accounts, however this did not turn up any material concerns.

- The largest changes to the aggregate net exposures came from bonds borrowed/securities pledges and financing transactions. The former increased from \$241 million to \$858 million and the latter from \$812 million to \$1.5 billion. These increases were explained as (by Judy, Mike had left) "normal fluctuations" and mention was made that the changes tend to differ for quarter end and non-quarter end months (although I am not sure which this was, I can ask). In addition, the total notional size of the CTC loans increased to \$1.2 billion (from \$487 million), but this was attributed to loans against liquid securities to mutual funds. (Kind of said just picked this stuff up, sounded like would be moved elsewhere, I will confirm what they plan on doing going forward so we know how to interpret future changes in this column. We might even want to request for them to keep putting in the page that breaks these CTC loans by underlying category?).

#### For Memo

- OPSRA staff discussed with risk management and business personnel Bear's Structured Funds business. This desk transacts in derivatives where the underliers are baskets of hedge fund shares and hedge fund indices. Through these structured transactions, Bear provides downside protection as well as leveraged exposure to fund investors, often through a FoF manager. The risk management of this activity poses special challenges, given the illiquid nature of hedge fund shares and thus hedging challenges. In short, this business, which currently has over \$4 billion in notional transactions, exposes Bear to simultaneous, large movements in multiple hedge fund shares. Given the complexity and materiality of the risks generated, OPSRA staff will continue to monitor and discuss with risk management activity in this space.



## **Bear Stearns (Package Dated April 28, 2006; Discussion on May 17, 2006)**

### **Market Risk**

#### **Bankruptcy/ High Yield Area:**

The Distressed Debt Desk had a very large profit of \$40 million. The desk remains concentrated in three areas: independent power plants, Enron, and asbestos companies. We asked the risk manager if he had relative value plays on in these sectors or if they were outright long the sector—he replied that they were outright long with some minimal short positions. Most of the profit during the month came from the independent power plant companies; however, the entire book was doing well. The Enron positions decreased from \$150 to \$100 million. The overall distressed positions ended the month at \$965 million, marginally above last month's amount.

Bank Debt Funded- net market value increased from \$1.1 billion to \$1.7 billion and the Bank Debt Commitments net market value increased from \$3.5 to \$3.7 billion.

#### **Bank debt update:**

We discussed the activity and pipeline of deals with Mark (Credit Group within RMD). He noted that April was a very active month and as shown above both commitments and closed deals were up. There were two noteworthy deals that closed during April: (1) A facility to Burlington Coat Factory (\$ *amount of commitment??*) for a LBO by Bain Capital in which BS recognized a \$10 million profit and (2) \$300 million participation in the Boston Scientific facility for the purchase of Guidant. There were also a couple of \$100 million dollar commitments to Xerox and Catmark (spelling??).

We asked for some market color, particularly with respect to flex terms. This hasn't been an area that we have discussed very often with Bear Stearns and it makes sense to get this kind of market color from BS as well as the bigger players in the event-driven lending market. Mark stated that BS has seen market flex terms (for 1<sup>st</sup> lien notes) in the 25-75 basis point range (this is slightly lower than the standard terms (i.e. not what the KKR's of the world would give them) what we had heard from Alex Golten at GS a few months ago). He also said that BS will apply fees against a deal as well and that they have never lost money (i.e. - never had the price on a deal result in losses in excess of the fees BS received on the deal). Finally, regarding rating triggers, Mark said that in the current competitive market rating triggers are virtually never seen. He stated that they have been seen for the last 1 ½ years.

Mark also gave some general market color on bank loans. He gave two reasons for the market's highly bullish view of the bank debt area: (1) 70 % of the term loans are going to CLOs which are in constant demand for product and (2) Moody's is coming out with a study on LGD for bank debt which is positive on the recoveries of bank debt (senior secured) suggesting that they should be upgraded a notch. (With that said, one would think that this would already be reflected in spreads and the issuance of the report

probably won't be much of a market mover). Conversely, Mark said the report suggested that subordinate debt should be a notch below current ratings.

CLO Desk (Collateral Accumulation) – the CLO desk is running at an all-time high of just over \$3 billion. Kan noted that the largest (BS or in the market generally??) CLO deal in London was set to clear in May (800 million Euros). He also noted that the desk was looking to purchase some short-term default protection. (Let's follow up on this at next month's meeting).

### **Mortgages and ABS**

The ARMs Desk – had a very large profit of \$61 million. However, this is down from the enormous \$104 million profit in March. The turnover in ARMs dropped substantially from March (turnover was \$4 billion in April vs. \$7.5 billion in March) with only one deal taking place during the month. Much of the profit in April came from the sale of residuals from earlier securitizations. Despite the sale of some residuals from earlier securitizations, aged inventory in ARMs (and non-agency CMOs) were up during the month. (*Follow up on this at next month's meeting. Kan said this is on his watchlist*). The net market value of ARMs increased to \$13.3 billion close to the high set in Dec 05 at \$13.9 billion.

The CMO Desk – made a big profit of \$55 million. No story here except for the increase in aged inventory. However, net MV (excluding residuals) decreased a healthy \$1.4 billion to \$11.6 billion.

The Asset Backed (xsub/CBO) Desk – made a very large profit of \$34 million. The risk manager attributed this do good deal flow.

### **European securitization stories (London ABS/MBS/CDO- whitebook):**

#### **Subprime Residential:**

Kan discussed some losses suffered by Bear Stearns' UK subprime residential mortgage business (\$4 million in April and so far another \$4 million in May). He stated that Bear Stearns' UK subprime mortgage originator subsidiary, Rooftop Mortgages Limited, had suffered losses on remaining BB notes and residual tranches from its first two securitizations of Rooftop collateral originated in April 2005. The mark-to-market losses resulted from the trust having a shortfall in cash due to extremely poor performance of the collateral. Bear Stearns' has moved to replace the current UK servicer of these loans. However, they recognized that the issue also involved issues with underwriting standards. Rooftop currently has collateral accumulated (and growing) for the next deal. Given the performance of the earlier securitizations, the ability to bring the next deal to market will be severely challenged. We will follow up on any additional plans regarding changes to the underwriting standards at Rooftop as well as any further P&L resulting from remaining securities and accumulated loans.

## Commercial:

Kan highlighted a \$12 million mark down on a loan backed by the cash flows of a parlor. The loan was technically in default (due to the breach of some covenants) and as a result Bear Stearns replaced the operator. The ousted operator used his influence with existing employees to cause havoc and problems with BS receiving the cash flows. As a result, they haven't been able to sell the loan and have marked it down to 25%. We should follow up on this deal and any lessons learned.

Commercial Conduit – the desk made \$11 billion, have of which came from a \$1.7 billion securitization that took place in April. The desks net MV was down slightly to \$3.6 billion.

## **Fixed Income Investments**

Max Recovery – made a profit of \$13 million.

## **Credit Trading**

The Credit Trading Desk had negligible P&L as it went short credit spreads and took a hit.

## **Emerging Markets**

The Emerging Markets Desk had negligible P&L. The risk manager noted that the JP Morgan EM Index hit a low during the month (Low for what time period??) but that BS was short in Brazil and Mexico which made them some P&L and thus they were not too affected by the market moves.

**Risk Arbitrage** – the desk increased its long MV position to \$1 billion as the trader was “given more rope” due to his out-performance year-to-date. The main trader basically had already exceeded last year's profit. With that said, the risk manager alerted us to some down days in May due to the market down turn (“the desk had taken a whack the last Friday/Monday in May –prior to our meeting on Wednesday”). The risk manager also noted that this trader does not hedge against general market risk declines. We should follow up at next month's meetings given the further move down in equity markets (at least in the U.S.).

## **Derivatives:**

The Equity Derivatives Desk - made a very large \$54 million profit.

The main discussion about this desk was with respect to a restatement of the large market drop (20% drop in equity markets in one day) - a stress test that is done for SEP. In

March, a large short-dated variance swap was put on. The swap had caps on the payouts and these caps were accounted for in the large market drop stress test. The issue was discovered and corrected in April. As a result, the SEP desk showed an \$80 million loss from the stress test at the end of April vs. a \$3 million benefit in March. We also

These variance swaps were purchased from hedge funds, which is on Credit's radar screen.

The Fixed Income Derivatives Desk – made \$17 million. The risk manager noted that the desk had made its first sizable swap with a Chinese bank booking a \$5 million profit on the single trade.

The F/X Desk – made a \$17 million profit based on large market moves and having a long gamma profile.

Block Trading / OTC – The Endo Pharmaceuticals position was down to \$50 million as of the end of April (from an original \$300 million position) and as a result OTC-Long MV was down from \$195 last month to \$40 million. As a result, VaR for the OTC desk decreased from \$19.7 million (perhaps an all-time year for the desk since we have been covering the meeting) to \$5.4 million one-week 95% VaR.

The block stock trading desk took a \$68 million short position in (GS systems?). The position caused a large VaR for the desk, up from \$474k to \$10.805 million weekly 95% VaR. *(We should follow up on the particulars relating to taking an outright short position on a block stock trading desk?)*

### VaR Specifics:

- Rupert prepared an analysis of the February VaR restatement discussed last month resulting from the misspecification of a fed fund option position during February. In the analysis, Rupert shows how including cross-gammas to generate a more complete Taylor series approximation reduces substantially the error in the predicted change in the fed funds option. Due to the extreme convexity of the position (as it was very short-dated and near the money), even with adding in the cross partials, the change in price can only be approximated by a quadratic equation. *(For more details see the presentation Rupert handed out).*
  - The following lists the steps taken, currently being implementing, and potential future enhancements to make sure this problem couldn't arise in other interest rate products where this principal factor approach is used to calculate VaR.
    - Cross-gammas have been implemented for listed positions in the Interest Rate world.
    - Implementation is underway for OTCs and should be done in the next few weeks. Rupert highlighted that this same issue could affect certain swaptions.

- In the long-term, they will work towards full historical revaluation where feasible (e.g., not for mortgages).
- Due to time constraints, we did not discuss the VaR changes in detail. However, we discussed with Rupert the reason for the large decrease in diversification benefit within the interest rate books (the question we submitted to him a couple of weeks prior to the monthly meeting). He said he didn't have a concrete answer but believed it was due to many desks taking the same view on rates.
  - We anticipate having a much more detailed discussion on the VaR tab at next month's meeting including an overview of the quarterly VaR backtesting report.

### **Scenario Analysis:**

- There was no discussion of the scenario changes during the meeting.

### **Credit Risk**

- Credit risk did not change significantly month-over-month. CE increased from \$21.6 billion to \$23.2 billion (\$11.6 billion in placements).
  - The only noteworthy change was a substantial increase in placements held at JPMorgan, \$3.8 billion up from \$1.3 billion the month before. The increase was due to a decision by Treasury to keep segregated customer money at a one centralized bank, JPMorgan, versus holding it at many institutions (8-9 banks). This move was done for cost savings and went to the Executive Committee for approval.

### **Additional Presentations – Prime Brokerage**

OPSRA staff requested an update on events in the prime brokerage space, both in terms of GCS and FICC. Our goal was simply to hear about how the businesses have been evolving and what market trends have been, as well as to hear about any changes or enhancements in terms of risk management.

On the GCS side, our discussion focused on two themes: 1) enhancements being made to the account level risk reports/tools as GCS is rolling out RACS II and 2) broader trends.

To recap quickly the daily GCS risk process, the RACS system(s) automatically flags each night accounts with risk threshold violations. These violations occur when the hypothetical P/L resulting from one of the RACS stress tests/scenarios is greater than a predetermined percentage of the liquidating equity in the account. These flags are specified for different levels of portfolio granularity. For instance, ratios are established for portfolio type losses, as well as for industry and single name (concentration) type losses. The magnitudes of the ratios are also established as a function of the liquidity in the underlying positions. Once accounts are flagged, GCS Risk Control personnel drill down into those accounts. These account level views are where the RACS II

enhancements are being made (although one new scenario has also been added for flagging accounts). That is, once accounts are flagged, the new RACS II reports get GCS personnel “closer to the data”, providing more granular risk views. For instance, risk managers can now view P/L as well as exposures (market values and greeks) and liquidity data by asset types (equity, fixed income (rates and spreads), convertibles, AD(?)). For now, GCS Risk Control is using the old reports in parallel with these new RACS II reports.

In addition, GCS has been working towards obtaining a completely comprehensive view of all positions their clients hold at Bear. Currently most equity derivatives positions can be seen (and applied to the RACS analyses), and since the CSE review CDS feeds have been added. Again, GCS typically does not take credit for the equity of these positions booked with derivatives desk, but will rely on this information to get a fuller view of the portfolio in making leverage/margin decisions.

In terms of broader trends, GCS Risk Control has continued to field requests for Margin Lock-up Agreements, as 34 of the approximately 900 fund families now have these in place. However, the risk manager says he now has a good feel for exactly what sorts of covenants are required before GCS feels comfortable signing one of these. Also, the current pipeline of lock-up requests is small. In addition, the risk manager explains that funds (including new funds) are not asking for additional leverage, and asserts that the number of accounts flagging for risk thresholds violations is probably at an all time low.

However, where GCS Risk Control is focusing a lot of time is handling client request for more comprehensive prime brokerage services and portfolio views. As clients are getting “bigger and more institutionalized”, they are requesting more cross product margining on “all kinds of derivatives”. This cross product margining can occur in more or less formal ways. The informal way is for the GCS risk folks to recognize that they can see an offsetting position on the derivatives desk and adjust the prime brokerage margin requirement to reflect that. The more formal way obviously is to come up with a single margin requirement for the client (which it sounds like they have done in some instances, such as for bond-CDS basis trading). Along these lines, the risk manager conveyed a feeling that Bear needs to get into the derivatives prime brokerage business, to meet client needs. Also, more recently GCS Risk has found it challenging internally to address client demands regarding their risk views. Whereas during the CSE OPSRA staff got the impression that GCS Risk personnel did not want to be in the business of providing a lot of risk reporting and analytics to their clients, it sounds as if things are moving more in this direction. It sounds as if Jeff feels this demand is more motivated by margin and the funds wanting to understand how the dealers are looking at their accounts, versus actually wanting these reports for their own management and decisions making.

In terms of the aggregate size of the GCS prime brokerage business, our recent data request indicates that the business is quite similar in size as during the CSE (in terms of # of accounts, gross market value, total debits, and total equity). Separately, we inquired as to whether GCS was seeing more or less overlap with the activities carried out by FICC. Jeff’s answer was that there was not much overlap, except maybe in terms of financing corporate bonds. There are occasions where clients want to house CDOs, mortgages, and ABS in their GCS accounts, but these are still priced at zero and the clients must take those over to the repo desk for financing.

On the FICC side, overall growth seems quite paced. The number of clients is up from 189 to 204, with equity held in-house remaining relatively flat at around \$15 billion. One trend FICC has witnessed is an increase in the number of REIT (versus hedge funds) clients, which now sits at 12 (there are also 6 broker-dealer clients).

There have been no changes to the “Client Risk Trend” report and related portfolio analytics, which are discussed in the CSE Review. The overall margining philosophy conveyed by Mike Alix and Chris Mushell is that FICC accounts are margined based on a GCS-like asset backed model. However, there do appear to be instances where FICC will take potential exposure. In addition, the risk manager explains that margin requirements have been tested recently, as Bear feels their competitors require less margin in this space (yet on a full portfolio basis, Credit personnel feel the risk to equity ratios have remained strong). Also along these lines, the business is facing challenges with respect to cross product and cross entity margin requests. For instance, REITS hedging bonds/MBS with interest rate swaps often want to do their hedges out of a subsidiary, creating a margin situation that crosses two counterparty entities as well as two Bear entities.

Another recent trend involves clients using multiple fixed income prime brokers, although Bear is still the sole fixed income prime broker for most of its clients. Apparently this is particularly prevalent where clients want to use a separate prime broker just for their TBA trading strategy. When Bear serves as such a second prime broker for one strategy, it typically has much less excess equity in the account (since it is not the bank so to speak), and there are nuances to gaining comfort with the counterparty risk and margin levels.

## **Other**

- Regarding Bear Energy. Bear is trying to complete a new servicing arrangement with Calpine and continues to work with them to hire key personnel. Currently, the only material contract under the old servicing agreement with Calpine is with Ellis Power. This agreement involves buying gas and selling power on a one-day ahead basis. There is no market risk and very little counterparty risk.

Bear will continue to use Calpine until it builds its own capacity. We will continue to monitor this area.

- Stamp Trade- Kan gave out a write up he did on the recent Stamp trade discussed last month. (If anyone is interested, I'll make you a copy).

## **For Memo**

- During the prior month, OPSRA heard of difficulties that some subprime mortgage originators were having in the U.S. This month, the risk manager stated that Bear Stearns' UK subprime mortgage originator subsidiary, Rooftop Mortgages Limited, had suffered losses on remaining BB notes and residual

tranches from two securitizations of Rooftop collateral originated in April 2005. The mark-to-market losses resulted from the trust having a shortfall in cash due to extremely poor performance. Bear Stearns' has moved to replace the current UK servicer of these loans. Rooftop currently has collateral accumulated (and growing) for the next deal. Given the performance of the earlier securitizations, the ability to bring the next deal to market will be severely challenged. We will follow up on any additional plans regarding changes to the underwriting standards at Rooftop as well as any further P&L resulting from remaining securities and accumulated loans.

- During the May risk meeting, the risk manager discussed the risk profile and the year-to-date performance of the risk arbitrage desk. He discussed the fact that the main trader had already exceeded last year's profit and thus was allowed to grow his positions. As of the end of April, the desk was long \$1 billion which was the highest level seen since last fall. The risk manager noted that the desk took some big hits during the market volatility in May. We will follow up on the performance and risk management of this desk at the upcoming meeting.

*JTG, 5/23/06*



## **Bear Stearns (Package Dated August 31, 2006; Discussion on September 20, 2006)**

### **Market Risk**

#### **Bankruptcy/ High Yield Area:**

High Yield Desk – this desk was moved into Credit Trading. No separate P&L number was given this month.

The Distressed Debt Desk made a profit of \$17 million. The net MV decreased \$150 million to \$1.031 billion.

The largest positions in the portfolio remained the same areas: (1) IPP- down \$20 million to \$190 million net MV; (2) asbestos related names- down from \$140 to \$117 net MV; (3) Enron- relatively unchanged from last month; and (4) aircraft leases- up from \$140 to \$150.

Some notable events during the month include:

In IPP, the desk continued to lose money on its largest position; Owens Corning- lost another \$4million on this position and subsequently cut the position from \$24 to \$13 million over the month (including loss in MV from price declines).

The desk made \$6 million on some cable positions, \$3 million on Calpine, and \$4 million on Enron and lost around \$5 million on some auto supplier names (e.g. Collins & Aikman).

Finally, regarding the aircraft leases position, the desk executed a sale of an aircraft this past month. Kan will provide us with the full story next month.

Bank Debt Funded – the desk made \$11 million on 8 new deals. The net MV decreased \$1.3 billion to \$1.630 billion. The net MV of unfunded commitments increased \$156 million to \$4.348 billion.

The decrease in the net MV of funded positions was related to the firm's largest position; a \$1.2 billion unsecured bridge loan to Cedarfare was paid down. The total commitment facility had been \$2.1 billion (a large deal size for BS). The syndication process was not a resounding success as it required BS to eat into its fees to syndicate out the paper. The firm ended up with \$100 million of bank debt after the end of the syndication process (against a \$50 million hold limit). These positions will now go to the secondary trading desk to sell down further.

Significant commitments in the portfolio:

(1). The largest current position in the portfolio is the \$600 Metro PCS facility.

(2). During the month, part of the \$400 million relationship loan to Time Warner was funded (I believe \$225 million).

(3). BS has a commitment, originally \$1.5 billion and now sold down to \$500 million, to provide financing for Valassis Communications acquisition of ADVO. Marc said that the deal fell through but that it is now in court. He further stated that BS' attorneys have stated that BS' commitment is "null and void". We will follow up on this deal at the next monthly meeting. Below is a news story covering this deal:

### **Valassis Communications sues to stop ADVO merger**

Thursday, August 31, 2006 3:01:02 AM ET  
[newratings.com](http://newratings.com)

NEW YORK, August 31 (newratings.com) – Marketing company Valassis Communications Inc ([VCL.NYS](http://VCL.NYS)) Wednesday announced that it has filed a lawsuit to annul its \$1.3 billion merger with the largest direct-mail marketer in the US, ADVO Inc (AD).

The Livonia, Michigan-based company said that it is seeking to terminate its merger with ADVO on grounds that the latter company provided "materially false financial information" and did not provide important information related to its operating results, which have been significantly missing the Wall Street forecasts. In a filing with the Delaware Chancery Court, Valassis Communications also accused ADVO's executives of withholding information related to the problems associated with its enterprise-wide order-to-cash system.

While refuting claims made by Valassis Communications, Windsor, Connecticut-based ADVO said that it remains committed to the "binding" merger agreement signed on July 6, under which Valassis Communications would pay \$37 per ADVO share in cash and assume debt worth \$125 million. ADVO also said in its response that Valassis Communications' lawsuit was "baseless" and lacked merit, and that the company' actions reflect that it is "suffering from an extreme case of buyer's remorse."

#### Commentary on Bank Loans/Leverage Lending:

Marc gave a brief update on the bank loan market. He said that market conditions were favorable and that there has been lots of activity in the past two months. He noted that they have recently been seeing a lot of requests and that offers could be up significantly next month. In addition, he noted that there are a large amount of deals over \$1 billion in size out in the market (20 such deals). However, he re-iterated that BS wasn't in any of these deals as they typically focus on the smaller issues (in the hundreds of millions).

Marc also noted that they are still seeing some "back and forth" on covenant-lite structures. He said there were 1 or 2 deals trying to get (or actually done) as covenant-

lite deals. *We will follow up on this next month to see if this becomes a trend again or if it was an isolated occurrence.*

### **Mortgages and ABS**

Kan commented that August was a quiet month for the mortgage business. There were fewer deals and aged inventory was up (\$3.6 billion vs. \$2.9 billion last month) and profits were down substantially, especially for the ARMs desk.

Part of this lower P&L was the result of a thorough review of RMBS residuals held by the business across the various mortgage desks. The MTM Committee had requested a targeted review of the residual positions by RMD. RMD came up with prepayment vectors and did a high/low analysis. If a desk mark was outside of these bounds, RMD took adjustments. Kan stated that the group took adjustments for all cases outside the bounds if the mark was aggressive. However, they did not take all the examples where RMD viewed the marks as creating a cushion.

Kan quoted \$730 million market value for the residual positions and that they were mainly Post-NIMs (*I assume this is a subset of the \$971 million net MV under Residential Subs Desk*). We asked Kan to provide a detail breakdown of the residual positions by desk for the next monthly meeting. In addition, we asked to see the capital charge related to these positions. (*As a reminder, the pseudo banking book charges that BS applied to these residuals were a very large portion of the capital charge applied to this business and the firm in general (see Residential and Commercial Mortgage Securitization cross-firm project write up for details). During the initial mortgage origination meeting with NY personnel this summer, the Head of Mortgages, Tom Marano, stated that the firm had changed its general approach to keeping RMBS residuals and waiting for these to season and sell at a profit to one of selling off the residuals to investors much more quickly.*)

We inquired into whether risk management felt any resistance from the desk in performing the residuals review and making adjustments – the response to which was no.

Most of the securitization pipeline businesses (e.g. ARMs, CMO desk, Commercial Conduit) are in the 90-99% range of their net market value limits.

The ARMs Desk – was flat on the month regarding profit. The desk has almost always had either a B or VB profit over the past few years, so this is a very unusual occurrence. The ARMS desk had a net loss of \$4-5 million from the residual review discussed above (the gross amount of adjustments was between \$20-25 million). The net MV increased \$1.9 billion to \$11.525 billion.

The aged inventory built up in August, however the risk manager believed this was just due to it being August. He expects \$4.7 billion in deals to be priced in Sept/Oct.

The Option-ARM IO position discussed the last several months was back up from \$110 million to \$180 million. *We asked the risk manager to give us the marginal impact on VaR of this concentrated prepayment position at the next monthly meeting.*

The CMO Desk – had a profit of \$31 million. \$17 million came on 5 new deals (\$2.1 billion of collateral). This included a deal (\$500+ million) comprised of Bear Res 2<sup>nd</sup>-lien Alt-A collateral. They also made \$7 million off of 11 Agency-CMO deals.

ABS Desk- made a large profit of \$23 million of which a substantial portion came from 3 new CDO deals.

London/ABS/MBS/CDO –

The risk manager gave us an update on Rooftop. During last month's meeting, the risk manager stated that the business had "circled" to sell \$300 million of the worse performing product through a whole loan sale in which Bear expected not to take a loss. However, this month, the risk manager stated that the whole loan sale was looking more shaky now due to a change in trading policy of the partner expected to purchase the loans (not due to diligence around the loans). *Follow up issue- how soft a circle was this when mentioned last month.* The risk manager stated that now Bear expects to price a good size deal in October (I think around \$1 billion in size and bigger than both of the previous Rooftop securitizations that had poor performance in recent months as documented in the FT). *We will follow up on this deal next month.*

Bear plans on keeping its current servicer for this deal but switching for future deals. The long-term focus will be on changing the special servicer-probably bringing this function in-house.

Commercial Conduit– The desk made \$9 million. The desk priced 2 CMBS deals in Tokyo during the month (\$500 million across the two deals). The risk manager also discussed a \$3 million re-mark of a New York office loan that has been adjusted up and down each of the past few months.

The desk has \$5.5 billion in net MV, the highest since August 2005.

### **Fixed Income Investments**

Max Recovery – made a profit of \$17 million (\$13 million-US and \$4 million UK).

Credit Trading – made a very large profit of \$54 million. \$20 million came from HY flow trading-dominated by the Autos tightening. The firm has substantial long positions in this sector. Most of the gains came from Ford Motor Credit. \$15 million came from the Global Structured Credit printing a few new deals and \$10 million from VoX Capital, Bear Stearns' internal hedge fund structured credit arbitrage desk- which looks for off-setting trades (at different values), not focused on building out the full capital structure-

which may be done by the Global Structured Credit group. The traditional customer capital arb business (i.e. the Structured Credit group not including VoX) can only print P&L if they build out the entire capital structure. \$11 million came from debt origination. During this past month, the business had their best ever acceptance rate from Markit -99% of all its prices were accepted. However, they have noticed a slight trend to under price the equity and over price the super senior and Oliver and team are exploring this area further. The firm has reserved for this over the past two months (*Follow up at the next meeting*).

Regarding Credit Trading in general, most of the business has moved to the derivative side. One exception is in the EM space, where most of the action is still on the cash side. The main cash business are the FRN book in LDN (consist of highly rated names (e.g. banks)).

Aged inventory in Credit Trading was up to \$2.8 billion from \$2.6 billion-led by significant position in GMAC and large positions in European banks.

**Risk Arbitrage** - made \$6 million.

The Long MV was down \$120 million to \$800 million of which \$100 million was in the rumortrage strategy. There were a couple of big deals (BOC & Linde) during the month-closed in September (\$55 million worth).

Despite a recent rough patch discussed in previous write ups, the desk has a record YTD profit (Global-\$45 million; \$43 of which comes from LDN).

### **Derivatives**

**Equity Derivatives** –a very large profit of \$32 million. The VaR decreased substantially from \$10.8 million to \$6.3 million, while the large market drop increased from \$15.9 million to \$28.7 million loss. (Follow up on the reason at next month's meeting or via email).

From a business and P&L perspective, the risk manager stated that the desk had already surpassed the P&L for all of the past year and that the 3<sup>rd</sup> quarter was a record 3<sup>rd</sup> quarter-but still down substantially from the 1<sup>st</sup> and 2<sup>nd</sup> quarters.

He has noticed a slow down in two places: (1) volatility trading and (2) exotics. The exotics business has shown a slow down as the market has seen a marked increase in realized correlation (jump of about 20 points). The desk lost \$7-8 million on realized correlation but has continued to increase their short correlation position.

The desk sells much of its exotic basket products to private banks for high net-worth clients.

The risk manager stated that they have been bleeding P&L (theta bleed) through their active hedging of their portfolio. The typical instruments used in hedging the portfolio are short-dated options and variance swaps.

Fixed Income Derivatives- the desk made a small profit of \$7 million. The desk lost money on its Vega position and on its short gamma position. (***Follow up on the gamma and Vega positioning of the desk at the next monthly meeting***).

### **VaR Specifics:**

- The weekly 95% VaR for August month-end was \$77 million and increase of \$10 million from the prior month-end. This increase was driven primarily from the interest-rate sub-total and specifically from interest rate derivatives and MBS desks. The Equity sub-total also showed a modest increase from \$9.5 million to \$10.8 million, driven primarily from a large increase in the VaR for Block Stock Trading (from \$199K to \$6.355 million). While the month-end VaR number was up substantially, the high-water mark for the month was significantly less than the previous month.
- The interest rate derivatives VaR increased from \$16.8 million to \$20.3 million due largely to a larger short Vega positioning.
- The MBS desk VaR increased from \$59.5 to \$62.9 million, almost entirely from an increase in VaR for the ARMs desk. As discussed above, there was a large increase in Net MV for the ARMs desk from the prior month. We also asked the risk manager to provide us with the marginal impact of the Option-ARM IO positions to the VaR.
- The significant increase in Block Stock trading VaR was from the taking down of 2 large trades (Limited and Valassis???) totaling around \$130 million, which is of significant size for BS' block stock desk. (Same name in both bank debt and block stock deal???). ***From a market perspective, I read that some of the major dealers (Citi; GS; LB; ML; MS; UBS) unveiled a new trading system known as BIDS (Block Interest Discovery Service), which is a system to make it easier for brokers to place large blocks of shares off-exchange where they will not incur trading tariffs. We should follow up on the effect of this on the taking down of large blocks.***

### **Scenario Analysis:**

- There was no discussion of the firm's market risk scenarios during the meeting. Upon review, for the most part the numbers did not change that materially from the previous month. One exception was the dramatic increase in the 1987 Stock Market scenario-where for example, the blended one week/one month scenario increased from a loss of \$615 million to a loss of \$832 million. On a one-week basis, the loss increased from \$589 million to \$812 million. These results were consistent with the increase in the large market drop stress on the equity derivative section of the Risk Summary by Trading Desk.

### **Credit Risk**

- HF update:

At the beginning of the meeting, Mike discussed Amaranth in detail. He stated that BS had no energy related trades on with Amaranth but did have a number of credit and equity derivatives (e.g., CDS and variance swaps) as well as some structured mortgage product (such as lower rated tranches of MBS) financing/repo trades. The MBS trades consisted of 15 trades with a notional of \$65 million. BS held \$32 million of collateral (from initial margin) on these trades. The high level of margin was due to the less liquid, volatile nature of the security being financed. With respect to the credit and equity derivatives, the firm was reducing its positions. Rather than reducing its positions and taking cash out of its account at BS, which would have triggered a margin call, the firm agreed to take the proceeds from the closing of trades and credit it directly to their collateral account. The counterparty did not have to do this, but BS proposed it to them because BS did not want to get cherry picked. Mike viewed Amaranth's willingness to agree with this approach signaled that they were not in a liquidity crisis.

Mike went on to say that he saw no contagion into other markets from this episode and further stated that this appeared to be "a crowded trade of one". He also stated that while many funds held positions in Amaranth, the losses in funds that are referenced in BS' structured funds transactions were inconsequential and did not trigger any de-leveraging of the structures.

When asked about how Credit viewed Amaranth "ex-ante", Mike said that they viewed the firm as having some of the smartest risk managers in the Hedge Fund industry (good risk management but aggressive). The perception was that the risk managers were on top of it. With respect to ratings/margin requirements, Amaranth was a half notch below the Citadel, Tudor, and Moore's of the world. Bear required initial margin on structured transactions and variance swaps but not on sold protection.

Credit is given more attention now to the natural gas futures space as the firm does clear for a major player in this market (which was on the other side of the Amaranth's trades).

Mike Alex said the firm was re-looking at "what stress really is." Understanding what the stress event can be and doing something about it is quite a risk management challenge. When asked if you can detect a crowded trade, Mike answered "no". Unless you are clearing for one of these players it is hard to detect. In Amaranth's case, it had around 11 prime brokers across four product areas but had a single natural gas clearer (JP Morgan).

After discussing Amaranth, the conversation moved to a discussion around what metrics are best in highlighting to senior management any concentrated counterparty credit exposure to hedge funds. This discussion was the result of Steve asking for additional monthly reporting of top hedge fund PEs. Mike then discussed the problems with looking at aggregate PEs<sup>1</sup> and then discussed the group's new project, "stress margin call" analysis, whereby all the hedge fund portfolios are subjected to a set of stresses and the sum of all the margin calls (across products) are added up. These stresses would be

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<sup>1</sup> Mike stated that looking at a 2 std deviation move over two weeks of a trade is not sufficient and the simple adding up PEs by product, which is their method of creating aggregated PEs, is way too punitive.

akin to those used by the firm internally for market risk managing its inventory positions. The goal of this new analysis would be to provide senior management with a more robust view of concentrated or correlated risk to its hedge fund counterparties, by addressing some of the shortcomings of the potential credit exposure (PE) metrics currently used as the primary risk measurement tool. Namely, the PE techniques measure risk in a counterparty and product siloed manner, and often capture only “first order” risks (e.g., broad increases or decreases in interest rates, as opposed to changes in the shapes of yield curves).

- Current exposure decreased \$456 million to \$23.5 billion. The decrease was across the bonds borrowed/stocks borrowed/repo space (quarter-end). This decrease was partially offset by an increase in placements.
  - Regarding placements, Treasury began to put more money into money market funds and so the composition of the top placement and short term investment report changed somewhat.
  - CE by industry, geography, credit rating did not change materially.
  - The top exposures remained the same.
  - One interesting exposure was the firm showed a \$30 million CE to Owens Corning (one of its biggest distressed debt positions). The credit risk manager noted that this was a right-way trade (an equity call) - where there would be no exposure at default.

## **Other**

**Model Review Presentation** – this was the first in-depth presentation from the model review team since the CSE review. The discussion included an update on the model review process, including update on personnel, changes in scope, and how model review fits into the overall risk governance process. We also discussed a few specific reviews in detail.

We plan on having an on-going quarterly discussion with the model review team. It hasn't yet been determined whether this will occur as part of a monthly risk meeting or a separate discussion (See separate write up and copy of presentation for details).

**Backtesting (June 2006- August 2006)** – there were no exceptions at the firm-wide level or at any of the significant white-books. The only desks with exceptions (of the 95 and 99% VaR) were the (1) muni desk; (2) strategic structured transactions; and (3) Firm Investments. VaR is probably not the best metric for the strategic structured desk and the firm investment desks, which are not diversified portfolios. These two desks are also not drivers of substantial risk for the firm-despite the lumpy P&L that comes from selling off of SST positions such as the power plants in FL. Interestingly, the risk arb desk backtesting was quite good compared to its peers. Apparently the inclusion of deal break risk is picked up at least somewhat in the VaR measure.



The graphs showed two days of extremely profitable days during the quarter. One of these days was from the sale of the 2 power plants in FL and the other was at June month-end and resulted for month-end adjustments primarily from Max Recovery and MBS businesses.

### **For Memo**

- During our discussion of counterparty credit risk to hedge funds, the Chief Risk Officer explained that his group was currently working on a “stress margin call” analysis, whereby all the hedge fund portfolios are subjected to a set of stresses and the sum of all the margin calls (across products) are added up. These stresses would be akin to those used by the firm internally for market risk managing its inventory positions. The goal of this new analysis would be to provide senior management with a more robust view of concentrated or correlated risk to its hedge fund counterparties, by addressing some of the shortcomings of the potential credit exposure (PE) metrics currently used as the primary risk measurement tool. Namely, the PE techniques measure risk in a counterparty and product siloed manner, and often capture only “first order” risks (e.g., broad increases or decreases in interest rates, as opposed to changes in the shapes of yield curves). We will discuss these analyses in more detail as they are implemented.
- The Head of Market and Credit Risk for Europe and Asia discussed his recent experiment in London of migrating some of the risk management duties typically performed by market risk personnel to credit officers who have significant fundamental credit experience for certain desks that arguably require both skill sets (e.g., distressed debt). Conversely, he also discussed the use of market risk personnel in the Credit quantitative group. We will continue to discuss with the firm any future integration of both fundamental credit and market risk skill sets in risk managing certain businesses.
- During the past month, the Mark-to-Market Committee asked for a complete review of the firm’s mortgage residual positions. The net change to marks as a result of this review was not material. However, due to the magnitude of these positions, we have asked for a detail briefing of the residual positions by desk for the upcoming meeting.
- Bear is reorganizing its activities in several ways. The firm’s prime brokerage business is being rolled into the Equities Division, which will be co-headed by the previous heads of cash and structured equities trading. Also, the firm has consolidated proprietary trading, or principal investing, into a separate business unit within the trading division (i.e., there will be one prop trading head who reports directly to the firm’s senior management). Finally, the firms Operations and Technology division have been formally merged under the management of one individual (who is also responsible for front office Equity Analytics). We will discuss the implications of this reorganization, such as how the prime brokerage and independent credit risk management functions will (or will not) be integrated.

## **Bear Stearns (Package Dated December 29, 2006; Discussion on January 17, 2007)**

### **I. Market Risk**

December was a “super” month as several desks including distressed, various mortgage desks, credit trading and equity derivatives had outstanding months, some record months.

#### **Bankruptcy/ High Yield Area:**

The Distressed Debt Desk – made a record profit of \$59 million (continuing a theme of the past few months) while inventory grew only \$171 million to \$1.3 billion (much of this of the increase in marks). The VaR increased \$4.5 million to \$21.9 million (95% weekly VaR).

- 1/3 of the profit came from IPP positions, where they are \$310 million long: \$12 million profit from MacGen (\$150 million position); \$12 million LakeRoad (sold to private equity firm; \$3 million from Boston Gen (\$90 million positions). I believe MacGen is expected to undergo a favorable recapitalization and Boston Gen is refinancing and rumors have it being sold to private equity soon.
- \$6 million profit on \$65 million Calpine position
- \$10 million on cash disbursement on world com position

The largest positions on the desk include: IPP sector \$310 million long; airline sector \$350 million (increase from \$200 million including \$160 million in new loans to Delta (now at \$195 million to Delta); Enron at \$130 million; Calpine \$65 million.

- The risk manager posed the question “What will they pursue next?... Where will they drift do?” given they have hit such a home run so far. (For instance, he raised the possibility of them getting involved in some private equity type investing.)
- *The risk manager said that he would get some more details on the change in VaR (i.e. was it strictly due to the large increase in Delta exposure during the month or were there other drivers).*

Bank Debt Funded – made a profit of \$12million on 8 new deals. The profit was lower due to 5 of the new deals being relationship loans. The VaR for Leverage Finance (both bank debt and CLO collateral) fell \$4.9 million from the previous month as inventory in CLO desk decreased \$625 million and bank debt commitments dropped \$518 million.

*Kan promised further details.*

#### **Leverage Finance Update (Marc and Helen from RMD):**

##### **Discussion of Particular commitments:**

- Kan discussed one of the largest bank debt funded positions, Aircastle. This is a warehouse facility (with two other dealers participating as well) that advances 65% to the counterparty (name not given) to purchase aircraft. Currently, the line outstanding is up

to \$415 million. I believe these shows up in their bank debt funded line (at other firms not included in the corporate lending numbers).

- As everyone is aware, a competing offer has come in for EOP and thus this commitment is currently in play.

- The Cablevision deal is dead. The Board declined the Dolan's offer (which is not expected to be increased) and thus the commitment will go away.

- At next month's meeting, follow up how much of the Merck deal remains.

#### Hedging activity:

As was briefly discussed last month, the LPMG has started to hedge its high yield loan risk (both pipeline and closed positions). The impetus for this hedging activity was that the Executive Committee asked for the desk to put on a hedge. (Mike Alix also added that this area was "the #1 focus of risk management in the firm" and that "the firm was close to its satiation point.")

Currently, they have a \$700 million short CDX HY position on as the hedge—to hedge against a spread-widening event in high-yield bank loans. RMD, however, is not convinced that this is the best hedge, given the different features of senior secured bank debt compared to HY bonds (i.e. capital structure difference) as well as basis risks. (As spreads on bank debt have grinded tighter, the desk has lost \$5.5 million on the hedge since it was put in place in December). The risk manager gave as an example using tranching product to provide more targeted protection for a cheaper price (i.e. short mezz tranche of a CLO; long super senior tranche of a CLO).

#### Risk management:

During the meeting, we discussed with RMD a couple of items relating to risk management of the leverage finance positions: (1) the relationship between bank debt (senior secured and bridge loans) and HY bonds and (2) work on the limit structure with leverage finance.

(1). Helen Wong discussed some recent research they have done in comparing spread volatilities of both senior secured bank debt and bridge commitments with HY bonds. The senior secured debt had a ratio of 4 to 1 with (i.e. 25% of the HY bonds spread volatility). She then said that with respect to bridge commitments the ratio was closer to 1:1. I believe see also said that there was a 2 to 1 ratio between regular CDS and CDS on leverage loans. ***Confirm whether the ratio was with respect to spread volatility or hedge ratio.***

We have received/discussed the issue of spread volatility previously with Helen in context to the cross-firm project on Event-driven loans.

From BS discussion during cross-firm project:

For both term loans and revolvers BS makes a downward adjustment (taking only 85% for high grade and 65% of high yield of volatility risk) to the historical as well as specific risk volatility parameters that are obtained from the bond data. Can we discuss this further, including the empirical analysis performed to justify the adjustments?

*Helen provided some BSIX, BS High Yield Index, historical volatility numbers for (1) Index-all, (2) Sub-index "BB", and (3) Sub-Index "B". She then presented volatility data from Loan Pricing Corp for revolvers and term loans since the 1<sup>st</sup> qtr of 1998. For the Index-all the volatilities of the revolvers and terms loans were 56% and 58% of the BSIX historical volatilities. For the revolvers and terms loans that were rated BB and B, the historical volatilities were closer to the Sub-Indices for the BB and B rated bonds, between 57% and 75%.*

*As stated above, for the leverage lending portfolio (i.e. mostly NIG), they simply apply 65% of the BSIX related index volatility to come up with their historical time series of spread moves. (Credit VaR is calculated around % spread moves).*

(2). Mike Alix said that they continue to evolve to a more formal limit structure for the leverage lending business. As stated above, they have put on some macro market hedges on this book, but they have not yet decided on how to incorporate these hedges in determining exposures to limits. He said that the future limit framework will probably be a net market value equivalent limit (and a net spread sensitivity associated with it), but they have to be comfortable with the ratios before they decide on how much credit to give for the hedges (i.e. have the convert the notional using these ratios). The limit set on this risk metric would be meant to limit the chance for a significant P&L event brought on by a significant spread widening in the bank debt market. This limit, and the hedging activity meant to reduce exposures within this limit, relates solely to a macro market move and does not speak to the idiosyncratic risk associated with individual deals. The firm will rely on its upfront approval process, which in addition to the due-diligence done on the deal will take into account the firm's expectations regarding distribution of the paper.

I believe Mike also said that there would be four buckets in the limit framework:

- (1). CLO warehouse
- (2). Hold positions in Leverage Finance

These positions would be predominantly senior secured debt (a lot would be unfunded)

- (3). ANC
- (4). UCC

I don't believe Mike stated whether net MV limits would be set at each bucket. ***We should follow up on these items in future meetings as their plans solidify.***

#### Market Color:

Regarding the market in general, Marc stated that there were no visible signs of a slowdown, change in velocity, etc. Spreads on HY have continued to grind tighter. He said that most deals are "covenant-lite" (i.e. most conditions are upfront, with little to no

ongoing covenants). Based on discussions at other firms, the definition of covenant-lite is probably not consistent across firms. In addition, BS might be viewing the terms today against the terms that were market practice several years ago.

Mike Alix also jumped into the conversation regarding the tightness of spreads basically noting that the CLO bid is not very discriminate (i.e. solely relying on diversification) currently. Obviously, if they began to push back or become more discriminate in picking deals, this would have an impact on deals (spreads and or conditions).

#### Rating Agency impact:

Mike spoke again to the importance of Rating Agencies (both in leverage finance and BS other businesses (e.g., structured credit and MBS/ABS) and stated that they are “systematically more important than ever”. As stated above, the CLO bid is indiscriminate and relying heavily (if not solely) on ratings by rating agencies (“more concentration of analysis by the Rating Agencies).

With respect to bank loans, Marc stated that B3 (i.e. B-) debt is not eligible to be put in CLO deals and of course, this is one of the biggest distribution channels for bank debt currently.

One concern Mike had was the possibility that market events cause a re-pricing of borrowing costs, which could then change default predictions resulting in rating agencies subordinate levels changing.

CLO Accumulation- The inventory dropped \$625 million to \$2.351 billion at the end of December. They had told us they expected to have three deals completed during December. ***We will follow up on the execution of these deals as it was not discussed during the meeting.***

#### Mortgages and ABS

The ARMs Desk – had a very large profit of \$51 million vs. a flat P&L the month before. Most of the profit was from the pricing of 10 new deals off of \$4 billion in collateral (i.e. the inventory still may be on the books). Included in these deals was a \$1.8 billion Option-ARM deal on which the desk made over \$20 million. Additionally, the desk made \$12 million in servicing.

The inventory was up to record levels at \$13.1 billion (up \$2.5 billion from the previous month) and represents collateral purchased for new deals. ***We will follow up next month if this number does not come down.*** The VaR was up \$2.7 billion on the increase in inventory.

The MTA Option-ARM inventory stood at \$3.1 billion at month-end (flat with previous month), with the MTA IOs at \$150 million (up \$10 million). The non-MTA IOs stood at \$16 million.

Agency CMO - This desk was not discussed during the meeting. However, the VaR for the desk spiked up \$7.2 million to \$13 million. ***We will send a follow up question to Kan intra-month to seek an explanation as this is a substantial VaR for this desk.***

The Non-Agency CMO Desk - made a very large profit of \$56 million. \$30 million came on 12 new deals (\$4.5 billion of collateral). \$19 million of the \$30 million came from Bear Res originated product.

In addition, Kan highlighted that the desk made \$20 million on shorting spreads through synthetic positions (e.g. PAUGs). Most of the positions were in the BBB and BBB-space and spreads widened in this area. (I believe we heard this at other firms as well). This amount of P&L obviously shows that the mortgage business at BS, while still dominated by its securitization factory, is materially involved in taking views/positioning in the marketplace. With that said, this operation probably won't be confused with Howie's business at MS.

Inventory was up almost \$2 billion to \$11.9 billion. Correspondingly, the VaR for the desk increased \$2 million. ***We will follow up with Kan on the other drivers of the increase in VaR, possibly from the synthetic short spread positions.***

Flow Desk- this desk is rarely mentioned in our meeting. However, the VaR increased substantially, up \$7 million to \$9.4 million. Kan stated that the desk had a short mortgage basis trade on (short TBA??/long swap/treasury). He said he would investigate this area. ***We will follow up on the driver of the increase in VaR year and any risk management issues.***

CBOs – made a very large profit of \$27 million on 4 new deals (\$3.5 billion of new collateral).

Commercial Conduit - made \$12 million profit during the month. \$6 million came on a new deal (a \$2.2 billion deal of which BS contributed ¼ of the loans).

Aged inventory across the MBS/ABS desks increased by \$1 billion to \$5.6 billion at the end of December. This represents a high level but not a record number for this product area. The bulk of the increase in aged inventory relates to a commercial loan for approximately \$700 million. The plan for this loan is to securitize half of the loan during the 2<sup>nd</sup> qtr 2007 and prior to that sell the mezzanine piece. ***(Let's ask for specifics (i.e. is this a single-asset or multi-asset backed loan.)***

**There was no discussion of the international space (i.e. London and Tokyo)—let’s ask about this area during the next monthly meeting (both resi-in London and commercial in Asia).**

### **Fixed Income Investments**

Max Recovery – made a profit of \$19 million. As was the case last month, the U.S. continues to outperform the model expectations and the UK positions continue to underperform the model expectations. They discussed the UK problem as an operational issue concerning receiving payments (“previously described as a “lock box issue” relating to checks getting sent back to debtors. The business is focused on these operational issues and does not see a deterioration of the credit of the borrowers. The risk manager also stated that the businesses expected to see some catch up going forward. Last month, Kan said that the Max recovery models were also on the list to be reviewed by Model Validation soon.

Credit Trading – had an outstanding month recording a profit of \$95 million. The Global Structured business made between \$30-35 million, \$40 million from IG flow, \$15 million from HY flow.

### Structured Credit:

Within structured credit, the largest portion of the profit came from origination profit, mostly in NY. However, the LDN structured desk made \$3 million on a Taiwanese dollar deal and the EM Structured business made a large \$4million on the month (short Ecuador). The “greylock” Babson notes (discussed last month) were a notable contributor again this month. They made between \$7-8 million during the month on \$700 million notional of notes sold.

Additionally, VOX Capital (outward facing prop desk) made \$6 million on 4 new bespoke trades and printing a few “full capital structure” deals.

Kan also discussed again a bias that the desk was running in its marking of mezzanine positions. The desk continues to price mezzanine tranches at wider spreads than Market Partners consensus. However, the magnitude of this bias came down significantly in December. Kan also noted that equity tranche spreads were a little below (tighter) than consensus. He stated that he was staying on top of this issue. (*See price verification write up as well*).

### HG flow:

Auto positions contributed 1/3 of the desk’s \$40 million in profit as spreads continued to tighten. The desk also made \$5 million on a World Com distribution (BS had positions both in Credit Trading and Distressed desks). Kan also discussed a relative value play that the firm had with respect to SABER (spelling??) in which it was long a bond and

short CDS. In this particular case, the bond had a step-up feature that “knocked-in” upon a downgrade (200 basis point step up on a 2016 maturity bond). As a result, when spreads blew out, the short CDS paid-off but the bond was either not hurt or hurt much less since the likelihood was that it would then generate larger cash flows with the coupon stepping up (absent default).

#### HY flow:

The desk made significant gains on a few positions including: (1) Calpine; (2) ToysRUs, etc.

#### Aged inventory:

Aged inventory in Credit Trading reached an all-time high up \$4.5 billion (up \$700 million). The largest aged position was GMAC, which the firm had \$260 million in aged (over \$1 billion in total position).

Kan stated that this metric (aged inventory) gets a lot of push back from the business in this area (as opposed to the mortgage businesses where both business and independent risk rely heavily on the metric). Kan acknowledged that the process wasn't working perfectly in Credit Trading but that overall it was helpful. One of the issues here is that they don't give benefit for opposite cash positions (although they do grant benefit for offsetting CDS even if the terms aren't exact).

VaR was basically flat on the month at \$17 million, while the profit was up substantially. The net CS01 shifted from slightly net short to slightly net long. However, as discussed before, looking at a net CS01 across the entire portfolio is misleading as the firm is short tight spread names and long in wide spread names (i.e. autos). As Kan stated, “the positions seem to be going all right this month”.

**Risk Arbitrage** – the desk made \$12 million evenly split between NY and LDN. In NY, the desk made \$5 million on its Caremark position. LDN made half of its P&L from its events book (“rumortrage”).

#### **Derivatives**

**Equity Derivatives** – had another great month, making \$54 million (\$28 in NY, \$17 in London, and \$9 in Tokyo). The U.S. volatility book made \$11 million. There were a couple of structured trades that produced single digit millions in profit during the month: (1). The Volkswagen trade discussed in delta last month made \$4million as the desk has increasingly hedged its risk (50% now hedged); (2). A large Stamp trade in Europe done on an Egyptian stock made \$2 million on change in volatility.

Not included in the \$54 million was \$10-11 million made by equity proprietary desks (e.g., black box strategy where the desk is \$1billion on both sides (long/short)) which



have been pulled out of equity derivatives to be separately reported (discussed previously).

Finally, the VaR increased \$2.8 million to \$7.7 million and the Large Market Drop loss impact increased from \$18 million to \$23 million. No further discussion. ***We should ask for the largest risk factor contributions to Equities VaR and discuss the pulling out of gamma for a small subset of exotic equity derivatives (as stated in Tab 6 of the package “Model Modifications”). Also, how much did this model change impact the VaR in December and how much is it anticipated to affect VaR as the methodology is rolled out to some other similar trades.***

Fixed Income Derivatives – made a profit of \$13 million. This desk has had a very sub par year and Kan commented that the head flow trader (i.e. plan vanilla interest rate swaps) of this desk is not performing well. Last month’s large profit was overwhelmingly the result of EITF reserves of old PRDC trades as the desk did some risk-reducing trades to demonstrate some price transparency. It was not from the desk’s flow activity.

### **VaR Specifics:**

There was no specific discussion of the VaR (5 day 95%) changes, other than for the desks mentioned above. ***We will be sending the risk manager a follow-up email on desks where VaR has changed substantially and where there was not a clear explanation given.***

The following were some overall changes:

- Firmwide VaR decreased \$3 million to \$59 million. It is not clear that there is a single driver of this slight decrease.

- Credit Sub-Total VaR remained virtually unchanged at \$43 million. However, within the subtotal Distressed VaR increased \$4.4 million on higher Net MV (large increase in Delta position) and Leverage Finance decreased (largely on decrease in Net MV of commitments and CLO collateral inventory).

- Interest Rate Sub-total- VaR decreased \$2.9 million to \$46.4 million. It is not clear the driver of this risk (absent saying their was an increase benefit in diversification) as all desks below increased: the MBS desk increased \$5.8 million, the Interest Rate Derivatives whitebook increased \$1.4 million and Governments increased \$1.2 million. ***We will follow up with the risk manager for an explanation.***

- Within the MBS whitebooks there were a couple of desks with large increases in VaR (namely Agency CMO and Flow Desk). However, the large VaR coming from these desks may be coming from short mortgage positions and as such providing a natural hedge to other desks. ***We will confirm this conjecture with the risk manager.***

◦The Agency CMO and Flow Desk's had very atypically high VaRs. ***Discuss this with risk manager regarding the cause of the increase and any risk management implications.***

***•The VaR and Stress Loss limit framework discussed last month included Merchant/Illiquid desk. As such, these metrics should be reported for this white book in the package presented to us. Also, a firm-wide total should be given (both we and excluding this whitebook). Follow up with Kan.***

### **Scenario Analysis:**

No discussion during the meeting. In reviewing the numbers, the numbers for the 1987 Stock Market Crash came down across the board. The blended week/month scenario for the 1987 Stock Market Crash came down from \$972 million to \$642 million. In fact, the 1998 Russia/LTCM scenario had the largest loss for both the 1-month and blended 1 week/1 month time periods. The 1987 scenario remained the worst stress loss event for the one day and one-week scenario. (***Ask for some analysis here.***)

## **II. Credit Risk**

### **Hedge Fund Report –**

As promised last month, the Credit Section of the monthly package now includes 2 reports on stress exposure to Hedge Funds: (1) Top 10 counterparties by Stress Exposure (assuming netting) and (2) Top 10 counterparties by Stress Exposure (assuming no netting across entities). The reports include: (1) fund name; (2) fund family; (3) Stress exposure; (4) Scenario causing the largest exposure; (5) Time period of Scenario causing the largest exposure; (6) Product traded by the fund; and (7) Client PE.

Mike Alix said that they have told the Executive Committee about this stress testing process but that they want to get a little more experience before presenting a limit framework. The challenge is to convert the stress test exposure into a stress test loss. Mike said they need to work through this to get an economic capital risk-based capital number. (***We will discuss this as well as other analytics used for hedge fund counterparties as part of our validation efforts.***)

Currently, the report is generated in an ad-hoc fashion as they continue to work on productionalizing the process. For now, the report is prepared monthly and takes 3-4 days to produce. (The goal is to produce weekly for the CPC.)

### **Judy's discussion:**

•CE increased \$4.4 billion to \$26.9 billion. The increase was concentrated in placements-- \$2.5 million increase. There was also an increase in repo product exposures.

- There was a \$600 million increase in CTC exposure. The increase was predominantly from a couple of new accounts in December but also reflects a lot of exposure on the fund of fund loans.

#### Mike Alix Commentary:

- In discussing the increase in CTC loans to Hedge Funds, Mike Alix confirmed that most of the exposure relates to loans to Foff managers to manage around rebalancing dates (e.g. borrow money to invest in new funds while waiting for investments back from funds they have sent in redemption notices. December is a month where notices are typically sent). In contrast, the short term bridge loans they have to individual Hedge Funds to help them manage cash flow while waiting for performance fees to come in (discussed during trilateral meeting) are deminimis. However deminimis, Mike added that they do file a UCC to get a perfected interest in the performance fees on these short term bridge loans.

#### • Netting Issues:

Mike had previously stated that they had formed a committee to look at issues around the legal enforceability of netting agreements. In this month's meeting, he stated that there have been two outcomes of these discussions:

(1). BS is looking to consolidate the number of BS affiliates facing customers.

For one, they are looking to consolidate unregulated U.S. affiliates (BSCM, BSCP, and BS Forex) into one entity. However, they want to do it in a way that doesn't require any customer action.

(2). Bring balances back to the U.S. broker-dealer. They expect to implement the new portfolio margining rules in early April and move some of the non-trading book loans back to the U.S. broker dealer—reducing the effect on the CTC exposure (i.e. the exposure is totally due to netting issues- not level of collateral).

#### • Mortgage Warehouse Lines:

Mike stated that they continue to scrutinize marks on loans on the warehouse lines and are comfortable with collateral. He said that BS had no exposure to MLN, with the exception of some small rate hedges (on which MLN performed). That said, BS has suspended some material providers of mortgages in their conduit program. Mike had stated last month that with respect to subprime loans, the desk had bought much less product in 2006 than the year before based on concerns.

## **II. Special Presentations:**

### **Update on Equity Risk Management (RMD):**

James Bell, SMD (RMD) and Head of Equity Risk was in town from London and gave a brief update on the Equity books, almost exclusively on the Structured Equity Products (“SEP”) whitebook (i.e. Equity Derivatives).

The presentation materials included the following:

- Business performance overview (history of monthly P&L by two-year increments since 2001) by whitebook. One of the purposes of this material the various whitebooks under his review but also to show the growth in the SEP whitebook (the monthly run/rate for 2006/2007 (to date) is \$50 million profit vs. a \$17 million run rate for 2003-2004).

The whitebooks that are under his review from a market risk perspective are: (1) Block Stock; (2) OTC; (3) Intl Equity; (4) Risk Arbitrage; (5) SEP; and now (6) Principal Strategies<sup>1</sup>.

The story was very similar to our discussions during the CSE review. His group spends the vast majority of their time on the SEP whitebook, and in particular on the exotics products. He reiterated that Block Stock and OTC were generally cash, market-making activities and were very “dull” from a market risk perspective and that as a firm; they don’t generally take down very large blocks. His focus on these whitebooks is usually limited to review of large or odd transactions.

He discussed the Risk Arbitrage desk briefly. Basically he just reiterated the story that Kan has been telling us for some time: (1) the business now includes both announced mergers and “rumortrage”; (2) there has been a lot of expansion in London (i.e. this is where the event trading or rumortrage trader is located); and (3) the P&L has been much more volatile, but in general very successful. The P&L run rate for Risk Arbitrage has increased substantially over the past year (2006 was a record year for the desk).

#### SEP:

His group spends the vast majority of their time on the SEP whitebook, and in particular on the exotics products. SEP has financing products (TRS, CFD, etc), plan vanilla flow derivatives, and structured equity exotics. It is these exotics that pose the challenges.

James said that the business has seen an increase in diversified income streams, a higher gross book, but not a substantially bigger VaR (*maybe a follow-up question—is this due to gap risk or some other risk factor not captured in VaR- outside of Gap Risk associated with the Structured Fund Derivatives*).

#### SEP Exotics:

The equity exotic business has grown significantly from around 100 trades in 2002 to 3,500 trades by Nov. 2006.

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<sup>1</sup> Principal Strategies was recently formed when BS decided to separate out its prop desks into a separate whitebook. This would include black box strategies, convertible arbitrage, and other arbitrage opportunities.

Much of the book includes hedges provided to European banks that are offering exotic equity retail products. These trades typically generate a short correlation profile and involve taking gap risk. Increasingly, there has been an evolution of these products with hedge funds moving into the space. This has presented the firm with market making activities in the space, where the firm attempts to extract a bid/offer. Most of this activity has been in the correlation space.

James noted that the ability to do risk transfer trades has increased. For example, the desk trades conditional variance swaps (generally with hedge funds) in order to trade their Vega exposure and extract a bid/offer spread. One nuisance of this hedging strategy is that the hedges BS typically provides to its customers are in the 3 year range; whereas the transactions it enters into with hedge funds to hedge out the Vega risk, for example, are at the most 1 year. Generally, the desk buys these short-dated variance swaps and have to roll the hedge every month or so. When there is a spike in volatility, they pay more for the hedge.

The various exotic trades are bucketed into different classes which include the following (not exclusive list): (1) cliquets; (2) multi-stock; (3) multi-index; (4) Callables; (5) Correlation swaps; (6) Variance swaps; etc.

As the business builds up its books, RMD will identify where they have uncertainties and will track the changes in risk metrics (# of positions, gross vega, Gross MV, etc) for the broad categories and try to ascertain how the books are changing over time. For the more tailored exotics, RMD will perform a trade by trade review. (Due to the high-dimensionality of the exotic equity derivatives, the effectiveness of a “heat-map” type concept, one that BS uses for more of the plain vanilla equity derivatives, is limited).

The major risks in the Exotics books are:

- (1) Complexity-bespoke vs. flow products (for flow products, it is easy to see concentration risk; for bespoke trades it is more difficult;
- (2) Basis to hedges—even though the numbers may look flat, they may behave differently for different products (thus the importance of bucketing the exotic trades into different classes with similar behavior patterns);
- (3) Correlation;
  - The exotics desk is short \$4-5million per point increase in correlation.
  - The desk prices its trades factoring in a correlation of between 30-30% and as such, the desk generally sits back and earns a positive yield until there is a spike in correlation. (in the presentation, there is a graph of correlation from Dec 05-Dec06 and it shows that the correlation generally was well below 40% but spiked above that level during Fall 06.
- (4) Convexity ( $\$Vega/\$Spot$ ,  $\$Vega/\$Vol$  (i.e. vol of vol)
  - Overall, the desk is long \$3-6million Vega.
  - The desk is generally long single stock Vega vs. short index Vega (i.e. benefit from single name events; but don't benefit from increase in correlation).

- The desk is short around \$1 million Vega Convexity (for a 5 point move up in vol the book gets shorter \$5 million Vega and assuming no interim re-hedging the book would lose \$12.5 million).
- Two of the exotic products that have material negative convexity profiles for BS are: (1) Options on Variance (which they have several and we have model review docs on this product) and (2) Reverse Cliquets (which they have a small amount of trades).

(5) Gap risks

- The structured products that typically generate a long Vega profile also generate gap risk for the desk. The hedge hedges this gap risk by going long, short-dated Vega (i.e. the short dated variance swaps discussed above).

(6) Price transparency

James walked us through two price verification examples in the exotics area:

(1). Totem correlation pairs

James stated that they have approximately 10-20K correlation pairs that they care about in this business. About 5K of these correlation pairs are submitted to Totem/Markit Partners.

In the graph presented, it shows that the correlation marks submitted on the 5000 pairs of stocks are concentrated around the Totem consensus line which a slight bias of BS correlation marks being slightly higher than Totem. In this case, they are more conservative for events where correlations increase, which happens to be a particular risk of the BS exotics equity portfolio.

Calibrating correlations—James stated that he believes trades at all the firm’s generally mark correlation based on the use of algorithms (e.g., realized correlation “plus something”).

We asked how many contributors there were to this service of Totem/Markit Partners. James said that the number of contributors range on the high-end (some pairs having 15-16 contributors) and on the low-end (some have only 4 contributors).

(2). Totem correlations by Country

James also showed a series of graphs breaking down these correlation pairs into region pairs (America-America; America-Europe, etc). The one region pair, where BS’s correlation marks differed materially from the Totem consensus was the Asia-Asia correlations. For these, the difference was approximately -5%.

James stated that BS has 8 products in its Equity exotic business in which it sells over and over again in Asia. BS is consistently able to sell this product at a spread that is higher than what would be predicted based on the Totem consensus data. Currently, RMD's price verification efforts show a \$1-2 million cushion for the correlation marks here (i.e. BS is marking the correlation higher than Totem consistently across the various 5000 pairs). In effect, BS is selling these products at a spread above where the consensus data would predict.

### (3). Variance Swaps

I believe James stated that Variance Swaps are used to hedge other positions (vanilla index variance swaps??) and in dispersion trading (e.g., short index variance swap and long variance swaps on single names).

James gave us a graph which showed the desk mark vs. average quote and the exposure was small \$489K. The broker quote history used in coming up with the avg. quote to compare to desk marks includes a 1000 data points every month. James stated that there is a discrepancy between where the market trades and the theoretical value. He also stated that they will be changing the system for valuing variance swaps to include an "offset parameter" to get back to the market price. (*I don't think I fully understand this part*).

### Model Validation- 4<sup>th</sup> quarter update:

-See separate write up.

### III. Other:

During the meeting, we became aware of some personnel changes. The changes include:

- (1). Oliver Jacobs has been promoted to Head of all Fixed Income- Risk Management (previously was Head of Risk Management for Credit Trading).
- (2). Michael Bellacosa (MD in RMD covering Munis, Gov, F/X) has taken another position with the firm—his position remains open. He also was the individual who usually edited the Daily Risk Highlights, which apparently has fallen to Kan for now.
- (3). Kan also confirmed he was the "acting COO of Market Risk" so the "Head of Market Risk" has not been conferred on anyone yet.
- (4). There has been more turnover in the Model Validation group. Given their already thin staffing levels, this should be an area to watch. (See separate write up for details).

We asked for an updated organizational chart (which was followed by some laughter).

### IV. For Memo

- During this past month's risk meeting, the risk manager proposed the idea of eliminating one of the primary risk reports that we review during our monthly market risk meetings. The risk manager noted that while this report was still going to the Executive Committee, it was not a real focus of senior management. Further, he thought the risk department could provide us with a more meaningful report that provided risk information at a somewhat higher aggregated level (e.g., Fixed Income, Equities, Mortgages, etc) versus the current report which is very granular. This proposed change in reporting is consistent with the move to place more emphasis on aggregated risk measures during our discussions with market risk managers.
- As previously highlighted, over the past several months, Bear Stearns' corporate lending business has grown substantially and has approved some very lumpy buyout transactions. The Chief Risk Officer stated that the leverage finance business was the number one focus of risk management in the firm and that the firm was close to its satiation point. As a result, senior management asked the business to increase its hedging activity, in particular hedging the credit spread risk associated with deals in its pipeline as well as left-over positions from previously closed deals. In addition, the Chief Risk Officer stated that the firm was working on implementing a more formalized limit structure for this business. We will continue to discuss these initiatives with risk management.



Kan,

As usual we found the monthly risk meeting to be quite informative. However, we did have some follow-up questions/clarification. Many of the follow up questions relate to changes in the VaR at various whitebooks and at higher levels of aggregation. In addition, while we have been very pleased with the in-depth discussions of the various desks during our monthly risk meeting, we would like to spend more time during these monthly meetings discussing the drivers of material changes in VaR (and scenarios), particularly for desks where the underlying driver is not a simple increase and decrease in Net MV.

We also just received the revised VaR documentation. Once we have had time to digest the material, we will want to schedule a day to come and discuss VaR and Scenario Analysis with Rupert and his team. We can talk further about what the agenda may look like at the next monthly meeting.

VaR follow up questions:

(1).What were the drivers of the \$3 million decrease in Firmwide VaR? **Based on immateriality of the move, agreed we didn't need further discussion. However, Kan understands that if a move was significant at a higher aggregation level (sub-group; firm-wide, etc) we would like an explanation of the drivers of the risk (during the monthly risk meeting). We discussed briefly that we need some level of discussion around changes in VaR in order to speak to BS meeting the "use test". He understood.**

(2). Regarding the Interest Rate Sub-total, VaR decreased \$2.9 million to \$46.4 million. It is not clear what drove the decrease in measured risk (absent saying there was an increase benefit in diversification) as all desks below increased. Any further details you could provide would be helpful. **The relationship between mortgage spread and interest rates led to lower risk as the interest rate position switched from November to December. In November, the interest rate VaR was driven by interest rates falling; whereas in December, the interest rate VaR was driven by interest rates increasing (which was less correlated with the mortgage spread VaR).**

(3).Similarly, within the MBS whitebooks there were a couple of desks with large increases in VaR (namely Agency CMO and Flow Desk), while the total MBS increase in VaR was small. **The VaR day exhibited less spread VaR and thus the total VaR increase was not as significant.**

(4). The Agency CMO desk's VaR spiked up \$7.2 million to \$13 million. What was the cause of this abnormally high VaR? Any risk management issues? **The spike in VaR was the result of the net IR POPs (model based) increasing significantly. The big issue here is that the trader vs. model POPs were significantly different. Details of the issue:**

**The trader flipped from being short to long –treasury vs. agencies. Based on the trader’s IR POPs, he believed his risk was the same as the previous month. However, in the trader’s marking of the interest rate sensitivity of the short pass-throughs, he was showing much more benefit (higher short IR POP) than the model-based IR POP gave credit for. As a result, the VaR spiked.**

**We told Kan that we would like a further discussion with the mortgage risk managers on how this “difference in trader vs. model risk sensitivities” (IR POPs) compares (over time) within this product/desk. I also expressed some concern about such large differences for such plain vanilla instruments (treasuries and agency pass-throughs) and asked that they provide some more feedback. (It is easier to understand a trader vs. model POP difference for a tranche of an Option-ARM security for example.)**

**Regarding risk management action- the mortgage risk managers (in MRD) obviously looked to the trader’s vs. model POP reports and understood this was driving the VaR. Kan said that the action taken was “more soft” as is typical when these two estimates of the sensitivity disagree and the risk managers will look to future evidence to support one or the other (e.g., future P&L swings). We will follow up more during the next monthly meeting.**

(5). The Flow Desk’s VaR increased substantially, up \$7 million to \$9.4 million. I believe the desk had a short mortgage basis trade on. Was this trade the main driver of the increase in VaR? Was there any risk management issue related to this desk generating such a large VaR? Has the exposure come down since month-end?

**Same as answer to #4 above- (“Trader vs. Model POP” and position change). Again, we will follow up more during the next monthly meeting.**

(6). With respect to the Equity Derivatives VaR we have some more fundamental questions. As James Bell put it, the SEP desk has grown its book (gross) and profit substantially over the past year; however, there hasn’t been any increase in VaR. What causes the dampening of VaR for SEP? What are the significant risk drivers for this business that are not captured well in VaR (outside of the gap risks for the Structured Funds business). What was the effect of pulling out the gamma for a small subset of exotic equity derivatives (as stated in Tab 6 of the package “Model Modifications”) on the desk’s VaR in December? How much is this change in methodology anticipated to affect VaR as the methodology is rolled out to some other similar trades?

**Kan sent us a written response (included below). We also discussed these issues on a follow-up call. Finally, as our questions got more detailed, Kan suggested we discuss the issues with James Bell as well. We had a follow-up call on Monday Feb 12<sup>th</sup> with James Bell to discuss what risks are not captured well in VaR for the Equities Derivatives business.**

### Conversation with Kan:

Kan basically said that while the SEP business has grown substantially from a gross position (and revenue basis) that the net positions and VaR have not increased materially. He stated that one of the main reasons that the VaR has not increased significantly is that the business is structurally long gamma (i.e. not the result of RMD or senior management coming down on the business). The structurally long gamma position comes from customers selling BS options (including in the exotics space). The gamma protection is typically “local”. As such, risk management is managing the gamma protection “at-the-money”. However, the business (e.g. Head of Vol trading and Head of Exotics) does actively manage the gamma for larger moves where the structural gamma protection may erode. An example of this is the management of the Large Loss Limit (a limit with SEP), which the business and senior management view as one of the more tangible stresses.

Kan gave as the overriding theme of the SEP profile:

- (1) long gamma –locally
- (2) long vega- this is the largest driver of VaR for the whitebook

Not captured in VaR:

- (1). Frequency of delta rebalancing—see discussion with James Bell below for detail.
- (2). Implied Correlation—see discussion with James Bell below for detail.
- (2). Cross-gamma- Kan stated that the VaR doesn’t have cross-gamma included very well. See discussion with James Bell below for detail.
- (3). Theta- he stated that a large theta bleed for the business is \$200k/day. He also noted that the theta from the system is viewed as a “dirty number” since not considering the funding cost in the equation.

Variance Swaps- single stock variance swaps. The max payout is way-out-of-the money. In gap scenarios (not generally in VaR but for the large loss scenario and 1987 crash scenario), the max payout (as capped in the contract) is reached and exceeded. As a result, the benefits in the stress test and large loss limit (not VaR) are exaggerated. Kan noted that RMD manually adjusts the large loss limit to cap the benefit of the variance swaps in the stress scenario. Kan will follow-up on whether this is done for SEP in its contribution to the 1987 scenario (firm-wide scenario).

### Written response from Kan:

(6). With respect to the Equity Derivatives VaR we have some more

fundamental questions. As James Bell put it, the SEP desk has grown its

book (gross) and profit substantially over the past year; however, there

hasn't been any increase in VaR. What causes the dampening of VaR for SEP?

- Books are hedged, delta is typically quite low, vega managed within bounds. In general a larger gross book means that the firm may have more work to do in order to keep risk within normal tolerances. However, after hedging the book's net risks are largely unchanged. It should be clear that this is an active process that follows the firm's desire to keep risks relatively low.
- An increase in activities has led to more sources of revenue, and correlation/diversification effects across the book.
- It's also important to note that the book has been running consistently long gamma, and so this will tend to make VaR numbers look smaller than might be expected. The VaR model assumes an unchanging portfolio, while in reality we will be rebalancing delta fairly frequently and so some of the large gains that might occur if we did not rebalance over large market moves will not be realised in practice.
- Note that the growth data shown in James Bell's presentation related to the SEP Exotics activity - not all of SEP.

What are the significant risk drivers for this business that are not captured well in VaR (outside of the gap risks for the Structured Funds business).

In rough order of importance

- Frequency of delta rebalancing. A long gamma book will tend to produce worse results than might be inferred from VaR, and a short gamma book better results.
- Implied Correlation is not directly captured by the VaR model. We have a VaR add-on that is under test but this requires refining. Note that the daily p&l associated with correlation is typically of the order of a few hundred thousand, and so we do not anticipate significant VaR changes.
- Cross gamma. For multi-asset trades we approximate the impact of market movements using delta-gamma-vega approximations. This does not capture the impact of moving two assets together. These cross gamma terms tend to be negative [although this is a function of the

composition of the book], and including them would tend to increase VaR.

On a more minor basis we also don't have a dividend risk number in VaR, but this is of less significance. We monitor this sort of risk factor in our day to day work, so that should they become more significant we can incorporate them in VaR.

Looking at risk more generally, VaR is a local measure of risk, i.e. how much do we lose at a given confidence level on our current positions if the market moves from where it is today. In order to understand the risk of derivatives portfolios, we want also to be able to understand the possible future shape of the book [e.g. through Heatmaps]. This enables potentially large risks to be dealt with whilst the cost of exiting / modifying positions is relatively low and gives sufficient time that any liquidity issues can be managed.

What was the effect of pulling out the gamma for a small subset of exotic equity derivatives (as stated in Tab 6 of the package "Model Modifications") on the desk's VaR in December?

- Insignificant at global level, i.e. no noticeable impact. For SEP Asia the impact was a more stable VaR number- there had previously been significant noise in VaR as a result of noise in the gamma. Directionally, ignoring gamma resulted in an increased VaR number, as the missing gamma was positive. We have now introduced a new method to capture the gamma risk from these trades. Tests showed that the impact on VaR for SEP Asia was a decrease of \$1.5mm to \$2.0mm compared to VaR calculated with zeroed gamma.

How much is this change in methodology anticipated to affect VaR as the Methodology is rolled out to some other similar trades?

- I don't anticipate rolling this out to further trades. The nature of the problem was localised to a few positions in traded in Asia.

### Notes from call with James Bell:

**We discussed the main risk factors not included in VaR for the Equity Derivatives business as well as other issues affecting the accuracy or completeness of the VaR calc. James stated the largest drivers of risk of SEP (and the exotics) are Vega and Delta and Gamma.**

#### **(1). Frequency of Delta Rebalancing-**

**James stated that this was the biggest driver of the difference of realized volatility of P&L and the implicit volatility of P&L as stated through VaR. Positive gamma profile will result in less P&L benefit than VaR would predict; negative gamma**

profile would result in less P&L cost than VaR would predict. This is intuitive and would be the case for all of the CSE firms (not a model deficiency).

One slight difference at BS which could make the benefit of the generally positive gamma framework overstated is that BS uses 1-week moves and then scales down to 1-day. This could result in bigger moves and thus bigger gamma benefits.

(2). Risk factors not completely included--

The largest risk factor not included is implied correlation. This is next on James to-do-list as correlation trading is increasing (e.g. for example, the market making activity James discussed at the last monthly meeting). He estimates that the addition of an implied correlation risk factor into the VaR would only increase VaR at SEP by couple hundred thousands. The firm is in the process of creating an add-on for this risk; however they have encountered some issues with the methodology (as diversification of the book has increased they are not seeing the add-ons going the right way). *Follow up on the implementation of this add-on.*

James also mentioned that there is no risk-break type VaR approach for M&A names that are included in Equity Derivative transactions. He said that RMD has the ability (tools in RIO) and does track names that have become M&A names but that no different VaR is done for these derivatives (unlike if they were trading on the Risk Arb desk where the VaR would include a component for deal-break risk). I don't believe any firm has this capability and James said that the impact at the SEP level has been deminimis.

(3). pricing approximations--

Cross Gamma effects are most problematic for Options on Multiple Stocks. Unlike most of the Equity Derivatives where the firm uses a two-dimensional revaluation matrix (i.e. pricing grid) to capture the non-linearities, Options on Multiple Stocks rely on the DGV approximation (i.e. Taylor series expansion) due to the high dimensionality of the product. BS tends to be structurally long gamma on these multi-asset exotics. The cross-gamma terms of these multi-stock options tend to be negative (a function of BS' book) and as such, not capturing the impact of moving these underlying assets together, results in an overstatement of the gamma and an understatement of the VaR. With that said, the estimate of the impact is even less than the exclusion of the implied correlation risk factor discussed above. In an ideal world, you would do full revaluation. If the effects ever started to become significant, they would implement full revaluation (don't see this on the immediate horizon).

Other elements of cross-partials, such as the volatility convexity for those products with high vol convexity (e.g., variance swaps, conditional variance swaps, Options on variance) are picked up in the VaR. The firm uses revaluation grids in pricing these instruments. Within this product, there are some subtleties regarding shifting of volatility surfaces in the reval grids. The shifts done in creating the pricing grids

are parallel shifts. This works fine for vanilla options, but for the variance swaps, etc, the shape of the vol surface matters more. James said that any efforts in this area would be “way down on the list of importance” given the magnitude of the differences (i.e. immaterial).

**(4). Data quality—**

With respect to the VaR calculations for the plain vanilla equity derivatives, the main issue is around data quality. In almost all cases they get the underlying stock price changes. The data issues come with respect to the data on implied volatilities. Their database is heavily based on U.S. names. James stated that they need more European and Asian implied vols. Currently, there is a fair amount of proxying that goes on. Generally, he finds the proxy mapping to be ok. However, there have been a few circumstances where the proxying methodology has yielded a result which RMD has overridden.

Other follow-up questions:

(1). The VaR and Stress Loss limit framework discussed last month included the Merchant/Illiquid desk. As such, these metrics should be reported for this white book in the package presented to us. Maybe we can discuss this further at the next monthly meeting.

**They will include the Merchant/Illiquid desk in the metrics reported to us next month.**

(2). During Helen Wong’s discussion where she was comparing senior secured bank debt and bridge commitments to HY bonds, were the ratios she was stated referring to relative spread volatility or hedge ratios? For example, I believe she said the ratio was 4 to 1 with respect to senior secured debt versus HY bonds (i.e. senior secured bank debt has 25% of the spread volatility that HY bonds exhibit?) and closer to 1:1 for bridge commitments and high yield bonds.

**They didn’t understand the question. Helen and Marc will be at the next monthly meeting and can address the question.**

(3). We discussed the drop in inventory (\$625 million) for the CLO Accumulation Desk. Did this represent the expected execution of the three deals that were originally scheduled for November?

**Yes. 2 deals printed in U.S. and 1 in LDN.**

(4). In the discussion of aged inventory across the MBS/ABS desks it was said that the bulk of the increase in aged inventory related to a commercial loan for approximately \$700 million. Was this a single-asset or multi-asset backed loan? Any specifics would be helpful. **Kan gave the detailed explanation below:**

**The spike in December’s aged was caused by \$770mm MeriStar floating rate loan. The loan was to Blackstone to facilitate the acquisition of 43 full- service hotels**

geographically diversified across 19 states. Since going on aged the loan balance has been paid down to \$662mm as the borrower liquidated several properties behind the loan per the lending agreement. Of the current balance \$292mm is conduit eligible and is slated for a March floating rate securitization while the remaining \$370mm in mezzanine debt will be marketed and sold to investors.

(5). During James Bell's Equity Update, we did not discuss the Structured Funds business. We didn't know if the figures in the presentation included the Structured Funds business or if this business was excluded from the presentation. We would like to get some updated numbers (i.e. exposures and profits). Our last set of exposure numbers came during the cross-firm review, which are probably out-dated by now. The notional and "gap-to-zero" amounts in total and by product type would be great. Also, we would like to see the amount (# of contracts and exposure) of the book that relates to contracts where BS invests in a FofF or single HF vs. where BS buys directly a diversified set of hedge fund interests as a hedge to the structured product offered.

- P&L included structured Funds
- Exotics focus did not [SF is categorised as a separate business line within SEP]

Kan gave some historical perspective on the senior management focus on the roll-out of this business some 5 years ago. He noted that this business proposal generated the most heated discussion within senior management that he had ever seen. Significant discussion around whether the profit merited the risk taken on (the outcome being the ROE model used on every trade to make sure it passes the internal ROE hurdle rate). Currently, there is a \$6.5 billion (loan equivalent limit) on this business with current level of exposure of \$6.3 billion (loan equivalent- collateral). There is an outstanding request to move to \$10 billion loan equivalent. He also brought up the fraud risk issue with investing directly into FofF vs. investing in the underlying HFs themselves (an IA finding as well). At the next monthly meeting, the package will include an update on the Structured Funds business.



## **Bear Stearns (Package Dated February 28, 2006; Discussion on March 15, 2006)**

### **Market Risk**

#### **Bankruptcy/ High Yield Area:**

- High Yield Desk lost less than \$1 million due to \$6 million write down on a \$27 million position in Medquest over concerns about its Medicare reimbursements. This was offset by gains on HealthSouth bonds tendered. The net MV of the book declined due to the tendering of the HealthSouth bonds coupled with a short position in a different healthcare name (I assume synthetically or in Equity).
- The Distressed Debt Desk had a large profit of \$25 million. This was driven by positions in independent power plant companies. \$20 million of the profit came from the \$210 million MV of IPP positions. The desks also made \$5 million on \$150 million MV on Enron positions. Finally, the desk had approximately \$110 million of exposure to Asbestos names. These positions have generated losses post month-end.
- Bank Debt Commitments- net market value increased \$240 million to \$3.36 billion, principally driven by BS's \$520 million participation in Time Warner's \$20 billion facility. This facility is being used by Time Warner to make a significant special dividend distribution (to appease the likes of Carl Ichan, etc). In effect, this is an IG dividend recapitalization. BS has purchased a \$80 million hedge against the commitment.
- CLO desk- The desk made \$8 million during the month. The desk continues to see strong demand from customers and continues to grow (and turnover relatively quickly) its collateral. The desk has a few deals that are set to settle in March and the MV should decrease \$800 million from its current high of \$2.5 billion.
- Capital Markets- the desk made \$17 million from fees associated with financing of the LBO of Linens and Things by Apollo Investments.

#### **Mortgages and ABS:**

- The ARMs Desk – had an enormous profit of \$95 million in February. The outsized profit resulted from both (1) strong securitization activity (5-6 new deals) and inventory turnover coupled with (2) a significant tightening in the spreads of higher credit quality mortgage products (ARMs, Alt A, etc.). This tightening came as the result of more seasoning in this space (i.e. the market realized that at current spreads the securities were outperforming the model predictions). Bear profited from this one-time spread tightening event in both the inventory it had previously purchased and was waiting to be securitized as well as from an forward purchase agreement with one of its top ARMs originators (“Greenpoint”), from which it purchased large amounts of mortgages at below market rates. The desk also made \$20 million from the sale of servicing rights on \$11 billion Alt-A hybrid ARMs.

- Total ARMs MV- decreased from \$12.2 billion to \$11.3 billion. Aged Inventory fell from \$205 million to \$175 million and there was \$8 billion of turnover in ARMs inventory during the month.

**(See Risk Management section for discussion of prepayment assumptions (and credit concerns) on ARM products- specifically SAMI Libor resets and MTA Option ARMs).**

- The Non-Agency CMO Desk also had a large profit, making \$56 million on the month. \$30 million came from new subprime deal and an additional \$10 million from whole loan sales. The desk increased its turnover and reduced its Net MV from \$16.25 Billion to \$13.6 billion.
- EMC – made \$40 million- no discussion here.

(Follow up next month- is this mostly servicing related or on performing/non-performing loans)

- The Commercial Conduit Desk- did not give a P&L. Its net MV increased \$471 million to \$4.879 million.

### **Credit Trading:**

- The Credit Trading Desk was marginally profitable overall from good customer activity. However, there were several notable areas which generated losses:
  - (1). The desk flipped from being long \$8.049 million spread risk pops to short (\$8.519 million) spread risk pops-which caused the desk to lose money as spreads grinded tighter; (2) desk lost \$3-4 million on its large auto positions, such as GMAC; (3) \$3-4 million loss on shorting recovery on Dana Corp.

### **Derivatives:**

- The Equity Derivatives Desk made \$47 million. \$26 million came from NY and was quite distributed across desks (included index trading; new convertible issue (Amgen); portfolio arbitrage (i.e. black box traders), etc) and \$21 million from LDN (including \$2 million from Tokyo). Much of the LDN profit came from remarking skew (as trades come closer to maturity volatility skew decreases), highly structured derivatives on baskets of stocks, and new origination of more structured derivatives.
- The Fixed Income Derivatives Desk lost \$6 million as the dollar swaption volatility decreased and the desk had a long Vega position (post month-end this position has been flattened out). This loss was partially offset by some gains from skew flattening.

## **Block Trading**

- Block long market value decreased substantially from \$171 million to \$11 million as the desk sold down its large block (Harman Industries) from last month (\$147 million at the end of last month). The desk lost approximately \$1 million (the profit on the discount purchase price on the large block was fully taken into income Day 1-last month).

## **VaR Specifics:**

- BS changed the filter on what was included in the VaR summary report in Section 4 of the monthly risk package. They switched to only including those desks/whitebooks where VaR is used for regulatory capital (i.e., max-recovery and merchant/illiquid desks were taken out of the calc). As a result, there was a significant drop in Firm-Wide VaR and Equity sub-total VaR from Prior Month as Merchant/Illiquid whitebook was a dominate driver of Firm-Wide VaR in the past.
- The Firmwide 1-week VaR decreased (from the re-stated amounts for last month) by \$7.7 million to \$37 million (however the high and low for the month were \$67.6 and \$36.2 million). Total Credit and Equity stand alone VaRs changed very little. Thus Interest Rates drove the Firmwide decrease, as its stand alone VaR decreased from \$46.42 million to \$38.94 million. The decrease came from several areas, with ARMs exhibiting the largest stand alone decrease of \$3.4 million, which is consistent with the decrease in net market value. In addition, the second largest decrease came from the Interest Rate Derivatives Desk decreasing its long vega position (discussed above).
- Credit Sub-Total VaR decreased slightly to \$26.7 million. Leverage Finance increased both in Bank Debt (up \$772 thousand to \$7.67 million) and CLO Collateral (up \$1.2 million to \$10.2 million) for a total VaR of \$17.492 million. All the other credit whitebooks had decreases in VaR including Credit Trading which decreased \$1.5 million to \$10.3 million.
- The Interest Rate Sub-Total VaR decreased \$8 million. Most of the decrease was the result of Fixed Income Investments VaR decreasing \$5.76 million as the result of a position feed error in REITs being corrected from last month (\$5.4 million decrease). The decrease is already adjusted for taking Max Recovery out of last months and this month's numbers for Fixed Income Investments. The MBS desk VaR actually increased \$4.8 million as Commercial Conduit positions increased and there must have been either specific risk or less diversification benefit, because all the residential mortgage desks (excluding Agency CMO) had decreases. Both the ARMS desk and the Non-Agency CMO desks had large decreases in VaR mainly from reduction in net MV as securitization deals continued to get down in February.

- Equities Sub-Total VaR was cut in half (down \$5.5 million) down to \$10.009 million. The VaR last month (pre-exclusion of merchant/illiquid whitebook) was \$45 million. The three big changes were as follows: (1) Block Stock Trading VaR was down significantly (down \$8.39 million to < \$1 million) as a \$150 million block was sold out; (2) Equity derivatives VaR was down (down \$4.285 to \$4.355 million) from a combination of (a) less Vega exposure, (b) more positive gamma, and (c) change in the approach for estimating implied volatility time series for options that do not have their own historical data; (3) Risk Arbitrage VaR was down as a result of reduction in position size.
- Change in the approach for estimating implied volatility history for equity options that do not have their own history - The old approach, which was described as resulting in unrealistic blow outs of vol of vol, relied on determining the absolute changes in the implied volatility of the index (proxy) and applying it to the estimation of the absolute changes to the volatility of the individual stock through the implied volatility ratio. The approach has been modified to use proportional changes in volatility using lognormal processes for the implied volatility ratio as well as the index implied volatility. (See Section 5 of the package for details) The effects of this enhancement are particularly pronounced for dispersion trading strategies.

### Scenario Analysis:

- There was no discussion of scenario changes during the meeting. The numbers did not change significantly (one-day 9/11 went up from (\$300 million) loss to (\$342 million; Russia/LTCM 1998 went up from (\$174 million) loss to (\$216 million loss); and 1987 stock market went down from (\$831 million to \$803 million). On the one-month basis, the Russia/LTCM 1998 scenario was still the largest (\$826 million) loss. Unlike VaR, still running the scenarios on the merchant/illiquid and max recovery whitebooks as expected.
- This month's package-there is a column for blended week/month scenario. **(Let's follow up on this next month and ask what the current use of the scenarios is by risk management and the business).**

### Credit Risk

- Total Current Exposure dropped \$2.075 billion to \$23.7 billion.
  - Approximately \$1 billion drop in placements
  - Approximately \$1 billion drop spread across all other products- almost every product space was down from the prior month
  - From an industry perspective, bank exposure is down \$1.3 billion (mainly due to decrease in placements).

- Current exposure at CalBear at the end of February was in the hundreds of thousands spread across a handful of counterparties. This exposure is not currently included in the package.
- Steve discussed our desire to have on-going dialogue with regard to both leverage finance deals as well as the prime brokerage business (See risk management section for discussion on Derivatives Prime Brokerage).

### **Additional Presentations**

- 1<sup>st</sup> quarter 2006- VaR backtesting package:
  - Elaine Hutchinson walked us through Bear's 1<sup>st</sup> VaR backtesting package during the monthly meeting. The backtesting package consisted of both exception reports- by white book and at the firm-wide level and graphs of various P&L measures against both 99% and 95% 1-day VaR.
  - The main takeaways from the discussion were as follows:
    - Bear Stearns does not rely on backtesting to highlight risk factors that its VaR model may not be capturing or time series that may be incorrect. Rather, it is done primarily for regulatory reporting purposes. They would be “quite surprised” to learn any new information from the backtesting results. Rather they rely on their daily risk monitoring processes (P&L explain, etc) to discover any inadequacies in their VaR model. They of course feel that their VaR model is quite conservative (no Firm-wide VaR exceptions).
    - Bear Stearns P&L is much more “spiky” than some of our other CSE firms. The spikes in P&L (dirty and fee-adjusted) tend to be related to two things: (1) month end-adjustments- catch up entries; reserve releases and (2) securitization profit related to the MBS/ABS desks are quite lumpy. The largest spike in the quarter package occurred at the end of December and was the result of month-end adjustments and a \$30 million gain in SST (i.e. I believe Houston Energy group related- not CalBear). While the Houston Energy's P&L is included, their positions are not included in VaR.
    - As discussed above, since the Houston Energy's positions are not in VaR, this caused 5 separate violations for the SST whitebook (comparing apples and oranges). I believe this should be the only whitebook affected (assuming that the P&L for both Merchant/Illiquid and Max/Recovery (which are separate white books- not sub-components of a whitebook like the Houston Energy business) are

excluded from Firmwide P&L as well. **Confirm with Elaine at next month's meeting?**

- Elaine analyzes exceptions and lumps them into three categories: (1) True VaR violation- market move outside of VaR predicted move (the 1 exception to the 99% VaR for Emerging Markets was related to a single position where the market price moved from 109 to 122 in a single day; the violations in governments were also actual market moves); (2) VaR violation- due to reserves and other adjustments- outside of daily market moves- not expected to be captured in VaR (this was the case with the Credit Trading exceptions); and (3) VaR violations- as a result of a problem with the VaR model. The third category of violations is generally not expected to occur. If it has, it has generally not been a surprise, but rather too deminimis (i.e. not worth changing the model) to cause a change. The gave the example of the block stock desk, where they have relatively few lumpy positions and where they don't use single stock time series. As a result, VaR exceptions are typically. Again, the size of these positions and the related P&L and risk don't warrant making the changes necessary to capture this risk fully.
  
- The major backtesting issues are as follows:
  - For static (positional p&l) - the are still relatively few desks for which BS has this type of clean p&l. In addition, the graphs we saw for static P&L were quite distorted because of bad data feeds for prices. Elaine did not go back and correct for these missing prices. **We asked that the next quarterly back test package be free of these errors.** (*These might present some challenges- we will address at the inaugural P&L quarterly meeting on April 20th*).
  
  - For the fee-adjusted P&L vs. the dirty P&L- Elaine highlighted that the differences sometimes are not as large as one would expect. She stated that not every desk classifies P&L the same- as a result fee-adjusted P&L might track very close to dirty P&L. Fee-adjusted P&L is Dirty P&L (straight from accounting P&L) - fees & commissions, net financing charges, and gross credits.

- CalBear Update

(1) New Energy PE Model for CalBear trading:

Rupert discussed Credit's new PE model for the Energy space. The PE model was built to take into consideration the uniqueness of the energy market including the following

characteristics: (1) cash flows trail delivery of gas & power (I believe by approximately 1 month)- which leads to large payables and receivables; (2) the term structure of volatility (short volatilities are greater than long-term volatilities); (3) seasonality; and (4) correlations falling apart as you get close to expiry. (See Section 5 of the report for details)

As with other product areas, the simulation based PE methodology relies upon front office pricing grids for re-pricing counterparty positions in the face of potential market movements. However, the risk factor simulation seems much more explicit here than elsewhere (although this could be just that it has been written differently). In addition, it is worth noting that correlations between products and maturity points are not currently estimated empirically, but simply assumed. (It also sounds like the vols are potentially more assumption driven, we will follow-up).

Rupert said that within the next few months, they will be switching to a mean-reversion model (for simulation purposes). Currently, they are only doing short term trades and thus the lack of mean reversion in the simulation process is not as big a deal as if they were doing longer term trades.

Rupert (and group) has given the business “cheat sheets” that convert notionals into counterparty exposures.

Rupert and Mike also discussed the difference in the counterparty (e.g. typically lower rated than in the interest rate derivative world) and the credit terms (e.g. generally have meaningful thresholds and thus not nearly as much collateral flowing back and forth).

## (2) New trade:

As part of the bankruptcy of Calpine, BS has decided not to sell Calpine natural gas and buy power from CalBear. However, as a result, they have not been able to get many contracts with other participants because of “concerns about the longevity of the CalBear operation”. The amount of master agreements to trade power and gas has been on the low end of their estimates. They are hoping that this new transaction will help to get counterparties motivated to transact with them.

The new transaction (booked March 24<sup>th</sup>) is as follows:

The transaction is with LS Power (a private equity HF) which has bought eight power plants from Duke. BS will (on a daily basis) buy up to 6000 megawatt hours of peak power from LS and sell them natural gas. The settlement of the difference occurs on the 25<sup>th</sup> day of the following month. All transactions are on a 1-day ahead basis. BS should be in a net payable position (i.e. no CE) to LS Power (however LS did put up a \$5million Letter of Credit) because it is getting paid for the power before paying for the gas. BS then will be doing the opposite (buying natural gas and selling power) to other counterparties. Thus there is no market risk, but there is counterparty risk to these other counterparties. **(They did not mention specifics about the other counterparties. We**

**should confirm what assumptions go into this zero market risk assumption or whether they have formal agreements with other counterparties)**

**Risk Management Issues:**

- The Global Head of Risk Management (i.e. head of market risk) resigned prior to our monthly risk meeting. As a result, the market risk discussion was led by the Head of Market and Credit Risk- Europe and Asia, with whom we have interacted with both during the CSE review and through our on-going monthly risk meeting process. We will discuss transition/hiring plans for this position with the Chief Risk Officer and how or if these plans will alter the independent market risk structure at Bear Stearns.
- The Chief Risk Officer noted that the Credit Department is currently focusing a lot of attention on the timely request and collection of claims related to “put-back rights” Bear Stearns has with mortgage originators that sell Bear Stearns residential mortgages. These put back rights include selling back loans to originators at cost for certain reasons, particularly if there is an early payment default or an early prepayment event. During the month, Bear Stearns increased its reserves for this issue by \$18 million for a total of \$32 million. As of the end of February, Bear Stearns had \$258 million of loans in inventory with outstanding claims<sup>1</sup>, with a significant amount of the outstanding claims coming from a relatively few amount of originators<sup>2</sup>, many of which were traditionally prime lenders who drifted into the subprime area. This issue has received the attention of senior management enhancements to the policies and procedures were recommended in a recent internal audit of this area. We will follow up on the corrective actions taken in this area. (The CRO also stated that with the typical over collateralization of the warehouse lines for subprime residential loans (generally between 3%-5%), the amount of impairments of loans (akin to the % of loans put back to originators in the purchasing context) would not have been much of an issue<sup>3</sup>).
- Derivatives PB

We asked Mike Alix about the status of Bear Stearns’ Derivatives Prime Brokerage business (at one point he had discussed the possibility of Bear growing such a business). Outside of its F/X prime brokerage operations which they have had for a

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<sup>1</sup> BS purchased \$37.4 billion of loans (subprime only or all of residential??) bought from originators during FY 2005.

<sup>2</sup> For some of the \$258 million in outstanding claims, BS has some concerns about the willingness or capacity to pay. The largest concentration came from \$54 million in claims to Mortgage IT (a public company) for which BS estimates the breakage or loss at \$12 million (as the defected loans are considered roughly 20% impaired). 5% of all of the Mortgage IT subprime loans sold to Bear were defective vs. the 60 basis points worth of defective loans from BS’ other subprime originators. Bear Stearns is currently in litigation with Mortgage IT over these claims.

<sup>3</sup> Assuming 5% of all loans are defected, and those 5% are 20% impaired, 1% over collateralization would suffice



long time (similar story across our PB firms), they haven't done much in this area, outside of ad-hoc assignments of trades.

The stated that, "their intermediation model has not caught fire in the market place." They have had one test client in the interest rate swap world and 3-4 clients in Credit Derivatives prime brokerage (back-to-back business). However, I don't believe they have had much success signing up other executing dealers.

BS has been very leery about this back-to-back business on a few fronts. First, Mike Alix sees this as a business that generates marginal PE with marginal trades (i.e. the business will be a user of credit exposure as they grow- as opposed to the traditional prime brokerage, which is largely "scalable") and that the risk/reward of taking on this credit exposure when you are only getting clearing fees might not be acceptable. Secondly, they are concerned about operational issues – namely the delay in booking the trades in DTCC. While the executing dealers are sending Bloomberg messages to the prime broker, they want the trades to be booked into DTCC concurrently (not at the end of the day-as others are apparently doing- Bear isn't currently willing to engage on this type of model). They would like the operating model to be more of a straight-through-processing operation.

- Risk Arbitrage desk- a trader in London made a sizable long only play on Peninsular & Oriental Steam Navigation Co., the British company that Dubai Ports World bought this month. During our of the weekly Risk Committee meetings, the exposure was discussed as the position had grown to \$75 million (vs. a single position limit for this desk of \$100 million). Management on the Risk Committee were asking how the trade could be building this position with all the avalanche of bad press here in the U.S. concerning the purchase of U.S. ports by a Dubai government owned company. The trader explained that notwithstanding the political uncertainty, that the legal certainty within the London Courts meant that the purchase was "rock solid". The trader took the position up the next day from \$75 million to \$92 million. Warren Spector and Sam Molinaro instructed the trader's manager to get the position down to the level at which it was when senior management expressed concerns. When the deal went final, BS had a \$57 million position in P&O. If the deal would have broken at the height of the position, risk management estimated that the losses would have been in the \$8-10 million range.
- FTC investigation into servicing practices at EMC- Mike Alix informed us that Bear Stearns EMC servicing operation was under investigation by the FTC for alleged aggressive servicing practices.

This has garnered senior management's focus and they have hired a consultant to shore up its practices, process and technology. He indicated that much of this could be related to having inadequate infrastructure.

EMC primarily services subprime and Alt-A (fixed rate) product. They don't do much (if any) in the ARM space (something to do with the complexity associated with having to calculate the resets- maybe they don't want this operational risk).

- Analysis of prepayment assumptions for new ARM products-SAMI Libor Reset and MTA Option ARMs.

The CRO highlighted the firm's focus on prepayment speeds with respect to some of the newer and more sensitive rate products. The two main products discussed were: (1) the SAMI Libor ARM<sup>4</sup>- which is a reset ARM (reset monthly, six-month, etc) which is a regular amortizing loan and (2) the MTA Option Arm- where the principal balance goes up at the reset period (to a max level) vs. the monthly payment going up (as is the case in the reset ARM).

The CRO stated that "prepayment assumptions on newer product are highly changeable". During the past month, the CPR fell on the SAMI (no option) Libor ARMs after seeing fast prepayments in the past. Much of BS' highly prepayment sensitive product is in this space (e.g. IO tranches).

With respect to the MTA Option Arms (e.g., negative amortization loans), the prepayment behavior is of particular interest to the Firm. In this area, the effects of prepayments could be harmful either way. If prepayments rise due to rates falling, this will decrease the value of the securities. However, if the firm doesn't see prepayments rise, this could be an indication that the borrower is unable to re-finance, thus signaling credit issues.

### **For Memo**

- The Global Head of Risk Management (i.e. head of market risk) resigned prior to our monthly risk meeting. As a result, the market risk discussion was led by the Head of Market and Credit Risk - Europe and Asia, with whom we have interacted with both during the CSE review and through our on-going monthly risk meeting process. We will discuss transition/hiring plans for this position with the Chief Risk Officer and how or if these plans will alter the independent market risk structure at Bear Stearns.
- The Chief Risk Officer noted that the Credit Department is currently focusing a lot of attention on the timely request and collection of claims related to "put-back rights" Bear Stearns has with mortgage originators that sell Bear Stearns residential mortgages. These put back rights include selling back loans to originators at cost for certain reasons, particularly if there is an early payment default or an early prepayment event. During the month, Bear Stearns increased its reserves for this issue as the firm had a significant amount of loans in inventory with outstanding claims, with a disproportionate amount of the outstanding claims coming from a relatively few amount of originators. This issue has received the attention of senior

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<sup>4</sup> While Libor products have been around for some time, the CRO notes that this is a new type of monetary environment for these products.

management and enhancements to the policies and procedures were recommended in a recent internal audit of this area. We will follow up on the corrective actions taken in this area.

- Bears Stearns has rolled out its initial PE model for the Commodities product area. Future iterations are expected in the near future. OPSRA will conduct a more thorough review of this model and planned enhancements as part of our ongoing PE validation project.

JTG 3/20/06

## **Bear Stearns (Package Dated January 31, 2006; Discussion on February 15, 2006)**

### **Market Risk**

#### **Bankruptcy/ High Yield Area:**

- The Distressed Debt Desk had a large profit of \$26 million, \$9 million of which came from gains on first lien Calpine debt following an affirmation of payment by the bankruptcy court. The net market value changed by only \$80 million (decreasing).
- Bank Debt Funded's net market value decreased by \$112 million to \$1.28 billion, as the desk syndicated down \$100 million of Sprint/Nextel exposure.

#### **Mortgages and ABS:**

- The ARMs Desk – had a large profit of \$55 million due to several deals (which collectively were well in excess of \$4 billion) getting done. The risk manager described January as a “robust issuance month”, speculating that the desk possibly benefited from pent up demand following the quiet December. Consequently, net market value decreased by \$1.76 billion to \$12.17 billion.
- The Non-Agency CMO Desk also had a large profit, making \$36 million on the month. The desk enjoyed overall good deal flow. Net market value decreased by just \$27 million.
- Last month the net market value of the Asset Backed Desk's positions had increased by \$532 million (which was unexplained at the time). This was driven by some “VPRN notes coming out” (these look like GMAC Variable Pay Revolving Notes which are backed by home equity loans). This exposure came back down this month as the desk sold out of the position; net market value decreasing by \$858 million to just \$154 million.
- The Commercial Conduit Desk made \$12 million during the month and its net market value increase by \$511 million to \$4.4 billion.
- Aged Inventory, which was discussed last month as being an area of focus for RMD, is now back down for Mortgages as a result of the various deals getting done. Aged inventory for mortgages was down \$500 million (\$3.1 down from \$3.6 billion).
- Following the release of the new *ABS indices*, the risk manager noted that there had been considerable volume in CDS trading in the home equity index (BBB subcomponent). This was described as representing a transition from derivatives trading from single name (meaning referencing individual cash deals in this context) to index product. When asked if this trading was concentrated in a particular desk, the risk manager's response was that he thought (seemingly not sure) trading was

spread out across various desks (e.g., ARMs, CMO and Resi Subs). In addition, RMD has hired a new employee from FAST for reviewing mortgage models.

As an aside, the credit risk manager noted some personal skepticism regarding the potential for creating tranching product from this index; explaining it seemed a lot of subordination would be required to carve out investment grade securities.

### **Credit Trading:**

- The Credit Trading Desk made \$60 million during the month. While most subdesks contributed, particular drivers were large single name positioning in the autos (discussed in previous months; still have \$500 million in GMAC and \$200 million in Ford Motor Credit) and profits from the structured credit prop traders. (These guys are apparently not correlation traders, and take more plain vanilla risk. Separately, a structured credit trader is moving into Fixed Income Investments. This was described as serving the role of a sort of internal hedge fund). Aggregate spread risk pops flipped from basically flat to long \$8.9 million, which was not discussed (we'll ask next time).

### **Emerging Markets:**

- The Emerging Markets Desk's positions are expected to come down, as two traders were "let go". There were no serious issues leading to this dismissal, the risk manager just noted that Bear has had a difficult time developing a niche in this space. This desk's VaR is currently \$3.4 million (compared to \$11.9 for Credit Trading) and aggregate spread risk pops are \$2.4 million.

### **Derivatives:**

- The Equity Derivatives Desk made \$81 million. The profits were spread across a number of product areas as well as between US and London trading. For instance, in New York the volatility desk made \$21 million and \$9 million was made in convertibles trading. Meanwhile in London \$14 million was made in exotics and the volatility desk's dispersion strategy (long the single names and short the indices) exhibited gains. The VaR increased by \$373 thousand to \$8.6 million and the Large Market Drop loss increased by \$10.4 million to \$35.1 million.
- The Fixed Income Derivatives Desk had a small profit during the month, as it gave back some gains by losing \$5 million on a long volatility position and \$8 million on a short delta position.

### **Block Trading**

- Block long market value increased from \$14 million to \$171 million. The desk took down \$230 million of one ticker, which it had sold down to \$147 million by the time of the report. The P/L on the position was \$7 million, but this was somewhat inflated

due to a change in the accounting rules with respect to blocks (they are not suppose to take large position/liquidity discounts any more apparently).

### **VaR Specifics:**

- The Firmwide 1-week VaR decreased by \$7.5 million to \$63.8 million. Total Credit and Equity stand alone VaRs changed very little. Thus Interest Rates drove the Firmwide decrease, as its stand alone VaR decreased from \$46.42 million to \$38.94 million. The decrease came from several areas, with ARMs exhibiting the largest stand alone decrease of \$3.4 million, which is consistent with the decrease in net market value. In addition, the second largest decrease came from the Interest Rate Derivatives Desk decreasing its long vega position (discussed above).
- Credit Trading VaR is down by \$3.2 million to \$11.9 million, driven by decreases in the auto position VaRs (GMAC, Ford, and GM). [Must be due to time series because exposures are reportedly still up? we will follow up].
- The Risk Arbitrage VaR increased by \$3.9 million to \$9.5 million, however, the risk manager felt the deal break risk associated with a position was overstated by the methodology.

### **Scenario Analysis:**

- There was no RMD focus on scenario impact changes for January. The 1987 and 9/11 scenarios remain the most severe on a one-day and one week basis. The 1987 scenario increased modestly from an \$818 million one-day loss to an \$831 million one-day loss. The 9/11 loss increased moderately from a \$234 million one day loss to a \$300 million one-day loss. On a one-month basis, the Russia/LTCM 1998 scenario loss remains the largest loss, and is essentially unchanged at \$721 million.

### **Credit Risk**

- There was little change to speak of in terms of the net exposure numbers. Total exposure decreased by about \$1 billion, with Placements serving as the largest driver. Repo NE also decreased by roughly \$330 million. The NE distribution by rating also remained materially the same.
- Following up on the addition of the prime brokerage activities to the packet discussed last month, Mike Alix mentioned Bear's desire to domicile more hedge fund activities in the broker-dealer, so that Bear could get the portfolio effect (i.e. apply netting with more legal certainty by not having to net across Bear entities). Reference was made to the current debate regarding customer (portfolio) margining rules.
- The number of Fund-of-Fund bridge loan facilities, which are loans out of the custodial bank (CTC loans) secured by limited partnership interest in hedge funds, has increased. In terms of outstanding balances, the number has grown from \$487

million in August 2005 (around the time of the CSE review) to \$742 million. These balances obviously fluctuate based on redemption cycles, but at any rate we will continue to monitor growth in this activity.

### **Additional Presentations**

As part of the “Cross-firm Basel” project, Jim Collins presented the capital calculations for the 3 areas. Materials are available.

### **For Memo**

- OTC trading has commenced in CalBear. Thus far only “a few” counterparty trades have been done, and only with large counterparties such as Exxon. March 20 is the current deadline for the bankruptcy court to affirm the CalBear Agreements. Again, should Bear have to exit the deal its risk is basically limited to time/resources lost in establishing the venture. From a market risk perspective, trading remains limited to the \$1 million daily VaR.

## **Bear Stearns (Package Dated July 31, 2006; Discussion on August 16, 2006)**

### **Market Risk (Kan and Mike)**

July turned out to be a good month in terms of P/L and customer flow, especially compared to last month's expectations. As discussed in last month's note, there was some concern around the firm that investor activity was faltering, even on a seasonally adjusted basis. However, mortgage investor activity in particular was fairly strong in July. Given the typical seasonal drop off in August, the CRO expects less stellar results next month, and says there is currently a lot of desire to keep things moving through the pipe.

### **Bankruptcy/ High Yield Area:**

The Distressed Desk - made a big profit of around \$20 million, despite some continued losses on asbestos positions. In particular the desk's Owens Corning bond position has come under recent scrutiny, which we will follow up on next time. The desks total net market position value increased by \$47 million to \$1.2 billion, their largest position size ever. Some of the desks largest positions remain in Asbestos (\$140 million), Enron (\$110 million) and Independent Power Plants (\$220 million). Also, the desk increased its position in Aircraft Leases from \$90-\$110 million to around \$140 million. The desk continues to get more involved in the aircraft business, for instance contemplating providing warehouse lines (not sure how the financing fits in with the current business, but we will stay tuned). The basic idea behind the aircraft business is for the desk to purchase aircraft with distressed leases and either 1) renegotiate the lease, 2) re-lease the aircraft to another carrier, or 3) sell the aircraft. This business model requires in-depth knowledge of both aircraft value as well as the bankruptcy process, as the idea is to find planes with purchase prices that are a function of the distressed lease value, as opposed to the plane value or re-lease rate. (There was also something in here about knowing when the bankruptcy courts are going to reject a lease/re-lease?)

Bank Debt Funded made a large profit of \$13 million, \$10 on seven new deals. Also, one the BD Commitments line, one notable transaction was Bear taking a piece of a renewal of a \$4.5 billion unsecured revolver for GMAC. This is a relationship loan that the desk took an approximately \$4 million mark-down on. The ultimate hold level for this commitment is \$72 million.

Marc described July as another active month for leveraged finance. Bear's Offered total increased from \$5.4 to \$6.9 billion, and its Accepted Offered total increased by \$300 million to \$3.5 billion. He said that since the moderate pricing spike and investor push back in May, things have come back in July and August. He also noted that Bear is not participating in any of the recent, large and high profile deals – i.e., TXU and Kinder Morgan. He noted that the business is now really focusing on the smaller LBOs that have an equity component. That is, Bear is looking to capitalize on the revenue opportunities associated with the subsequent IPOs. Bear did participate in one large deal during the month, (Caleses?), which was not a sponsor deal. Bear's portion was originally \$1.8



billion, however, it quickly reduced this to \$590 million by bringing in two other banks. It will continue to syndicate down these exposures. The facility is comprised of bridge loan that is intended to be taken out by a high yield bond issuance, as well as bank debt.

The CRO also inquired as to whether we were having conversations with other regulators about leveraged finance, as he said this area, along with hedge fund margin terms and option ARMs seemed to him to be the really hot topics. As part of this conversation he re-affirmed that this continues to be a more important business and area of focus internally, and noted how people find it challenging to assess what the firm's risk is at any point in time (due to the standard issues, relating to offers not accepted, the sponsors getting multiple people to commit to full amount, deal-break, etc.). He suggested that what worries him is less the broad market event, but more what happens when there are one or several more idiosyncratic events. But nonetheless, people remain focused on understanding how the business is turning over risk, and what the impact will be when the music stops.

### Mortgages and ABS

Broadly speaking, turnover was back up a bit in the mortgage business, and aged inventory was reduced by about \$300 million to \$2.7 billion. (Recall last month things had slowed a bit).

The ARMs Desk - made approximately \$25 million, \$20 million of which was "deal P/L". The desk's net market value position was down a marked \$2.8 billion to \$9.5 billion. This is the first month since November 2004 that its net balance sheet has fallen south of \$10 billion at month end (which I assume is a combination of the better than expected July customer demand and slowing down the pipeline purchases before August). Also, the Option-ARM IO position discussed last month was reduced to \$110 million from \$160 million, via sales and re-securitizing some of the IO tranches.

The CRO continues to note the strength/importance of Option Arm product, as this now represents about ¼ of the collateral going into Bear's ARMs deals. In addition, the BearRes (origination) business continues to grow, and Bear continues to succeed in its efforts to vertical integrate its securitization business. **The desk did three deals in July that were collateralized 100% with BearRes collateral**, whereas before this month they had been sprinkling the BearRes product in with the loans they purchased. Early performance indicates the BearRes originated product represents "a superior set of loans", but it is really too early to tell as the loans are only aged about two months at this point. It sounds as if BearRes originates mostly ARMs - Option ARMs with some Hybrid ARMs, that are mostly Alt A like credit quality with some subprime, but we will follow up in more detail as part of our mortgage operations work.

The CMO Desk - made a large profit of \$32 million, \$17 million of which came from new deals. The remaining profit came from trading and servicing income.

The ABS Desk – made a big profit of \$19 million. \$16 million of this came on 3 new deals and the desk selling some equity and BB tranches remaining from previous transactions. The net market value was down \$89 million to \$598 million.

The London ABS/MBS/CDO Desk – made a large profit of \$32 million. \$9 million of this came from selling the impaired Pachinko parlor loan discussed in previous months. This was a \$40 million loan that the desk had marked back by \$13 million due to the impairment. Net-net, the desk lost about \$4 million on the position. These Pachinko loans (there was another one they had already sold) had been an area of focus at the firm, largely due to issues at the business such as relating to the controls in place around cash. There was a sentiment that this would probably be the firm’s last foray into Pachinko. However, as the firm continually seeks out new opportunities, such missteps are sure to happen on occasion.

Separately, the status of Rooftop is that some senior management in New York has moved over to London, so as to have experienced management drive the business locally rather than remotely. Rooftop however is still attempting to negotiate out of its agreement with the current servicer, Crown, and it has another servicing waiting to take over (but Crown will likely keep servicing the old loans). The CRO noted that the contract Bear entered into with Crown was “poorly drafted”. On the bright side, however, the business has “circled” to sell \$300 million of the worse performing product, which Bear expects not to take a loss on. One thing we did ask for clarification on was the extent to which new loan origination had slowed when the problems originally surfaced, as we were at one point under the impression (from Mike) that origination had stopped altogether. It turns out that origination has been “chugging along” all the while, as this is the sort of business that relies on broker relationships etc.- meaning you can’t send the signal that you are out of business. But the CRO stated that the origination had “slowed a little”.

### **Fixed Income Investments**

The REIT – position took a small loss of \$3.9 million, but this was purely due to the discrepancy discussed in previous months regarding how the position is marked relative to the rate hedges. There is still no other news on this position.

Max Recovery – made \$15 million, but the risk manager noted that some UK positions (an area that has been set for growth) were underperforming the model projections. But the model is recalibrated frequently.

Credit Trading – made a very large profit of \$64 million. Approximately half of this came from Structured Credit, due to new deal origination, a decrease in some model reserves, and the switching off of the single name – index basis discussed last month and at our recent controller meeting. The basis adjustment accounted for around \$6 to \$7 million in profit. The other half of the profits came from single name trading as well as the business’s structured credit prop desk, which often seeks to make money “by picking off some non-standard attachment points”. [A comment was made that it is interesting how you can make money on two sides, partly from completing the capital structure,

which sounded like what we have heard from Blue Mountain regarding how they arbitrage dealers]. The desk as a whole flipped from long \$7.8 million spread risk pops to short \$10.3 million. There was no one clear explanation for this, but the risk management noted that this can sometimes happen when the Structured Credit desk is pre-hedging, and also suggested a somewhat bearish view amongst the credit traders. In addition, the desk currently tends to be long wider spread names and short tighter spread names. Along these lines, the CRO noted that the firm is working on getting some alternative spread risk metrics reported via production mode analyses, as gross spread risk metrics in no way paint a complete picture. This led to a more broad discussion of his desire to enhance market risk reporting. He noted that currently risk management has at its disposal a lot risk reports and analysis that come from a variety of sources, but they want to work towards giving senior management the ability drill down into certain areas from their higher level reports. The goal is to accomplish this within the firmwide risk system RIO, rather than obtaining analytics from a variety of less automated sources (e.g., a spreadsheet produced on someone's desktop)

**Risk Arbitrage** – profit was approximately flat for the month, but P/L remains “fairly choppy”.

### **Derivatives**

**Equity Derivatives** – made a large profit of \$28.7 million. The risk manager noted that reset convertible bonds have recently taken off in Asia (I believe these were born in Japan, but declined in popularity for some time). The desk has recently had two of these transactions go somewhat bad, as the underlying stock price has fallen below the conversion floor, leaving the desk naked long a low quality bond. The total position size is only \$11 million and Bear actually has put back options to issuers, giving them comfort. The CRO commented that these are like share issuances by another name, and said that but for the floor on the conversion price these instruments are like what is referred to in the industry as “death spiral” financing (which appears to be used synonymously with reset or floating convertibles as far as I can tell), which got its name from the practice of firms continually selling stock in a dilutive manner in order to repay debt. At any rate, this is an interesting risk coming out of Tokyo, partly because of how these two positions have gone but also partly because these are somewhat controversial from the investors' perspective (as an aside, it sounds like typically small cap companies do these). We will follow-up regarding these positions (have they taken a loss, what do they need to do to get out, etc.?).

The risk manager also noted a recent build up in the European Variance Dispersion Strategy, which entails going long single stock vega and short basket vega. The desk is currently long \$15 to \$20 million of vega on each side, but this was described as a “great strategy” as it enables one to benefit from name specific events.

The large market drop impact flipped from a \$12.4 million gain to \$15.9 million loss. This change in risk profile was not discussed, but the loss impact lies well within the historical range of magnitudes.

Fixed Income – derivatives made \$11.5 million. The risk manager noted that the spread options business had been picking up a bit. He also noted a transaction in a new type of instrument that is PRDC-like with a cliquet (forward starting) feature (didn't give a name). These instruments have coupons that are a function of the FX –rate differential and previous period coupon, with a future option to flip out into a fixed rate payment. Kan noted that valuing these requires a three factor model and a FX forward skew input.

**Strategic Structured:** Made an enormous \$93 million profit from the sale of two power plants in Florida, where their partner dealer bought them out. The risk manager noted that this business has some other assets and is also looking for opportunities to redeploy.

### **VaR Specifics:**

- Again there was no VaR discussion, and again there was little change in the top line numbers. The firmwide weekly VaR increased from \$65.3 million to \$67.8 million (daily VaR from \$29.2 to \$30.3 million). And none of the changes seem surprising given the discussion of monthly business activity (e.g., ARMs VaR came down by \$7 million following the large position reduction). However, one thing we noticed was that the Interest Rate VaR spiked at nearly \$85 million intra-month. This was attributed to two factors: 1) a Fed Fund Options position rolled off during the month – and we have heard before that these positions behave a bit squirrely for VaR purposes as they approach expiry, due to the pronounced cross gamma effects (I can only assume that is what it was, Rupert was not present), and 2) the Mortgage desk has been/was running pretty significant rate risk. However, the traders actually felt the official rate risk being reported was overstated – and it sounded like that has to do with the typical sorts of stories we have heard before where traders use more empirical durations versus model based, and it is difficult to tell who is correct.

### **Scenario Analysis:**

- There was also no discussion of the scenario changes.

### **Credit Risk**

- There were no notable changes to the credit exposures. The only noteworthy event during the month was the firm forming an internal committee to decide on borderline cases for netting. Members include Mike Alix, Jeff Farber and the firm's deputy general counsel. Mike said the work this committee is doing should help shed some insight into some areas where credit is reporting some pretty big numbers. And he noted that the changes to the net capital rule and the firm being able to bring more positions into the BD should help.
- As part of the work senior management is doing with the Fed, we brought up current practice with respect to margining hedge fund counterparties for OTC derivative trades. Mike provided some useful details:

He confirmed that there is no exception on the zero threshold rule (some small minimum transfer amount aside I am sure). On initial margin, Bear basically has four buckets of

counterparties. We have a detailed presentation on this from Rupert for FX, but in turns out the same philosophy is applied across all the product areas:

1) House Margin: this is "very conservative" and is typically greater than the 5 day VaR, thus resulting in little to zero PE

2) Preferred: less margin than House

3) Bear Min - this is based roughly on what the exchanges do (but is more reactive to changing conditions). Thus it covers 1/2 to 1 days PE (my understanding is that the exchanges cover roughly a 1-day two standard deviation move). This is for larger more sophisticated funds.

4) Zero - For the largest and most sophisticated customers, no initial margin is required. This is used for a dozen or so counterparties.

Again, we have a fair amount of detail on the methodologies for 1 and 2 for FX.

Also, there is an overlay to the standard margining schemes, which was referred to as a sort of internal credit line concept. Basically, the businesses can use this line to decrease the standard initial margin requirements. It sounds like all they have to really pay in return is a higher CVA. But as the CVA is based on the expected loss and not a tail exposure, you can imagine the cost is not very large on the margin. We might want to look more at this.

Mike also said that, on a trade-by-trade basis, the terms for structured credit have gotten more aggressive over time.

Separately, he suggested we read a more recent Mercer Oliver Wyman report, as he said it had info on margin levels (for instance, shedding light on the number of managers who were able to negotiate away initial margin). I will look into this.

This is for derivatives only. Margin levels for traditional PB remain very conservative. Although, Mike discussed (again) the possibility of there being convergence in the two credit models over time. Also, one area where Bear has seen particular push back from clients, and had some clients actually leave for competitors offering more aggressive terms, is on the Fixed Income Clearance side.

### **For Memo**

- Bear's efforts to vertically integrate its mortgage securitization business continue to progress, as the business is sourcing a larger portion of the loans for its MBS deals from its newly formed (2005) U.S. residential mortgage originator, Bear Stearns Residential Mortgage Corp ("Bear Res"). For the first time in July, Bear brought several deals to market that were collateralized 100% with Bear Res originated loans.

Prior to July, all Bear Res product had been securitized with loans purchased from third party originators.

- The CRO noted that risk management is working to improve the production line suite of risk reports made available to the firm's senior management, so as to allow individuals to view the firm's risk from a high level and then drill-down into particular areas of interest. This entails not only work from an analytical modeling perspective, but making off-line reports available in a more automated and controlled environment. In addition to requiring investment by risk management, such enhancements should be facilitated by the front office IT initiatives, such as the upcoming front-to-back office platform "Calypso". As risk management works to enhance the risk reporting provided to senior management, we will discuss and incorporate into our monthly process.

**Bear Stearns (Package Dated June 30, 2006; Discussion on July 19, 2006)**

**Market Risk** (Given by – Kan via teleconference)

- The CRO explained that June was a good month from a P&L perspective but that many businesses have begun to take some chips of the table as they are seeing a reduction in customer activity in both credit and interest rate products. As such, he expects July's performance will not be as robust as June.
  - The CRO stated that the build up in aged inventory is one manifestation of customer activity waning. He also noted that the slow down in market making activities (i.e. summer doldrums) has come early and has been more pronounced than he would have predicted.

**Bankruptcy/ High Yield Area:**

High Yield Desk net market value increased 70% to \$123 million by the end of June. The largest positions remain autos at around \$40 million (\$27 million in GMAC alone). The auto sector improved in June.

During the month they added a \$15 million position in Chesapeake Energy. During the month, they had a couple of small losses on positions including a \$2 million loss on a \$20 million position in Six Flags.

The Distressed Debt Desk made a moderate profit of \$16.5 million down from a very large profit of \$48 million the prior month. Gains came from Enron positions and from independent power company positions (\$6 million). The gains were offset by \$8 million in write-downs on Asbestos related companies such as Owens Corning.

The largest positions in the portfolio which increased \$69 million to \$1.134 billion were:

\$150 million in Asbestos related names (the Owens Corning position doubled to \$44 million).  
\$210 million in Independent Power  
\$110 in Enron  
\$90 million (up from \$60 million)-in Delta related leases (exit strategy-renegotiate the leases or sell the aircraft).

Bank Debt Funded – the desk made \$18 million during the month. The net MV of the Bank Debt Funded positions increased \$1.2 billion. This increase was mainly the result of a 30-day Bridge loan to Cedar Fair (an amusement park deal) in the amount of \$1.2 billion.

BS has substantially completed syndication of the term facility (with circles down to \$240 million) that is to take out the bridge. Post syndication, they will sell further down to the target hold level.

During the month, the PAC Committee approved \$7.8 billion of deals. However, the largest deal approved during the month (\$3.6 billion for a buyout of an apparel company) was terminated when the fund sponsor they were backing did not win the deal. There were 15 deals that were approved during the month by the PAC committee.

Commentary on Bank Loans/Leverage Lending:

The CRO noted continued robustness in financial sponsor deals. However, he also confirmed that they have seen a push back against “covenant-lite” deals during June and that lower rated credits are now back to getting done with more traditional covenants in them. He saw this as another manifestation of higher risk aversion or less acceptance of overly aggressive terms by investors in the space.

The Head of the Credit Group within RMD also noted that on some deals (e.g., Rexnord Corp) the bank had to use its “flex” to get the sponsor to agree to covenants (i.e. flexed out covenants). Basically the firm used the threat of price flex to get financial sponsor to agree to include traditional covenants in the deal.

### **Mortgages and ABS**

The risk manager noted that while profits were good, they were down substantially from the numbers we have seen over the last few months. In addition, the numbers of deals completed in June were down from the prior month. As a result, net MV and aged inventory were up across the securitization businesses (e.g. ARMs and non-agency CMOs).

The ARMs Desk – had a profit of \$28 million, around half the profit the desk made the previous month. The net MV of positions increased \$2.1 billion to \$12.3 billion. The risk manager also noted that the Option ARM product continues to be a significant portion of their pipeline. During the month, BS purchased \$3 billion of Option Arm loans from Countrywide. Of these, \$2 billion were already slated for a new securitization deal.

The aged inventory for ARMS increased to \$318 million. The risk manager also discussed the prepayment sensitive IO positions the firm held:

- (1) SAMI IOs- were down from \$39 to \$33 million as prepayment speeds had increased on the underlying loans.
- (2) Option-ARM IOs- positions increased from \$60 million to \$160 million. The increase was through both new production as well as from the purchasing (buying back) of a large position from a client unhappy with the performance of the security.

Last year Bob Neff discussed a similar type transaction related to SAMI IOs, were the firm bought back a large IO tranche from a client. At the time, this position represented a significant portion of the measured risk for the ARMs desk.



Kan stated that he would be looking into the building up of Option ARM IO (prepayment speed increased on this product during the month). ***We will follow up on this area next month.***

The CMO Desk – had a profit of \$32.6 million (down from the outsized \$50 million profit the month before). The Agency CMO desk produced a large profit of \$10 million on 15 new deals; whereas, the non-agency CMO desk made \$17 million on 6 deals (with a \$2.3 billion net market value).

The risk manager noted that the agency CMO was above its limit and that aged inventory was at about 10% of the net MV. The Non-agency CMO desk increased 8% to \$9.5 billion and the increase was primarily in securitized product \$1.5 Billion. ***Follow up at the next monthly meeting.***

ABS Desk- made a large profit of \$25.2 million. \$19 million came from the CDO primary business where 3 new deals were done in June. In addition, they made \$7 million in ABS Trading (particularly in their auto loans positions where they have \$2 billion in Chrysler loans and \$1 billion in Ford-Canadian loans).

London/ABS/MBS/CDO – The desk made \$16.9 million of which \$12 million came from the securitization of a 350 million Pound loan for a Parlor in London. On the other Pachinko parlor loan (discussed in previous months- the one where the previous owner and operator of the parlor engaged in malfeasance behavior), BS hoped to earn back a couple of million on the loan they have previously marked down \$12 million. We can follow up next month.

#### Rooftop:

Rooftop was in the FT on the day of our monthly meeting discussing further problems with the two securitization deals (Farrington Mortgages 1 & 2) that Rooftop had issued to the market (backed by 2005 originated subprime loans).

(See attached article below)

**FT.com site : Mortgage bond draws on reserve.**

Paul J Davies

440 words

18 July 2006

Financial Times (FT.Com)

English

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The only UK bond backed by residential mortgages to have suffered a credit rating downgrade has had more problems meeting its interest payments to investors, after losses on some of its underlying loans increased.

Farrington Mortgages 1, a GBP125m (\$228m) deal from Rooftop Mortgages, the specialist lending unit of Bear Stearns, has been forced to make a second drawing on the funding cushion that is designed to protect investors in the deal from first losses.

The first withdrawal from the so-called reserve fund led Fitch Ratings to downgrade three tranches of the deal in May. However, Fitch said it would not take any more action on Farrington 1 this time.

The news comes as the arrears outlook worsens for sub-prime mortgage lenders, which make loans to people rejected by other banks, usually due to poor credit history or the lack of a proved regular income.

Shares in Kensington Group, one of the early leaders in the UK sub-prime sector, lost 14 per cent to GBP8.85 in one day last week after it reported growing arrears and bad debts along with its healthy profits for the first half.

While Kensington's stock has since slipped further, to GBP8.01 on Tuesday, the spreads on its residential mortgage-backed securities have not been affected, which analysts said was because the arrears data was already in the securitisation markets.

Also Investec, the investment bank, last week saw its first sub-prime RMBS deal price at a more costly rate than had been expected and wide of other deals in the market.

Fitch said on Tuesday that the GBP97,000 second drawing on Farringdon 1's reserve fund meant there was now just GBP1.06m in the cushion against an original target of GBP5.25m. Stuart Jennings, managing director at Fitch, said the deal could suffer further downgrades if performance continued to deteriorate.

Farringdon Mortgages 2, which was issued in September last year, also looks to be under-performing and could face a reserve fund draw in coming months, Fitch said.

Part of the reason Rooftop's bonds have suffered is because they are relatively recent issues backed by mortgages where borrowers had not had a chance to build up any equity, which can lead to bigger losses when homes are repossessed.

One of the main reasons the deals have seen their reserve funds grow so slowly is the constraint placed on cash flows to the deal by large detachable coupon tickets that were sold to some investors.

Rooftop is thought unlikely to include such tickets on future deals.

50237173

We asked the risk manager two specific questions: (1) How much did the firm hold in inventory (i.e. loans) on its books originated through Rooftop? And (2) What was the exit strategy?

The risk manager stated that they had \$1.5 billion in closed loans and commitments (no break-out given) that hadn't been securitized.

Last month they told us that they did not plan on originating new collateral out of Rooftop and that they were not bringing any new Rooftop deals to market. This month, they basically said that whole loan sales would probably be their exit strategy and that they had used this approach in previous deals (i.e. selling high quality loans through whole loan sales and putting the remainder into securities). They also reiterated that this was at least partially to blame for the poor performance of the collateral backing the securities.

The risk manager stated that they typically originate at a cost of 101 to 102 and typically make between ½ and 1 ½ points on the loans.

However, with the poor press, they may be stuck holding and servicing these loans for some time before being able to exit the position (*my personal commentary*).

***We will follow up on any developments in this situation.***

Lori- found this additional article on Rooftop (FT July 22, 2006)

**One man's ceiling is another's flaw - CLAY HARRIS MUDLARK.**

By CLAY HARRIS

126 words

22 July 2006

Financial Times

London Ed1

Page 16

English

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Rooftop Mortgages, a unit of Bear Stearns and a relatively recent entrant into the business of extending mortgages to less well-regarded borrowers, has learnt the hard way about why other lenders avoid them. Rooftop, like other subprime lenders, has been seeing bad debts rise.

According to one person at Rooftop, it lost more than Pounds 200,000 on the repossession and sale of just three properties.

One was abandoned in a state of disrepair; the second had been turned into a cannabis factory. The third, in possibly the worst DIY job ever, was a bungalow on which the owner had tried to add a second storey, badly.

EMC- Continues to ramp up operations. It made \$30.2 million on a combination of interest income and servicing fees. The risk manager stated that EMC plans to move to new offices in September (still in Dallas). They also plan to outsource certain admin and calling center operations to India. Mike also stated that the New Products Committee approved the BS Residential Mortgage Customer Retention business. The purpose of this endeavor is to have EMC retain its servicing base by identifying those loans that are likely to refinance and preemptively contact those consumers to try to have them refinance through Bear Res. This will be the first move into direct contact with customers as the traditional Bear Stearns Residential Mortgage operation is a broker based model. They are currently staffing for the operation. The individuals will be part of Bear Res but will physically be located at EMC. (This was one of the new products/transactions highlighted on tab 8 of the monthly risk package. See the package for other items reviewed by the committee).

Commercial – The desk made \$24.6 million on 3 deals during the month despite having a \$3 million write down on a loan backed by a NY office building. The problems with this borrower appeared to be a big deal for the business and there was discussion of some possible re-negotiation. Consider following up next month- on the type of loan and the reason for the mark-down.

## **Fixed Income Investments**

**Max Recovery** – made a profit of \$20.3 million, slightly above its average. Cash flows continue to come in substantially above model projections.

**Credit Trading** – made a profit of \$31 million. The substantial portion came from a curve steepener the firm has on both GMAC and Ford. They were running \$85k spread PV01 to the auto sector. They made money from the curve for these names tightening and steepening.

### **Structured Credit:**

The desk had a small loss for the month was driven by basis between single name hedges and bespoke CDO tranches which they currently mark by using index implied spreads.

The CRO briefly discussed the firm's historic approach to marking bespoke CDO tranches and how they are changing their approach. Historically, they would hedge and value bespoke tranches using index implied spreads. This approach was taken with the view that the index product was much more liquid and that certain single name CDS were rather illiquid and the price transparency was not there.

Now, with the single name CDS much more liquid, they are moving to mark the bespoke CDO tranches using single name spreads from CDS (*will hope to get much better clarification of this at next Thursday's meeting*).

This new approach should result in the elimination of a basis when the firm hedges with single name CDS as the bespoke CDO tranches spreads will be marked off of single name CDS spreads on a going-forward basis. As a result, the business will not generate basis risk unless they intentionally choose to hedge with indexes. That way any basis risk taken will be the result of a purposeful decision rather than a by-product of the way the book is marked.

Mike stated that when they fully recognize the switch from index to single name CDS they will recapture some of the losses they recorded in June on the widening of the basis (*Get clarification at next week's meeting*).

**Emerging Markets** – the desk loss \$850k in June. Most of the loss came from a short position in Brazil, which tightened over the month. The risk manager noted a concentrated position the firm had in a special class of Russian Debt (SPV that holds some Paris Club Debt) roughly \$135 million which is scheduled to be paid in the next couple of months. (This was discussed at LB as well as they have bought into this position as well- with the bet that the debt will in effect become German paper and be bought back at a premium at that point).

The risk manager also highlighted their exposure in the Middle East- \$30 million in CDS. Less than \$5 million in EM (\$2 million in Qatar); less than \$500k in Lebanon.

### **Risk Arbitrage**

The desk rebounded from the poor performance last month and posted a \$16 million profit. Most of the profit related to deal spreads tightening on announced deals not from the “rumortrage” or “event” positions that provided such large losses in May. In July, so far, the desk has lost about \$6 million, again, mostly on the event positions. Despite this continued P&L volatility, the risk manager noted that the desk has still had a record year. (Interestingly, when discussing merger arbitrage at Lehman, Paul stated that they do not bet on names prior to an announcement because “you can’t make any money unless you have inside information”).

### **Derivatives**

Equity Derivatives – had a profit of around \$32.5 million, a little bit of a slow up from the high profits generated in the past several months. The only notable P&L event was from a Quantitative (long/short) strategy which made \$6.5 million in June.

**The risk manager also noted that given the high implied equity vols in June, customers sold BS variance swaps and put options on the S&P. As a result of this client facilitation (not mandated from management), the desk had substantial protection against large market shocks. In fact, the large market drop scenario dropped from a loss of \$91.7 million for the SEP whitebook to a gain of \$12.4 million.**

Fixed Income Derivatives- made a profit of \$40.5 million mostly from options trading in NY. The VaR increase was due to the desk’s short Vega position. The risk manager stated that the Vega risk profile was complicated and that it was an area for investigation. *We will follow up at next month’s meeting.*

### **VaR Specifics:**

- There were no noteworthy changes in VaR and thus the VaR was not discussed in detail during the month. The Firmwide Total VaR (weekly 95%) decreased slightly from \$66.7 million to \$65.3 million.

### **Scenario Analysis:**

- There was no discussion of the scenario changes during the meeting other than the CRO noted that there was nothing noteworthy. In looking through the scenarios, the only change that didn’t seem to be explained by the discussion of exposures (tab 1) was the 1987 stock market crash with respect to the risk arb desk. The Risk Arb one-day loss went from \$(26) million loss to \$(167) million, which doesn’t seem to match the change in positions discussed on tab 1. *Follow up at next meeting.*

## Credit Risk

- HF update: Mike noted that conditions moderated in June for HFs. He stated that there were no outsized margin calls, no problems with PB clients making margin calls, and did not see an increase in leverage being used by funds (i.e. still using relatively moderate levels of leverage). However, Mike noted that during his conversations with HF clients, he characterized them as being more subdued and worried about systemic risk, crowded trades, and risk aversion in general.
- Current exposure increased \$1.9 billion to \$24.7 billion. The increase was across rating categories and products. In typical fashion, exposure in the bonds borrowed/stocks borrowed/repo space picked up (after being down the previous month-end (a quarter end)).
  - There were no noteworthy changes in the risk profile. However, Judy discussed a couple of corporate exposures (NABORS Industries (discussed last month as well) and Scientific Games). The trades with these counterparties were in effect call spreads purchased by BS on the company's own stock ("right-way" risk).
  - Judy highlighted a couple of other corporates (Xerox and Chesapeake Energy Corp) which had swap CEs of \$53 million and \$40 million respectively. However, she noted that they are being hedged (almost fully) by the CVA trader but that the hedges are not reflected on this report.

## Other

- **Regarding Bear Energy** – no material change in operations for the prior month.

## For Memo

- After a month characterized by high profitability and high turnover of inventory, the net market value of positions in Bear Stearn's residential securitization pipelines increased almost \$4 billion during June. The risk manager highlighted the lower turnover this month as well as a significant increase in aged inventory, a key metric in managing a securitization business. We will follow up with risk management on both the levels and aging of inventory in the securitization pipeline at the next monthly meeting.
- The problems at Rooftop Mortgages Limited, Bear Stearns' UK subprime mortgage originator, discussed two months ago have continued. As a result of the continued poor performance of the two deals already in the market, Bear Stearns has decided not to bring another Rooftop deal to market for the time being and hopes to sell the current inventory of originated loans through bulk whole loan sales. In addition, Rooftop has stopped originating new loans. We will continue to monitor this

situation as the amount of loan inventory, including commitments, is approximately \$1.5 billion.

- During the July meeting, the risk manager discussed plans to switch the firm's approach to marking bespoke Collateralized Debt Obligation ("CDO") tranches. The firm historically would mark bespoke tranches using index implied spreads. The decision had been made when many of the single name CDS were not as liquid as the indices. With the increase in liquidity and transparency in the single name CDS market, they have changed their approach and will now mark the bespoke CDO tranches using single name spreads from CDS as inputs into the pricing model. We are scheduled to have an in-depth discussion concerning the price verification of credit derivatives at Bear Stearns and will follow up on this new approach.

## **Bear Stearns (Package Dated March 31, 2006; Discussion on April 19, 2006)**

### **Market Risk**

The risk manager described March as a spectacular trading month across the board.

### **Bankruptcy/ High Yield Area:**

High Yield Desk had a modest profit as spreads tightened (17b.p.s). Also, the desk made back some of the Medquest loss discussed last month.

The Distressed Debt Desk had a large profit of \$33 million. Again, independent power plant companies and Enron positions were big drivers (\$8 million and \$5 million respectively). Apparently a bankruptcy deal was met involving 1/3 of Enron's debt being repaid with Portland GE stock; although this won't decrease Bear's position as it is in trading claims. The risk manager also noted that a Senate vote did not pass a proposal for setting up a trust for future asbestos claims. As this was not a favorable outcome for the asbestos companies and the desk currently has \$155 million in asbestos name positions, we will follow up next time. Total distressed positions were reduced by \$50 million (net market value).

Bank Debt Funded had a loss for the month, due to the initial markdown on a relationship loan. Bank Debt Commitments grew by \$184 million. At our request, in order to enhance our conversations concerning the leveraged lending business, risk managers presented a draft page detailing the month's lending/PAC activity. This page will be inserted into our monthly packet on an ongoing basis. As one might have expected, the number of commitments that actually closed in the month are quite small relative to the amount of deals approved by the PAC (to become commitment offers). It is also worth noting that the PAC approved a \$7 billion facility, which was the largest ever. The commitment was a revolver to backstop an acquisition. The desk's plan was to reduce the commitment to \$1 billion within a week, however, the tender failed and the deal did not close. Separately, the desk closed a \$443 million facility (term loan and revolver) to Time Warner Cable, which was interesting from a hedging perspective. The business bought \$155 million in protection in Comcast, given that there is currently not a viable TWC CDS market. Obviously this hedges out the sector risk, but no offset is given in terms of internal risk measurement/reporting due to the remaining idiosyncratic risk.

CLO Desk (Collateral Accumulation) – Bear has been talking with a third party about engaging in a total return swap to hedge these positions. The desk currently has about \$1.29 billion in first loss protection on \$3.88 billion in positions. Given the current level of deal turnover, if the desk put on no new positions it would be out of all of its positions by September, which is described as a “pretty active market”. (We should keep in mind some of the issues Bob N. raised with respect to risk sharing agreements on this line, and maybe talk about that in more detail one day)

### **Mortgages and ABS**



The ARMs Desk – had an enormous profit of \$104 million in March (largest I can recall). The desk turned over \$7.5 billion in collateral on 11 deals.<sup>1</sup> In addition, MTA option ARM collateral was “well bid” as people had gotten more comfortable with the loans (as they seasoned) and spreads tightened. Finally, the desk also made approximately \$10 million on its IO positions. Despite this enormous month (in terms of number of deals and P/L), the desk’s net market value long position increased by \$587 million to \$11.88 billion (but still far short of the December high of \$13.93 billion).

The CMO Desk – made a big profit of \$37 million. \$24 million of this came from Non-agency CMOs with the remainder coming from Agency CMOs. Of the \$24 million, \$12 million came from a new subprime deal and \$7 million came from the sale of a previously held subprime residual position. The total net market value of positions decreased by \$568 million.

The Asset Backed (xsub/CBO) Desk – made a large profit of \$25 million. Interestingly, \$18 million of this came from securitization and underwriting gains on a REIT trust preferred CDO, which is a tranching structure of pooled REITs. The risk manager said that this type of deal was the “flavor of the day”, as the structurers were basically able to improve on the ratings of the underlying collateral. Although, he expects the arbitrage on this type of deal to erode over time.

EMC – made \$27 million. \$8 million of this came from 3 new deals (this desk does scratch and dent type securitizations), \$12 million came from servicing fees, and \$6 million came from monthly interest income.

Special Situations – made \$17 million, but most of this was due to internal accounting related to the mortgage (whole loan purchase) put back reserves discussed last month. Now those reserves are allocated to ARMs and CMOs, which interestingly didn’t seem to hurt either desk’s month too much. Net-net, the total put back related reserves were increased by \$2 million, discussed further in the Credit section below. Also worth noting, the desk bought \$1 billion Canadian auto loans, which represents an entrance into the Canadian market. The risk manager expects the desk will have to hold these positions for some time before there is a take out. Consequently the desk’s net market of positions more than tripled to \$1.45 billion, however, this is well within its historical range.

Commercial Conduit – made \$19 million on four deals. Consequently, its net market value decreased by \$1.2 billion. In addition, the Commercial secondary desk made \$5 million on the redemption of some equity notes from a previous deal.

### **Fixed Income Investments**

Max Recovery – made a large profit of \$15 million.

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<sup>1</sup> We asked the risk manager what typical and good months were in terms of number of deals. Apparently this was a topic of conversation that morning and market risk decided to start tracking this for the various securitization desks.

## **Credit Trading**

The Credit Trading Desk made \$27 million. The New York high grade desk made \$13 million, much of which came from a tightening of GMAC. London made \$8 million, mostly due to some gains on some credit curve steepeners/barbells. The business reduced somewhat its aggregate short spread risk pops position.

**Risk Arbitrage** also had a strong month, making \$10 million on several event strategy related positions.

## **Derivatives:**

The Equity Derivatives Desk – made a very large profit of \$50 million. \$10 million of this came from the restructuring of a previous STAMP transaction, which is like a collar with a monetization/loan. (Not sure I got the details on why the restructuring is so profitable, something about changing the settlement terms to get cash settlement and a guaranteed bonus). \$20 million came from US single name and index volatility trading, and \$20 million come from the London desk.

The Fixed Income Derivatives Desk – made \$22 million. \$7 million of this came from originating options in the US and a little less than \$7 million came from a variety of products in the US. Meanwhile, the desk's one-day VaR increased from \$4.4 million to \$7.85 million, driven primarily by three positions. First, it flipped to a short rates gamma position. The size of the position is \$200 thousand per 10b.p.s move in rates, which is described as somewhat small. In addition, its vega VaR increased as it increase its short vega position, and it also put on and JGB swap spread widener, increasing its spread risk.

**The International Equity Desk** – has seen good customer flow on strong markets. It made a large profit of \_.

**Block Trading** – took down a larger than usual deal of \$300 million (Bear is quite small in blocks compared to our other firms). The deal had to do with a secondary offering of Endo Pharmaceuticals. The desk was able to sell down a portion of the position on day one (down to \$225 million) and was holding \$119 million as of our meeting. We will follow up next time.

## **VaR Specifics:**

- Bear restated its February VaR due to an issue discovered with the interest rates principal components analysis. At the Firmwide level, the daily VaR was increased from \$16.6 million to \$23.5 million, and the weekly VaR from \$37.2 million to \$52.5 million. In short, there was a large Fed Funds option position that “behaved funny” in the PCA, as some PCA scenarios were generating very large profits as a result of a sudden large uptick in the short rate. The explanation of the problem was not entirely clear, but it sounded like there was a problem in the translation of the principal

components to the full yield curve shape for revaluation. Rupert said they had not been running all cross scenarios due to computing constraints, and they were now considering doing a full revaluation at each date/scenario (although he thought the problem was reasonably fixed given whatever solution/work around they came up with). This sounds like they were using principal component risk sensitivities instead of rates sensitivities, and there was a problem with the component cross partial effects. I am not sure I get this, **we will ask for a written explanation of the model problem and enhancement to go into next month's Tab 5?** Rupert noted that this wasn't really an issue at the level of calculating a stand alone VaR for the desk, but it did matter at the firmwide level, since the desk was generating a lot of offset (gain) on the day in the historical simulation leading to the Firmwide VaR. (One potential issue P.C. pointed out here is that this might have to do with path dependency. Also, are there other types of options that might react strangely to the PCA?)

- Due to time constraints, we did not discuss the VaR changes in detail. (Should we suggest to Mike they start allotting four hours instead of three for our monthly meetings? We seem to run into this 1:00 pm constraint on the conference room at times). However, it is worth noting that Firmwide weekly VaR increased from \$52.5 million (corrected) to \$81.6 million, driven by the Rates and Equity white books. Interestingly, within Rates, a large decrease in diversification benefit seems to be a large driver, with the % benefit between the five main sub-desks falling from 40% to 20%. (**Maybe follow up with Kan to see if this is a typical swing in diversification benefit at this level of aggregation?**) The other largest driver in rates VaR was the Interest Rate/Fixed Income Derivatives desk, discussed above. Changes in the VaRs of the largest mortgage desks - ARMs, CMO and Commercial Conduit – were all commensurate with the changes in net market value discussed above (up, down and down).

On the Equity side, stand alone VaR increased from \$10 million to \$21.4 million. This appears to be overwhelmingly driven by the Endo block deal discussed above, as the OTC standalone weekly VaR increased from \$172 thousand to \$19.7 million. In addition, however, stand alone VaRs for both Equity Derivatives and Risk Arbitrage increased by roughly \$3.5 million. These were not explicitly discussed, although we know both desks had strong trading months, discussed above (Kan even went into some detail on various risk arb positions. I just don't think he said explicitly whether these were existing or new positions).

### **Scenario Analysis:**

- There was no discussion of the scenario changes during the meeting. Just a couple notable impact changes: The Russia/LTCM 1998 one day and one week losses fell considerably (from \$200 million to \$132 million, and \$491 to \$371 million), while the one week impact increased by roughly \$60 million (to \$603 million). Also, the one week and one month 1987 Stock Market scenarios losses increased substantially (from \$359 to \$536, and \$115 to \$415 million). In addition to following up on the Blended scenario implementation, we intend to follow up with respect to whether, for the different horizon scenarios,

assumptions are made regarding positions being closed out, or if the specification differs purely in the shocks applied.

### **Credit Risk**

- The small mortgage bank Acoustic, which we first heard about at Goldman Sachs last month, went out of business over the weekend prior to our meeting (April 15-16). Bear bought home loans from Acoustic and currently has \$3 million outstanding in EDP-related put back claims. The risk manager noted Acoustic is the subsidiary of a larger institution (Metro City Mortgage) that does have the capacity to pay (and I think Bear has a guarantee from). We will follow up next time. Separately, Bear is still litigating with Mortgage IT, discussed last time. More broadly, this event places further emphasis on the point that this is a challenging time for independent mortgage originators (particularly subprime originators it seems). Mike A. noted that Wayne is spending a lot of time on this area, and has increased the periodicity of his due diligence phone calls (to weekly in some instances). Also, now that GCD has addressed the issue of recognizing EDP puts more quickly, it sounds as if more attention is being turned to the issue of poorly underwritten collateral trickling into Bear securitizations. Mike mentioned doing some more granular analysis on the negative amortization products, as well as examining how many of the mortgages in Bear deals are on investor properties. We will continue to discuss these issues.

### **Additional Presentations – FX Prime Brokerage**

We requested an overview of Bear's FX Prime Brokerage Business. In short, the business model looks very much like the credit derivatives intermediation business models we have discussed with several other firms. This is interesting given that the CRO has previously described his concern with credit DPB as relating to the non-scalability of the business, given that each marginal trade intermediated creates marginal PE (versus the traditional PB model where margin requirements can be set conservatively enough to essentially finance an unlimited number of client assets). When asked what made FX different, he responded that with FX they are not doing any more volume through the PB relationship than they would be willing to do on a bilateral basis. (I am not sure how satisfying this answer is). The types of instruments intermediated in FX include spot, forward and options. Bear has less than 50 FX PB clients, 98% of which are hedge funds.

The risk management of PB counterparties is identical to the risk management of all hedge funds derivatives counterparties, with a couple of additional complications. Namely, intraday limits (notional sounds like) must be established and these limits must be published to the executing dealers. Otherwise, margin and other credit terms are the same as with bilateral hedge fund counterparties. All funds have zero CE thresholds and all except one post initial margin. Four different methodologies are used for computing initial margin requirements. Two of these are largely driven by the futures clearing house margin requirements while the other two are derived from an internal risk-based methodology (the House requirements). In either case, some benefit for portfolio effects

is given. Rupert walked us through their risk-based methodology, which resonated (with me at least) as fairly sophisticated. See PowerPoint presentation for detail. One thing that was not entirely clear was, when a new trade(s) is put on, whether the initial margin is calculated for those on a stand alone basis, versus re-running the requirement/calculation for the entire portfolio. My impression was the latter, and we will follow-up. Two other points possibly worth noting: 1) Stress Testing of extreme outcomes is used, particular for margining out-of-the-money options, 2) grids are used for revaluing exotics in the face of the various market moves considered.

### **Other**

- There is not much news on Calpine, other than the risk manager noted that Bear is currently attempting to get out of its non-compete agreements with Calpine, so that it can recruit their trading personnel.

### **For Memo**

- A small subprime mortgage originator that Bear purchased whole loans from declared bankruptcy in April. Bear had \$3 million in outstanding claims with this counterparty stemming from early default payment related put back rights, which were discussed in last month's DPG memo. Risk management remains very focused on potential operational and underwriting problems at the subprime originators, not only from a counterparty credit risk perspective, but from the perspective of the collateral going into Bear MBS deals. We will continue to discuss with risk management these issues and the work done to establish comfort in the subprime mortgage area.
- The equity business took down a \$300 million block deal, which is quite outsized by Bear's standards. The desk was able to reduce its position by roughly \$75 million on day one and \$170 million as of our meeting. We will follow up regarding the success in further reducing this chunky exposure.

*SMS, 5/1/06*

**Bear Stearns (Package Dated May 31, 2006; Discussion on June 21, 2006)**

**Market Risk** (Given by Mike Alix – Kan was out)

- The CRO reaffirmed that Rupert Cox is assuming responsibilities for all risk analytics. Furthermore, VaR responsibilities are going to be fully transferred to Rupert; Manosh (spelling?) has left the firm and other FAST personnel (Craig and \_?) responsible for certain VaR work are going to transition over to risk management, reporting up through Rupert.
- The risk manager explained that it had been a stellar month and quarter from a P/L perspective. The overall tone in Mortgages and Structured Credit remains positive. There was a little bit of spread widening during the month, which actually worked to Bear's advantage because it allowed the firm to get more new deals done as the wider spreads attracted investors that had been sitting on the sidelines (sounds like this was more so in the credit space). Also, mortgages continue to perform well despite the flat yield curve and slowing housing market.

**Bankruptcy/ High Yield Area:**

The Distressed Debt Desk had a very large profit of \$48 million. The Enron position(s) was the largest single driver, as the desk "continues to grind through and realized value". Calpine positions contributed as well.

Bank Debt Update – There was a lot of deal flow in the leveraged finance area, as well as some mark ups on some revolvers, resulting in a large profit of \$21 million for the Bank Debt Funded desk. The Accepted Offered line increased from \$1.1 billion at the beginning of the month to \$4.2 billion at the end of the month (although Offered Not Accepted actually fell by \$400 million to \$3.6 billion). The PAC approved 10 new commitments intra-month, for a total of \$7.1 billion. It sounds as if most if not all of this new activity was sponsor related, and a couple commitments were for public company deals.

Separately, we discussed the recent trend towards "covenant light" loans in the leveraged loan market. Put simply, as the good credit cycle and credit product demand from CLOs have persisted, financial sponsors have been successful in negotiating away traditional credit protection, such as covenants relating to financial ratios (e.g., leverage). The CRO explained the old days of bonds having no/few covenants and bank loans having good covenants are gone. In instances where no covenants are obtained, a payment default essentially becomes the creditors' only actionable event. The potential impact of this is obviously that it could decrease recovery rates. It is worth noting that within a covenant light deal, covenants may vary for the different pieces of the financing packages (i.e., might be different for Term Loan B versus Revolver). Also, it sounds as if even covenant light financings preclude the borrowers from taking on additional debt that is above the existing debt in the capital structure. (Although it sounds as if they can bring in more Pari Passu debt).

When asked if there was any concern that underwriting loans without traditional covenants increased the reputational risk associated with this business in any way (with the thinking being there are even fewer checks over the sponsors), the response was a categorical no. The CRO explained that Bear views itself as purely an intermediary (match borrowers and lenders) and that it represents a small portion (not a trend driver).

We also talked about pricing flex. As mentioned last month, in years past lenders were able to make commitments conditional upon an acquisition deal getting a certain rating from the agencies. These sorts of ratings triggers no longer exist (again have been negotiated away), and pricing flex basically serves as the alternative mitigant. See Excel table provided for the pricing flex amount ultimately obtained for recent covenant light deals that Bear participated in. In short, the flex appears to typically be either 25 or 75 basis points. However, there are two instances where it reaches 100 and 200 bps (the latter is on 2<sup>nd</sup> lien paper). As we have heard before, any flex the lender gets is in addition to fees. In other words, a spread widening would have to eat through both the flex amount and the fees before Bear took a MTM loss at closing, which has never happened (yet at least).

### **Mortgages and ABS**

The risk manager commented the business was successfully executing deals through the factory, and also noted that more of the collateral was being originated through BearRes (the “ramping up of” BearRes).

The ARMs Desk – had a large profit of \$53 million. Recall last month deal turnover was down and aged inventory was up. Turnover was back up this month as the desk did 7 deals, \$5.5 billion on the largest two. Total net market value was reduced by over \$3 billion and aged inventory was down “a couple hundred million dollars”. When asked, the CRO said discussions continued about the what the size of the this business should be, and said there is currently a feeling at the firm that \$12 billion in net market value positions is probably about right “through a period of volatility”. Separately, he also mentioned that Option Arm product remains important in this space, as demand persists.

The CMO Desk – had a large profit of \$50 million, but the net market value of its positions actually increased by \$1.2 billion to \$12.8 billion. The desk did nine deals for about \$2 billion. [Don’t think we got an update on aged inventory here, look out for next time].

London/ABS/MBS/CDO – Following up on the issues with Rooftop Mortgages discussed last month: the CRO responded that Bear is still working through the problems and has made some management changes. It didn’t sound as if the servicer had been replaced. Mike asserted that the firm has basically put a hold on originating new collateral out of Rooftop and on bringing any new Rooftop deals to market (Jim- this is a new twist on what we heard last month I think; didn’t Kan say they were accumulating for a new deal, and there was concern about how it would be received?)

Commercial – Following up on the loan backed by the parlor cash flows: all Mike added was that the position, which is in kind of a workout mess, is already marked really low - like \$0.22 on the \$1.00 - and that the desk was thinking about selling it.

### **Fixed Income Investments**

Max Recovery – made a profit of \$17 million, driven largely by its European business, which is looking to expand (see Nov 05 write-up for previous discussion of plan to expand internationally).

Credit Trading – made a large profit of \$41 million. As discussed above, some intra-month spread widening actually led to increased arbitrage opportunities on more deal volume, particularly at the mezzanine level for synthetic CDOs. As an aside, the risk manager noted maybe this CDO activity, which entails the banks selling tranche protection and then performing single name hedging, explains the observed pattern of moderate/slight widening followed by tightening. He also conveyed a suspicion that relatively few investors were driving the overall corporate credit markets activity.

Emerging Markets – spreads widened more than corporate spreads, and the desk reduced risk in May. Spread risk pops were reduced by roughly 50% to \$736 thousand, and Sovereign Debt gross market value was reduced by \$400 million to \$1.4 billion.

### **Risk Arbitrage**

Poor performance by the Risk Arbitrage desk may be the most noteworthy story of the month. Recall from last month's note that the head trader, who had recently received a limit increase due to strong performance, had taken some losses on long positions in the days directly before our May meeting. It sounds as if this poor performance continued, as the desk lost \$14 million for the month. To provide a little more color, in addition to taking long-short positions on announced deals, the desk also takes views on potential acquisition targets – a strategy referred to internally as “rumortrage”. This strategy, which entails simply going long potential targets, is where the losses were incurred (I think Kan's comments about not hedging against broad market drops make more sense now – this is a directional strategy). Consequently, risk in that strategy has been reduced “very much”. In short, the trader had been given some additional chips when he was outperforming, and subsequently some of those chips have been taken away. (However, the long market value remains at \$934 million, as seen in Tab 5. This is a bit surprising. Although the delta was reduced from \$311 million to \$134 million)

We spoke briefly about Bear's use of deal break risk metrics to manage this business. The CRO explained that risk arb has always been somewhat of an area of focus at the firm, given the asymmetric P/L profile of the strategy (limited upside with big potential downside), and the fact there is typically an increase in break correlations during down markets. Consequently, stress tests are probably used by senior management more for this desk than any other (partly because risk arb VaR is useless). Currently, the firm has



an aggregate \$200 million deal break loss limit, assuming all deals break at once (basically translates into around a 30% down sort of shock on the longs sounds like – **Jim, have you talked about this before?**). As of May, the measured risk against this limit was \$160 million.

## **Derivatives**

**Equity Derivatives** – had a very large profit of around \$50 million. The broad market declines in May seemingly had little adverse effect, as the desk was long gamma and relatively flat delta, and thus well positioned for the market volatility (which there was a lot of). As of month end, the desk was long \$181 million of delta and long \$264 million of gamma (their vega looks somewhat flat at \$4.5 million). Also, there were a couple of new structured trades contributing to the P/L. It is worth noting, however, that the large market drop impact reached \$128 million intra-month (or was that the month-end beta adjusted number?), which is “unusually high”. As somewhat of an aside, the risk manager noted there is a lot of talk at the firm about what sorts of assumptions should be made regarding dynamic hedging for these sorts of scenarios. [**Jim - If we do decide to talk about additional risk reports at some point, slides by the major risk factors might be worth discussing?**]

**Foreign Exchange** – made a very big profit of \$28 million. This represents an all-time FX high, however, that is largely because of the new precious metals trading business (this was actually included in Tab 8 last month). This was the first month that this business was material in volume, and the desk generated a lot of customer flow; particularly a lot of options. **(Jim, they offered to give a presentation on this business, something we can think about?)**

**Munis Derivatives** and **Munis** both had good months, as Bear was the lead arranger on a couple of tobacco deals and the BMA – Libor swaps trading area did well.

**Strategic Structured** – had a very big profit of \$38 million, of which the largest driver was a non-market driven P/L from a structured trade which gives Bear gas/oil rights being produced by (a plant in Michigan?). Sounds like this was accounting rule driven (said something about going from lower cost of market to fair value?).

## **VaR Specifics:**

- There was no specific discussion of the VaR Tab. Reviewing the numbers, the changes are relatively unremarkable.
- Elaine did present **Backtesting results**. **(Jim – I wasn’t sure what questions to ask regarding the P/L series. We basically asked if appropriate progress was being made on getting the P/L series right, and Elaine said yes).** One thing that was a bit surprising in the backtesting was seeing a couple of down days at the Firmwide level using the dirty P/L (also, it looks very strange that the Firmwide P/L seems to hit exactly zero on several occasions?)

### Scenario Analysis:

- There was no discussion of the scenario changes during the meeting. Again, the changes appear relatively unremarkable.

### Credit Risk

- Mike noted that following May market events some hedge fund managers were quite nervous, in terms of potential changes in levels of investor risk aversion, etc., most notably in the emerging markets equity space. There were larger than normal margin calls intra-month, but zero problems resulting and no unusual collateral management issues. Also, the areas Bear is the biggest in – ABS/MBS and Corporate Credit, were not hit hard (not sure if he was making this comment with his market risk or credit risk hat on, or both).
- As usual, there is nothing very noteworthy from the aggregate net exposure numbers. There is, however, a new top exposure worth mentioning. There is a \$221 million net exposure to Nabors Industries, an oil and gas company. This comes from Bear purchasing a call option from the company on its own shares, which is viewed as (very) right way risk (position worthless in the event of a default).
- Chris Mushell has taken over responsibility for Operational Risk Management, which also falls under Mike Alix. The individual who was covering Op Risk has left the firm. Chris's previous position was the credit person covering FICC (we have met with Chris several times). Now Barbara Biel, the GCD person in charge of hedge funds has moved to the trading floor and is taking a more active role in covering FICC, giving this business a more senior credit focus. We were curious as to whether this means FICC credit coverage would have a less quantitative focus (Rupert use to share responsibilities with Chris in this space). But Mike noted Barbara still has all of the quantitative resources at here disposal (e.g., Andrew Louw still covers FICC). [Plus apparently Chris was also a traditional credit person and Rupert and Andrew drove the margining and risk analytic development (which are discussed in the CSE Review)].

### Other

- **Regarding Bear Energy** – Bear continues to work to separate from Calpine. There is still no new trading being done other than under the servicing agreement previously discussed. Bear Energy, which has a completely organic feel to at this point, continues to hire, look for office space, build infrastructure (systems), etc. Several of the key people from Calpine have come over.
- Rupert presented the draft **JTD results**. See handout. Mike Alix noted the biggest issue with respect to this approach is how to deal with leverage loan commitments (there are including the full commitment amount for closed deals).

### For Memo

- The risk arbitrage desk, which was discussed last month, incurred a \$14 million monthly loss. Losses were particularly concentrated in a sub-strategy that involves speculating on potential acquisition targets, as opposed to taking more traditional long-short positions on announced merger deals. Following the May losses risk in this particular strategy was reduced “very much”. However, the desk’s aggregate long market value position remains at a relatively high \$935 million, and we will follow up on activity in this space next month.

## **Bear Stearns (Package Dated November 30, 2006; Discussion on December 20, 2006)**

### **Market Risk**

November was another good month and “the market was closing a lot of deals”.

### **Bankruptcy/ High Yield Area:**

The Distressed Debt Desk – made a large profit of \$30 million (that is \$80 million in two months on 1 to 1.1 billion in inventory!), and the net market value of its positions increased by \$178 million to \$1.1 billion (and thus VaR was up \$3 million). \$19 million of the profit was made on two airline positions - NorthWest and Delta - although this was partially offset by a loss on Ace Aviation. The total airline sector position increased by \$30 million to \$205 million. The desk also made \$9 million on Macgen, and that position was up \$35 million to \$140 million. Exposures to IPPs and Enron were also increased. The desk added \$35 million in Enron trade claims, increasing that position to \$155 million. And the IPP total exposure was up \$60 million to \$320 million.

Bank Debt Funded – made a very large profit of \$57 million (largest I recall). The desk made \$53 million in fees on 10 deals, some of the most notable of which were Metro PCS, Verizon, and Merck. The closing of the Merck deal generated \$8 million in income and the total commitment was reduced by \$3.6 billion. Bear now holds about \$1.2 billion, most of which is bridge commitment. The desk made \$15 million on Metro PCS.

CLO Accumulation – Last month three deals were expected for November, which would decrease NMV by around \$1 billion (or by about 1/3). These deals were not done, and are now coming up in December. \$1.4 billion in product is expected to be sold.

Capital Markets – made \$27 million; the risk manager noted that “these fees look like a quarter year’s revenue”. (I am not sure of the breadth of what the Capital Market desk does. I believe these are the guys who continue to sell the bank debt after bank syndication. And don’t these sorts of desks typically handle short-term corporate debt issuance?)

### **Mortgages and ABS**

#### **Discussion of Subprime Mortgages**

The CRO discussed the growing deterioration in subprime mortgage performance. He said delinquency rates have recently doubled for some pools of loan, climbing from the 1-2% range to the 3-6% range. Although, some deals have performed much better than others. There has also been some diminishing performance in some Alt A product as well, but not to the same extent as with subprime.

Mike feels Bear has done a good job adjusting against aggressive underwriting over time. He noted that in 2005 Bear securitized (as principal) \$17 billion in subprime product, versus \$7 billion in 2006. He seemed to be attributing much of this decrease to the

business decreasing the price for which it is willing to pay for loans from particular originators, as well as to a strategy of focusing more on Alt A and Option Arm product. He said the total number of subprime deals in the market increased by about \$6 billion, with Countrywide and Lehman at the top of the league tables. (Didn't Lehman say subprime deals are down in 2006, internally and across the board as well?).

Also, as was discussed in the September memo, subprime residuals have increasingly comprised a smaller portion of Bear's total residual position (an Option Arms more), partly due to Bear's use of the Silverton funds to forward sell these resids. This month Mike mentioned that Silverton has helped Bear distribute 75% of its subprime residuals.

Third, Mike re-emphasized that the firm has begun pursuing its EPD claims very aggressively. Fourth, he asserted Bear has made considerable efforts in getting better servicing (wasn't sure if this was just a function of doing more internally or using better 3<sup>rd</sup> party servicers as well). Finally, Mike discussed the continued use of PAUG swaps for hedging purposes. Although he did note that, while the BBB shorts that businesses have been using may currently look like a "brilliant" strategy, he is skeptical about how the cash-CDS basis has behaved. He also discussed the "timing game" between the securities being hedged and the hedges (basic idea seemed to be that NIMS can cash flow and BBB risk may last longer).

From a counterparty perspective, Bear has not had any problems since Mortgage IT, which was bailed out by Duetche. They don't have exposure to any of the originators that are currently rumored to be on the brink. Although Bear has canceled its warehouse line with People's Choice. Finally, we asked Mike about the article we saw regarding Encore's problems with EPDs. He said that Bear observed upfront that Encore's underwriting standards were too aggressive, and that the plan has been to use Encore's relationship to sell Bear's product, using Bear's controls.

The ARMs Desk – was almost flat for the month in terms of P/L. Sounds as if what the desk made in fees was offset by mark-backs. Also, the desk's net market value was up by \$830 million to \$10.6 billion, although the risk manager had heard nothing about an uptick in aged inventory. (We will keep an eye out for mark backs and aging next month).

Both the Non-Option Arm and Option ARM IO positions were down, to \$25 million and \$140 million respectively. The total MTA position was up by \$700 million to \$3.2 billion. Despite the increase in net market value position, the desk's VaR fell from \$37 million to \$32 million. While there was no single identifiable factor causing this decrease in measured risk, a decreased in net spread DV01 contributed.

Agency CMO - The VaR spike discussed last month did come down after the desk bought the IOs to package with the POs. The VaR had increased from \$3.6 million to \$11.6 million, and has now fallen back to \$5.9 million.

The Non-Agency CMO Desk - made a large profit of \$32 million. It did 13 deals on \$3.6 billion in collateral. Consequently, net market value fell by \$1.5 billion to under \$10 billion. (VaR fell only slightly from \$31.3 million to \$30.4 million, not discussed)

CBOs – made a very large profit of \$35 million on 8 new deals, the largest of which was \$700 million. (This desk falls under the radar much of the time, this seems to be a very good month for it).

EMC – made a good profit of \$20 million. About half came from servicing fees and \$7 million was made on two scratch and dent deals (on \$450 million in collateral).

Commercial Conduit - made a good (or decent perhaps) profit of \$11 million. A notable driver was a mez deal (I missed the details here). Commercial Secondary lost \$3 million due to widening of AAA spreads.

Tokyo – made a very large profit of \$27 million. Although it sounds as if this was driven by the commercial deal discussed in detail last month (appears the profit was booked in November).

### **Fixed Income Investments**

Max Recovery – made a profit of \$13 million (same as last month), but the UK positions continue to under-perform model projections, and \$10 million came from the US. Risk management has this model in its sights for review.

Credit Trading – continues to perform very well, making \$42 million. In addition, the desk is off to “an astonishing” start in December, and has been “printing \$4 or \$5 million a lot of days” (something we will discuss more next month). Of the \$42 million made in November, \$29 million came from Structured, \$11 million from IG flow, and \$3 million from HY flow.

Within Structured, \$19 million was made from a “Relative Value Hedging” strategy, which is more of a prop strategy focused on high yield. \$10 million came from the “more regular structured” trading, where “greylock” notes were a notable driver. These were described as notes for a CSO product involving thin tranches (e.g., 4-10%) with A to AA ratings and 7 to 10 year maturities. The risk manager said these have been exceedingly popular. In addition, the VOX desk, which attempts to arbitrage between dealer prices, lost \$6 million. November was the desk’s worse month in terms of its performance in the Markit partners bespoke tranche survey/service. The desk was pricing 7-10 year Mez tranches at higher spreads than the Markit consensus. Following the first survey, Markit did a second one and the desk improved considerably on the 10 year spreads, but not on the 7 year spreads. However, the Markit results present a challenge to risk managers/price verifiers, because Bear can often be printing trades with dealers at different levels than the Markit consensus. One possible explanation for such discrepancies is that Markit now has 20-30 contributors to its survey, but risk managers feel there are really only 6-10 players (dealers) in the market. Nonetheless, as a result, model reserves were increased by \$10 million. Another interesting twist to this story is

that VOX had been running relatively flat spread risk from some time, then built up exposure to mez spread risk in Oct and Nov (discussed last month), to then suddenly “get whacked” on the Markit consensus price. (Follow-up?)

For the IG flow business, the tightening of the autos (Ford) was the biggest driver. High yield flow had lots of ups and downs for the month, and made a good profit on Delta. Also, the HY business made a couple of million on a 3 billion yen bank loan to Seiku (a name that has been a big position at Goldman as well). This business manager apparently has record for making loans to less creditworthy companies and selling them for a profit. However, his distribution tends to be slow. (This guy actually originates loans out of Trade Credit, however only one at a time and they are smaller in size).

**Risk Arbitrage** – There has been one position that has been particularly volatile, which is the Scania position. As discussed before, Scania is a truck manufacturer that the Man group has attempted to take over (hostile). However Volkswagen has holdings in both Man and Scania and wants to reach a Tri-party arrangement. As events have unfolded, the share price has been “whipping around a lot”. The desk lost \$2 million on the trade in November, and is flat on the trade life-to-date.

### **Derivatives**

Equity Derivatives – had another great month, making \$44 million (\$20 in NY, \$17 in London, and \$8 in Tokyo). There were not too many big (single) P/L items. However, the business “did a lot of work” in Europe and Asia on realizing EITF 02-03, as it wanted to bring in the P/L with the changes to the accounting rules. It got \$9 million released.

Separately, \$6 million was made in NY trading converts, and \$44 million was made in 2006. Even though converts had a near death experience, there appears to have been some resurgence. The desk now has a \$600 million book size, and is “not a bad business”.

There was an unusual trade done in Europe that involved selling call options on Volkswagen preferred shares, which were trading 10 vol points higher than options on ordinary shares, and then covering the short (vega) with the ordinaries. The idea behind the trade is that you can make 10 vol points if the delta hedging works. The preferreds have actually been exhibiting higher intra-day volatility than the ordinaries, which (I think the conclusion here is that this has made the delta hedging more expensive. Intuitively, it would make sense for higher volatility on the preferreds to be bad since that is where they are short the vega).

Finally, the Large Market Drop loss impact decreased from \$112 million to \$18 million. No real explanation was provided, other than that the desk actively manages this number.

Fixed Income Derivatives – made a large profit of \$36 million, which was dominated by the release of \$30 million in EITF reserve related to PRDC, \$25 million on \$-Yen notes.

It sounds as if the desk did two trades where it bought notes (typically sells notes, more or less a one-way business) to demonstrate price.

Block, OTC, Invest – made \$15 million. The desk did a \$400 million GM block, which it was able to sell out in 3 days (“very quickly”).

Strategic Structured – lost \$13 million based on GAAP accounting. Economically the book was flat.

### **VaR Specifics:**

There was no specific discussion of the VaR changes, other than for the desks mentioned above. The risk manager noted that he is going to work on bringing VaR more into our discussions.

### **Scenario Analysis:**

Bear is implementing a framework of high level (aggregate) market risk VaR and scenario limits. Previously, the risk management approach has been more to impose control at the lower level (desk level) and ostensibly assume that works for the group/propagates up. In doing so, it seems management has typically thought about risk appetite in the context of business opportunities, and limits have been viewed somewhat as triggers for discussion. The new approach requires the separation of risk appetite from opportunity, and imposes harder limits at aggregate levels.

The Stress Loss limits are based on the scenarios that have been reported in the market risk packet for numerous months now. The current focus is on historical scenarios such as the Fall of 1998 and 1987 stock market crash, but risk management wants to work more on hypothetical scenarios over time. The scenarios are computed for several holding periods, but the 5-day holding period is what is being used for limiting. The proposed Firm-Wide Stress Loss limit is \$2.4 billion, and the VaR limits is \$150 million. These compare to peaks in actual measured risk of \$1.24 billion and \$99 million respectively, thus the limits do not appear to be binding in the short run (see handout).

We inquired as to the nature of the communication with senior management involved with such a change in the risk management approach. It sounds as if Mike Alix basically approached the Executive Committee with the idea, asserting he wanted to get people more focused on looking at risk across the firm; and they, along with other senior business personnel, were quick to accept. However, he did note that the conversations might have been much more contentious if the proposed limit levels had been more binding to the businesses.

### **Leverage Lending Discussion**

As requested several months ago, we had a leveraged lending discussion, in order to get a feel for whether the more recent, outsized deals (by historical Bear standard's) reflect any



change in risk appetite, whether risk managements' role in the control process was going to evolve, etc. The conversation ended up being largely repetitive from our CSE review, in terms of reviewing the credit approval and post approval risk management processes (see handout).

David Glasser, co-head of IB (I believe) and chair of the PAC was present. He explained that his approach to approving deals is to look at every transaction from the perspective that the distribution/sales force is going to fail, and Bear will have to hold the debt. Under such a scenario, he wants to feel comfortable that Bear will get its money back, even if they take some MTM losses along with the way. He said while every deal looks good in the short run, he typically is trying to assess the strength of a company out to around a 5 year horizon. (There is a bit of a contradiction here, in that one of the key factors they look at in approving deals is how quickly they think the risk will be distributed).

We asked David to speak specifically to the EOP commitment, and how he/they got comfortable with that transaction. He noted, for starters, that he feels Bear has a lot of strength in real estate, through both Mortgages and Banking. He also said that he felt this was a favorable time in the commercial real estate cycle. Third, EOP owns about 540 office properties, all individually leased with geographic diversity. Thus this was like financing 540 separate companies. Finally, they felt this deal had great securitization capability, and knew that it would be distributed quickly, because they had done similar type deals with Blackstone before and the debt was going to be IG.

He contrasted this deal to one the PAC recently turned down (PennGaming - Aztar I believe it was ). There, Bear probably would have been holding the commitment for 18 months due to the regulatory process, and that was not desirable.

The approval process has not changed since CSE, and there are no plans for change (including the role of risk management). Given that the Executive Committee currently approves every commitment greater than \$50 million, the sentiment basically seems to be that there could not be more involvement by senior management. The limits framework is being re-worked, both in term of level (i.e., limits are going to be increased) as well as granularity (made more granular, for example by rating, expected syndication time, size of deals, etc.).

We also discussed hedging (post close). One thing that did stand out to us (guess we never noticed before), is that the LPM group at Bear is on the private side of the wall. Apparently they work closely with compliance to make sure they are not putting on any inappropriate hedges. However, the business is thinking of putting some people on the other side of the wall (which is what all other firms do I believe).

As somewhat of an aside, Mike Alix mentioned they are doing some evaluation of the quality of the risk transfer that occurs when selling unfunded (bridge) commitments to hedge funds. (This is something we have contemplated before. There must be a concern that some funds simply view this a free money, and would not want to fund).

## **Credit Risk**

Hedge Fund Report – Mike Alix presented a draft version of a hedge fund report to be included in the packet. Risk management has made much progress on the stress testing work, and can now subject hedge fund counterparties to the stress/scenarios used for market risk (this was also discussed at the Tri-lateral meeting the previous day). Mike took back the draft he presented, because he said they were still trying to work out whether they could give us the fund names along with the results. Next month we will insist that we need to see the counterparty names. Aside from that, the report seemed good for our needs, and is going to be what they are looking at internally. It reports Fund, Fund Family, Stress Exposure, and PE, for the funds with the largest PEs. They also gave us two versions, one that showed non-netted exposures - where there was some potential reason to not net – and another showing fully netted exposures. Interestingly, the Stress Exposures are not that much larger than the PEs, because they allow for some diversification benefit across products. We might want to think about getting a couple of extra columns, like Fund NAV, and a column listing the products traded by that fund. We will also follow up with Mike regarding the effectiveness of the stresses in risk managing relative value trades, given that market risk stress tend to be directional in nature (and they are clearly going the direction of using this for limits).

## **For Memo**

- Bear is in the process of instituting a high level (aggregate) market risk limits framework, based on VaR as well as Scenario metrics. While risk management has used aggregate market risk analytics for some time, historically limits have only been set at lower business unit levels. While the initial limit levels are sufficiently high that they will not be constraining to the businesses, this change places more focus on understanding risks that span across desks. We will follow up regarding implementation progress and intend to place more emphasis on aggregate risk measures during our discussions with market risk managers.

**Bear Stearns (Package Dated October 31, 2006; Discussion on November 15, 2006)**

**Market Risk**

Broadly speaking October was a good month and Q3 was a strong quarter.

**Bankruptcy/ High Yield Area:**

The Distressed Debt Desk made a very large profit of \$50 million, which was more than likely a record month. This is a greater than 5% monthly return on the less than \$1 billion in net inventory (\$958 million of Oct 31), which was described by the risk manager as “pretty extraordinary”. \$27 million of this gain came on the Enron positions. As these have been discussed as a driver for some time, we had a more detailed conversation of the positions.

The desk began investing in Enron positions towards the end of 2001, with a modest market value position of less than \$10 million. The position size hit its pick of approximately \$150 million in Feb 06, and currently stands at \$120 million. In the earlier years, the majority of the Enron position was in loans and bonds – for instance, as of 11/30/03 \$28 million in loans, \$20 million in bonds, and \$29 million in trade claims. Currently, 84% of the position is in trade claims. As the bankruptcy proceedings have played out, there were more opportunities in trade claims, which are pari pasu with unsecured bonds but trade at a tremendous discount to bonds given their “murky pricing”.

Trade claims apparently involve a lot of negotiation, and the amounts negotiated are individually affirmed by the bankruptcy courts. Since Enron had so many trading partners, there is a lot of negotiation and approval to occur. Because the notional or claim amount is not known at the purchase of a trade claim, typically there is recourse back to the seller of the claims for the cost, creating counterparty credit risk (to Bear as buyer). Also, the universe of buyers for trade claims is smaller than for bonds and loans, making them less liquid. Recovery of Enron trade claims are further complicated by where the claims originated due to the complex corporation structure with numerous subsidiaries and SPVs.

The life-to-date profit on all of the Enron positions is \$215.2 million. The trade claims have only traded twice (sold off two chunks since initial purchase). Additional claims getting affirmed by the court are what led to the October mark-up. Turnover on the bonds and loans was not discussed.

Other drivers of the Distressed P/L (other than Enron) were the usual suspects. There was a large gain (5% I believe) on the \$155 + million airline positions in American, Northwest, Delta, and . American in particular had a tender offer during the month. \$4 million was made on Adelphia bonds; Adelphia is close to a Time Warner deal causing its bonds to tighten 20 basis points. In addition, the desk increased its independent power plant positions by \$80 million to \$290 million. The two largest IPP positions are Macgen (\$150 million) and Bostonside (\$93 million). Bostonside is being purchased, and the risk

manager expects this position to be closed out soon as a result (follow-up).

Bank Debt Funded – net MV increased from \$1.5 billion to \$2.2 billion, and the desk made a large profit of \$26 million. Bank Debt Commitments decreased by \$369 million to \$8.7 billion. \$17 million was made on 8 new deals, which was partially offset by a \$3 million loss on other mark backs (QVC?). In addition, there were \$8 million in gains on relationship back-stop facilities due to overall spread tightening and accretion (moving down the maturity curve to shorter maturities). The largest of these was a \$2.5 million gain on the Time Warner facility, as TW has tightened 20 bps since August.

Regarding the large Merck commitment discussed last month: Merck held a bank meeting with 70 lenders and there was strong demand for the transaction. Consequently, Mark still expects the commitment to be reduced to \$1.7 billion (originally was almost \$4 billion) by November – we will follow-up. Regarding Cablevision (also last month), BoA has “basically agreed” to come in for one third, and there are other lenders who want in as well. However, a special committee of Cablevision’s Board of Directors has hired an outside advisor to evaluate the buy-out offer (so it sounds like deal might fall apart). Again, we will follow-up next month.

In general, Marc describes the current deal flow as “very active” and notes that “everything is running smoothly”. We had requested to have a discussion of what appears to be a shifting business strategy towards the larger deals (that Bear typically has not been a player in) and senior management’s involvement in getting comfortable with this potential growth/evolution. However, Mike Alix was not able to attend the meeting, so that conversation was postponed until next month. However, Mark did note that he thought the most concerning risk in this business is the more idiosyncratic risks related to being defrauded by a borrower (referred to this as “underwriting” risks I believe), as opposed to a broad market disruption; this is a sentiment Mike has conveyed in the past as well.

Separately, we confirmed that Bear is still taking capital against only closed loans. The reason the Merck deal hit the last capital calculation is because it is a European deal (where syndication occurs after as opposed to along with closing – is that the right way to put it Jim?).

CLO Collateral Accumulation – net MV fell by \$267 million to \$3.1 billion. They did a European deal (referred to as “Master”?), which Mortgages (CDO) gets most of the P/L for and is cross-referenced below. In addition, three deals are expected for November, which should decrease net MV by about \$1 billion (recall last month was an all time high for this line). The amount of protection held by the desk (see last month) did not change, remaining around \$250 million.

### Mortgages and ABS

The ARMs Desk – rebounded from the summer slowness, making a profit of \$48 million. \$29 million was made on new deals (on around \$2 billion in collateral I believe), \$4 million on servicing, and \$7 million on whole loan sales.

(Kan gave numbers on MTA Option Arm and Option Arm IO positions. I believe he said the MTAs were up to \$2.5 billion and IOs were steady – MTA was at \$2.3 billion last time and IOs at \$1.45 billion. **Is that right Jim?**)

The Agency CMO - VaR increased from \$3.6 million to \$11.6 million. The desk went long POs in advance of a November purchase of IOs – with a strategy to repackage the risk. The increase in spread risk associated with the new position was the largest VaR driver, and this should come down next month. The desk had a small loss of \$1 million for the month.

The Non-Agency CMO Desk - marked back a \$117 million position in Alt A second lien residuals and NIMs from \$117 million to \$100 million. In addition, the position was marked back \$7 to \$8 million in September. The collateral exhibited a decrease in performance (marked down as new data came in on loss curves). Due to offsetting gains elsewhere, the desk was still had positive profit for the month.

Also noticed that the CMO line on page 1 has been broken out into Agency and Non-agency; the combined net market value remains around \$17.5 billion.

London/ABS/MBS/CDO – made a large profit of \$32 million. \$17 million of the profit came from transaction mentioned for CLO accumulation above – this was a \$920 million deal. Rooftop made \$7 million on a 500 million pound deal (believe this was a securitization, it was mentioned last month this was coming). The commercial conduit business made \$5 million from a Euro loan on a Belgian office park. Finally, \$5 million in profit came from released reserves on an equity piece of a previous synthetic ABS deal.

Separately, the net market value for this line now includes the pipeline/loans, which were being omitted. Including these, last month's net market value increases from \$347 million to \$2.47 billion. Due to November activity (above), NMV fell to \$1.65 billion.

Risk management provided a write-up on the Tokyo Commercial Deal Discussed last month. In 2005, a Bear client forward purchased the office building (from the developer it appears). In addition to providing funding for its client to purchase the office building, Bear provided a “sponsor letter” to support (guarantee) its client commitment, and provided a 400 million yen loan for a deposit (held in escrow). Due to this sponsor activity, Bear entered into a profit sharing agreement with the client. The construction was completed on time in September of 2006, and Bear funded the entire \$73 million purchase (8.63 billion yen). In October the client sold the building for 14 billion yen (with Bear's approval). The total profit to the desk (financing and profit sharing) was around \$23 million.

Commercial Conduit - made a large profit of \$32 million on two new deals. As a result the NMV of its positions fell by \$314 million to \$5.1 billion.

### **Fixed Income Investments**

Max Recovery – made a profit of \$13 million, but the UK positions were underperforming model projections due to a lock box issue that involved checks getting sent back to debtors.

Credit Trading – made an enormous profit of \$50 million. \$17 million came from the Prop Structured Credit desk (VOX). Traditionally this desk, which trades a lot of bespoke mezzanine tranches, has flattened out most of its model risk by basically filling in capital structures. More recently, however, it has developed somewhat of a bias towards buying 10 year protection. Risk management plans on talking to the desk and asking them to trade this position down, which is good risk management in general but also helps with the price verification of the desk (will follow up). Other large contributors were high grade flow with a profit of \$15 million and Structured Credit (franchise) with a profit of \$11 million. The desks' largest positions continue to be in the autos.

There was also a large profit of \$20 million for Debt Origination, which we typically do not discuss (always assumed went to banking). This was related to a debt origination in London, to finance construction for a (“Blue City Deal”?).

We inquired about the new CPDO deals we have heard about. Kan was not familiar with them but Rupert was. He noted the most interesting thing to him is the rating that they got despite how much spread/MTM risk they have (and leverage – how do you leverage something up fifteen times and come out with an AAA rating?). For the one he looked at, a 100 to 150 basis point widening in spreads could lead to an unwind. He also made a point about the roll risk, which we have heard about with commodity strategies too. If the credit curve is upward sloping, they make a little bit on the roll, but if it inverts the opposite would obviously occur (and it isn't clear how sensitive to or reliant upon the strategies are to the roll).

Rupert had also heard that after the initial spread widening (which these structures were blamed for), these stopped printing, as they weren't viable at the tighter levels.

The risk manager noted that Emerging Market spreads continue to tighten. The desk's spread risk pops were essentially unchanged (at \$1.4 million).

Risk Arbitrage - trading remains active. The desk made \$11 million for the month. Its long market value position fell from \$1.1 billion to \$944 million, with its largest position being \$37 million in the Swedish company Scandia (which may be taken over by Volkswagen or the Man Group, who are competing)

### **Derivatives**

Equity Derivatives – made a very large profit of \$47 million (exact same as last month). The business made \$20 (or \$30?) million in New York, including strong performances in Structured Funds and Vol trading. London made \$12 million, with strong Math Arb (long/short) performance and gains from their short pairwise correlation position in exotics (believe this was partially offset due to some long vega on exotics). This correlation position has been a “strategic one”.

The equity derivatives VaR increased from \$2 million to \$5.3 million. Kan and Rupert explained that they have had some volatility in their exotics VaR, due to the fact that a quadratic revaluation approximation simply doesn't work well for some of these products and that the risk sensitivities (particularly gammas) outputted from the front office pricing models are rather unstable. Rupert said they were “working on some more stable models”. The positive gamma decreased from \$430 million to \$376 million, while the long delta more than doubled to \$217 million (vega was more or less flat). More importantly, however, the loss impact of the large market drop increased drastically to \$112 million, which is one of the larger impacts we have seen. **Follow-up with Kan to see if this for the same reason (don't know if they are using full reval there).**

From 11/29 follow-up call: Kan had not identified the precise cause, but he thinks it has to do with a hedge expiry. The exotics manager often uses short-dated variance swaps to hedge crash risk. The equity risk managers use calendars to examine the impact of future expiries on the crash risk. In looking at these Kan could see (ex-ante) that a roll-off was going to lead to a \$170 million loss in downside protection. It seems likely that they covered some but not all of this. Kan actually suggested we have a session with the exotics risk manager (James?) to review some of these analytics he uses. I tentatively agreed but said I should first touch base with Jim, as I know the market risk team did some of that already during the CSE review. To the revaluation question above, Bear uses a combination of full reval and greek approximations for the scenarios, depending on the product (with more exotics getting the approximation). Also see discussion in Scenario Analysis Section below for more on crash risk and variance swaps.

Fixed Income Derivatives- the desk made \$24 million. The profits were dominated by exotics trading in NY and London, and Tokyo was flat due to a remark in a correlation parameter for PRDCs.

#### **VaR Specifics:**

- We had a follow up discussion on the sharp decrease in interest rate VaR from August to September. This was due to increases in yield curve and vol curve risk. See write-up and spreadsheet (though not sure I get the spreadsheet).
- For October, the firmwide VaR decreased from \$63 million to \$57 million. The only notable change at the white book level was for Interest Rates, which decreased from \$68 million to \$50 million. However, there was no single driver for this decrease (it looks as if a change in diversification benefit within MBS was actually the largest driver). In addition, there was an intra-month spike of \$80 million for the Rates, also not discussed. **(Follow-up)** As discussed above, the most notable changes at the desk level were for Agency CMOs and Equity Derivatives.

From 11/28 and 11/29 follow-up calls: Kan said the month-over-month Rates decrease was actually due to an increase in diversification benefit between Interest Rate Derivatives and Mortgages, as the Rates desk increased its short dv01 and the mortgage desk cut its short dv01. As the rates risk actually went from being reinforcing to being more offsetting, and the spread risk emerged as being a larger driver. (To be honest, this explanation doesn't make sense to me. All of the reduction appears to come on the Mortgages line; and if you compare the subtotals it is evident that there was a big increase in diversification within Mortgages).

The intra-month spike was due to an increase in short rates exposures, which was a strategy the desk was intentionally running and subsequently reduced.

### **Scenario Analysis:**

- There was no discussion of the firm's market risk scenarios during the meeting. The loss impact of all three of the most severe historical scenarios – Sept 11, Fall of 98, and 1987, fell (smaller loss) moderately. (How can the 1987 Crash Fall and the Large Market Drop Increase so Much? Sign for equity derivatives is different for this and the Large Market Drop?)

From 11/28 Follow-up Call: The reason the 1987 Crash and Large Market Drop results are so different is that the Large Market Drop metric reflects an adjustment made by risk management (for limiting purposes) to deal with variance swaps. Many variance swaps have trade with a cap (around 2.5 x the strike), which is not currently captured in the front office pricing model. A model upgrade is coming, but in the meantime the profit generated for a large, instantaneous down shock in equities is over-stated, hence the risk management adjustment. The current limit on this stress is \$150 million, and the equities co-head has authority to approve up to \$200 million.

### **Credit Risk (note Mike Alix was not present)**

- Aggregate CE increased by \$820 million, however, the largest driver was Placements, which have reached their highest all time level of \$15.1 billion. Prime Brokerage (recall this is related to cross entity netting) increased from \$1.4 billion to \$1.75 billion (mostly due to one loan, #15 on the list). Apparently the capital associated with this number has gotten some recent attention internally, and GCS is in the process of moving more of the positions (collateral) to London to go with the loans, which should cause this to come down. (Is this a problem Matt?)
- There was a new hedge fund on the top exposures under the CTC category (# 5). This is actually not due to a bridge/liquidity facility backed by hedge fund shares; this is resulting from a joint back office/enhanced leverage structure.

### **For Memo**

- Bear's Distressed Debt business made a record \$50 million profit in October, which represented a rather extraordinary 5% monthly return on the desk's inventory (net long position). More than half of these gains came from Enron trade claims. Given the illiquid nature of this position, we intend to follow-up with risk



management/controllers regarding the cause of the October mark-up, and discuss the challenges regarding the marking-to-market of such positions.

- As also evidenced last month, Bear's corporate lending business appears continually more focused on (or willing to engage in) the larger commitments. According to a November 20<sup>th</sup> WSJ article (after our monthly meeting), Bear is the co-arranger for a private equity firm's acquisition of a \$20 billion REIT. As mentioned in last month's memo, in December we plan on discussing with risk management the evolving business, including any increase in risk appetite and senior management's current involvement in gaining comfort around these outsized commitments.

## **Bear Stearns (Package Dated September 29, 2006; Discussion on October 18, 2006)**

### **Market Risk**

#### **Bankruptcy/ High Yield Area:**

The Distressed Debt Desk made a profit of \$27 million.

The largest positions in the portfolio remained in the same areas: (1) IPP- up \$20 million to \$ 215 million net MV; (2) asbestos related names- down \$33 million to \$94 million net MV; (3) Enron- was up \$30 million to \$135 million; and (4) aircraft leases- down \$39 million to \$85 million.

Some notable events during the month include:

- (1). Made \$14 million on sales of 4 aircraft and associated leases. The still retain interests in 5 aircraft at a MV of \$85 million.
- (2). Made \$3.5 million on the sale of \$38 million of Calpine debt. The position is down to \$65 million (2/3 of which is secured debt).
- (3). Made \$5 million on sell of Merry-Go-Round position
- (4). Lost another \$2 million on Owens Corning. The position is down to \$30 million.

Bank Debt Commitments – the desk net MV more than doubled from \$4.348 billion to \$9.107 billion with the addition of an approximate \$4.8 billion commitment to Merck KGaA for its acquisition of Serono SA.

Bear Stearns corporate lending business has historically been the smallest and least concentrated of the five CSE firms. The firm has traditionally focused on smaller to mid-sized deals mostly in the United States. However, with the outsized commitment to Merck KGaA in September, the firm's total exposure and concentration risk within the corporate lending space increased significantly. In addition, after month-end, Bear Stearns and Merrill Lynch each committed to providing one-half of the \$12.4 billion debt for the LBO of Cablevision. We will continue to monitor these outsized commitments as they work through the syndication process and will discuss with the Chief Risk Officer whether the recent deals represent a shift in the risk profile and risk appetite in this business.

#### **Significant changes in the commitments in the portfolio:**

- (1). Merck - during September, Bear Stearns, along with two European investment banks, was a lead arranger for the EUR 11.5 billion Syndicated Multi-Currency Term

Loan and Revolving Credit Facilities to Merck KGaA for its acquisition of the majority share in Serono SA. Bear Stearn's one-third portion of the investment-grade commitment is by far the firm's largest exposure in its corporate lending business. Merck KGaA is rated BBB+ and is expected to remain at investment grade post transaction.

Marc gave us the projections for selling down the exposure: (1) they expect to be down to \$1.7 billion by the end of November; (2) down to around \$700 million by early January; and by the end of March down in the \$250 million range.

This transaction has multiple parts and stages. The facility has a revolver, term loans, and a senior bridge. There will also be a rights offering (equity offering) and a HG bond offering. Marc didn't provide anymore specifics. ***We should follow up at the next meeting.***

(2). Cablevision- after month-end, Bear Stearns and Merrill Lynch each committed to providing one-half of the \$12.4 billion debt for the LBO of Cablevision. This was brought up at the end of the meeting but not discussed in detail. We will follow up at the next meeting (*See articles at the end of the write-up for details*).

(3). Valassis Communications- we discussed this facility again. Valassis and ADVO remain in litigation. Marc and Mike Alix said the two most likely outcomes will be either (1) the deal falls apart and commitment is not made or (2) there is a renegotiation at a lower price for the acquisition and a renegotiated commitment. BS still believes that at this point they have no legal obligation to act on the existing commitment, which was for \$1.375 billion (of which they have sold out \$500 million of the commitment).

#### Commentary on Bank Loans/Leverage Lending:

In addition to discussing the significant deals in the portfolio, Marc gave a brief update on the bank loan market. He stated that overall deals have fewer covenants than in the past and that most of the covenants are for upfront affirmation on the borrowing date vs. on-going covenants to be maintained.

Mike Alix had a few comments as well concerning the firm's corporate loan portfolio. First he stated that there had been lots of discussion at the firm regarding concentration risk (given the large commitments discussed this month) and that the firm was developing a framework regarding aggregation of portfolio risk and the individual concentration risk of the portfolio. He also stated that they gained comfort in the Merck deal given the perception of demand in the syndication market.

***We will follow up with Mike to get some more color on the discussions with senior management regarding these large concentration positions and whether we are seeing a shift in the business from a portfolio of diversified credits to a portfolio with lumpy concentrations. The other issue to discuss with Mike is whether they see a need for a revised role in this process by Credit or RMD. Unlike the other firms, approval from independent risk (Global Credit or RMD) is not required before a deal goes to***

*committee (either PAC and/or Executive Committee); however, Mike Alix does sit on the PAC committee.*

***From CSE credit risk review and leverage lending project:***

The loan approval process at Bear can be described as multi-step and involving a variety of groups/participants. In addition, the ultimate approval of the sizeable loans occurs at senior levels within the organization – i.e., at the Principal Activities and Executive Committee levels. The primary groups/participants involved throughout the ex-ante approval of a loan are 1) the business unit/deal team proposing a loan, 2) two quasi-independent functions established within the Corporate Lending business: a Quality Management Function (QMF), and LPM, and 3) the Principal Activities and Executive Committees - i.e., Bear senior management. Relative to its peers, Bear's independent credit function has a relatively light touch on the corporate lending business, which is exercised by Mike Alix, Head of GCD.<sup>1</sup>

Commitments are approved at different levels based on their size. The Principal Activities Committee approves commitments of \$25 to \$50 million that are less than 25% of total facility to Bear. A certain subset of committee members approves commitments under \$25 million that are less than 25% of total facility to Bear. The PAC and Executive Committee approve all other deals. The Executive Committee reviews are much briefer than the PAC committee reviews - e.g., the Executive Committee deal summary memos are only a couple of pages long, whereas the PAC memos could be as long as 30 pages. The PAC has 16 members consisting of members of GCD, the Risk Management Department, QMF, Co-heads of Investment Banking, and senior management outside of Investment Banking.

CLO Collateral Accumulation – the net MV for the desk has reached an all-time high of \$3.3 billion at September month-end. 1/3 of the book (on a MV basis) is coming from London- off which \$45 is in 2<sup>nd</sup> lien paper. The limit for this desk has gone up in lockstep with the growth in the business. They have currently granted a temporary limit of \$3.5 billion. They also have seven deals planned in the next 6 weeks which will take off most of the current inventory.

Post month-end, the business had both circled some of the equity tranches and bought some 1<sup>st</sup> loss protection from HFs (approximately \$250 million) as well. Mike Alix also stated that they did get some upfront collateral on these hedges with the Hedge Funds. I believe Kan said this was the first time the desk had bought protection on the pipeline.

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<sup>1</sup> Mr. Alix is a member of Principal Activities Committee and anecdotally has explained he spends a fair amount of time reviewing these transactions as presented to Committee for approval. When Bear entered this business, the decision was made that it would not be worthwhile for GCD to "reinvent the wheel" so to speak, by performing loan level due diligence and replicating the work of leveraged finance bankers (who have the greatest expertise in this space). That said, the Corporate Lending business has developed strong internal controls, and large transactions require approval at very senior levels in the organization.

## Mortgages and ABS

In addition to the in-depth discussion on the RMBS residual positions and the acquisition of Encore, we also asked risk management what senior management is currently focused on in the mortgage space. This question was posed after the risk manager stated that they weren't primarily focused on the net MV levels at the desks (after we saw the large increase in net MV for the CMO desk).

Mike stated that the Executive Committee was primarily focused on the following areas (from the risk perspective) in residential mortgages (and not on the absolute size of positions):

- (1). Influence of Pay-as-you-go Swaps on the firms ability to hedge credit spread risk.
- (2). International Residential Mortgage business- a substantially improving story after the much publicized problems at Rooftop.
- (3). Residuals risk- obviously a \$1 billion book of less liquid positions gathers attention.

The ARMs Desk – made a profit of \$23 million. The net MV was down \$1.864 billion to \$9.661 billion. The desk priced one new deal during the month (\$1.1 billion) which generated \$20 million in profit -\$10 for the ARMs desk and \$10 for the CMO desk.

The desk also made \$4 million on compensation for loans that were misrepresented to BS. The loans had teaser rates for a longer period than were published to Bear.

With respect to the MTA Option Arm positions, they were down \$1.6 billion to \$2.3 billion. As discussed in the Residual section, BS lost one of its major suppliers of Option-Arm product Greenpoint. (I believe they had an exclusive purchasing agreement with Greenpoint which ran out).

The Option-ARM IO tranche positions decreased from \$1.85 billion to \$1.45 billion. We asked Kan if he was able to get the VaR for these positions (he hadn't yet). During the price verification discussion the next day we met with Phil Lombardo and he said that these positions are in only a few accounts and that he would have Gregg (part of the RIO team now under Rupert) run the VaR on these portfolios.

The CMO Desk – made a large profit of \$44 million. \$8 million came from the Agency CMO business (\$4 million on \$2.1 billion of new deals). The Non-Agency CMO desk made the bulk of the profit. \$13 million on 6 new deals (\$2 billion of collateral) and \$10 million on the ARMs deals discussed above.

The CMO desk net MV hit a high at \$17.493 billion up \$2.6 billion from the prior month. We asked if there was a particular driver for the increase but the risk manager did not have details. As discussed above, our questioning of this level led to the risk

managers discussing what they (and senior management) focus on in this area. If the amount is at similar (or higher) levels next month, we might want to get some further details. The risk manager did note that the desk is using more Pay-as-you-go swaps, which given the MV levels seems prudent.

ABS Desk- made a profit of \$22 million. \$10 million on 3 new deals (\$1.5 billion of collateral); \$6 million on 6 new home equity(HELOC???) deals; and \$5 million on the release of reserves (I didn't catch the details on this release).

#### London/ABS/MBS/CDO –

The risk manager discussed two items in the international mortgage space:

#### Rooftop:

First, the risk manager stated that the firm had sold the remaining rated notes from the 1<sup>st</sup> 2 Rooftop deals. They were sold substantially above the marked down prices and made \$3 to 4 million on the sale. On a net-net basis, both of these deals were marginally profitable.

Secondly, the risk manager discussed the firm's plans for the loans originated since the first two deals. The total loan inventory is approximately 1 billion pounds. In October (subsequent to our meeting), the business was coming out with a 500 million pound securitization, of which they expected (have circles) to fully sell out the deal. Mike said that this deal was very important to re-establish the brand in the UK and as such the business priced the deal very tight (i.e. much less profit than a RMBS deal would typically generate). They had priced the deal to make a ½ point.

#### Tokyo Commercial Deal:

Kan discussed a \$75 million forward purchase of a Tokyo office building (*does this sound correct*). The building is expected to be completed by late November and BS is providing the financing for the purchase and has circled the mezzanine tranche of the loan.

The business expects to make a very large profit on this deal. *We should follow up on the exact nature of the deal again. Did they sign a forward purchase agreement (i.e. have an equity interest) and then sell it and provide financing to another party?*

Commercial Conduit– The desk made a profit of \$26 million.

As part of our discussion of the Tokyo deal we asked whether the commercial conduit business makes any investments other than in commercial loans to be put immediately into securitization. During the CSE review, the business said that they did have some

loans which they purchased where then knew they would be holding the loans for some time before they could go into a deal.

Mike said that the business has made the following types of investments or participated in the following types of deals (outside its primary strategy):

(1). Making construction or rehab loans – which will ultimately be refinancing and for which BS has some equity upside (sounds like the Tokyo deal??)

(2). Deals where they have made an equity investment in addition to providing the financing.

(3). Direct principal investments

(4). Securitization of an entire business- but based on intrinsic R.E. value vs. operating cash flows. The primary example of this was the Extended Stay deal last year.

Mike said they hadn't done any "bridge-equity" deals as we explained the concept. He said the only deals that somewhat resemble those are the bridge loans they make to real estate funds awaiting capital calls.

*Let's ask if all of these activities would fall under the Commercial Conduit and/or London ABS/MBS/CDO whitebooks.*

### **Fixed Income Investments**

Max Recovery – made a profit of \$13 million.

Credit Trading – made a very large profit of \$40 million. The desk made \$15 million in HG trading (about 1/3 from LDN). The desks had a decent size credit curve steepener on (\$2million/DV01- long short end of credit curve and short the med-long end of the curve).

They also continue to have a concentration in the autos \$800 million in GMAC which continued to tighten and significantly outpaced FORD.

The desk made \$13 million from structured trading. Part of the P&L was from a release of bid-offer reserves, which had previously grown as a result of the grossing up of the book by the previous hedging strategy and basis adjustment marking policy. Now that the firm no-longer does the basis adjustments on the bespokes, the book has come down and with it the bid-offer reserves.

HY made \$4 million in trading. Kan didn't have the details for VoX Capital (the internal structured credit HF).

Kan stated again that September was the firm's best ever month with respect to its prices being accepted by Markit Partners. Kan said that the discussion of the potential pricing bias of super senior and equity tranches was looked at by Oliver (and some of the exposure traded out of) but that no further work (or pricing adjustments) were deemed necessary. This was an issue Kan brought up during last month's meeting.

**Risk Arbitrage** - made \$11 million. The P&L was split 50/50 between the M&A and Event strategies. The M&A books are both in NY and LDN; however the Event or rumortrage strategy is solely in the UK. The M&A profit came primarily from a particular Spanish name which was up \$4 million during the month; whereas the profit in the event book was distributed across a number of names.

The Long MV was up approximately \$200 million to \$1.085 billion. Kan explained this as simply up from a relatively quite summer period.

### **Derivatives**

**Equity Derivatives** – made a very large profit of \$47 million. The business made \$25 million from NY; \$15 million from Europe and \$7 million from Tokyo. I believe Kan said that NY made \$11 million from its dividend strategy and volatilities going up??? Also, NY made \$7 million in its arb business (e.g., black box, long/short, etc). In Europe, half of the profits came from exotics, noting that the PCS (private client solutions?) has been a quite profitable activity.

In Tokyo, the desk made \$4 million in exotics. \$2 million came from Korean positions. Kan said the desk had built up a long Vega risk in Korea, but during the month pushed a large part of this risk out with transactions with hedge funds. The Vega was name specific coming from derivatives on custom baskets of stocks. Kan pointed out that their portfolio was nothing like the size of Credit Suisse's portfolio which had run into trouble during the third quarter when equity volatility in Korea decreased.

The VaR(weekly 95%) for Equity derivatives is sitting at \$2 million down from \$6.4 million in the previous month. The delta for the Equity derivatives desk is down marginally to \$105 million. The positive gamma increased substantially from \$282 million to \$430 million given the desk a very long gamma position. The Vega position increased from \$11.5 to 13.8 million. The gamma in not just local but extends out in the wings enough to provide protection against large events as well with the large market drop stress resulting in only a \$21 million loss. However, there was not much difference in the 1987 market crash scenario upon review of the firm-wide scenario results.

With that said, Kan said the VaR seems implausible to him as a risk manager. He said they will be looking at the VaR in this area and may have a series of enhancements. ***We asked Kan to walk us through any likely changes as they progress in their work in this area.***



Fixed Income Derivatives- the desk made \$15 million-- \$10 in NY and \$5 in LDN (0 in Tokyo).

From the risk perspective, the book has a short convexity position for changes in Vega (a short gamma with respect to Vega) in rates across a number of Options books. Kan also stated that the flow business in NY had picked up in September.

Block Desk- last month the Long MV for the block desk increased substantially from \$5 million to \$131 million on two large deals: (1) Valassis and (2) Limited (\$70 million block). The firm lost \$5 million on the Valassis position. We asked if that was due to the timing of the lawsuit it filed to annul its \$1.3 billion merger with ADVO, but Kan did not have the specifics. Bear had no difficulties in selling out the Limited block.

By month-end, the long MV for the block desk was back down to \$29 million.

### VaR Specifics:

- Firmwide weekly 95% VaR came down significantly from \$77 million to \$63 million. Daily 95% VaR was down from \$34 million to \$28 million.
  - The largest decreases came in the interest rate white books where VaR fell from \$76 to \$68 million. The largest whitebook decrease came in the Interest Rate derivatives where VaR fell from \$20 to \$11 million. (***Follow up with Kan whether the desk decreased its short Vega position from September or if there was another reason for the significant decrease.***)
  - The equity whitebooks sub-total also decreased from \$10.8 to \$8.3 million largely from the decrease in equity derivatives (see early story on large gamma) and decrease in block stock trading (2 large blocks from last month sold off).
  - FX also decreased from \$2.9 million to 254k.
- The VaR for the Credit Sub-total increased from \$36.1 to \$38.4 million. The largest increase was in the Leverage Finance whitebook (includes bank debt and CLO collateral). I assume this was due to the large increase in commitments (e.g. the Merck deal). ***Confirm with Kan that this was the case (i.e. that the ANC deal went into VaR and caused the spike from \$11 to \$18 million for bank debt).***

### Scenario Analysis:

- There was no discussion of the firm's market risk scenarios during the meeting. No noteworthy changes upon review.

### Credit Risk

The net CE increased by \$2.8 billion from last month to \$26.356 billion. The increase in exposure came from placements (\$1 billion) and across the financing products (mainly from the prior month being a quarter-end month).

We briefly discussed the project for looking at exposures at the principal vs. agent level. I believe Judy said that 99% of the names are going through the process and that they will be taken into GRMS relatively soon. These names (approximately 6000 counterparties) are mostly in the bonds borrowed/stock borrowed categories. The names range around the institutional landscape and include pension plans, insurance companies, hedge funds, etc.

Judy also said that while measuring exposures at the principal level was needed for capital purposes, this information can't be shared with the business due to confidentiality agreements.

The only interesting individual exposure we discussed was a \$151 million CE to a lower rated hedge fund, RIEF Trading, LLC (ranked # 5 on the top exposures report). Judy said the exposure was coming from a very large portfolio in the stock loaned/borrowed product space. However, like other numbers on this report (such as the CTC and PB product spaces), they feel the exposure is zero but given the legal entity netting issues this exposure is shown. In this particular case, the excess collateral is posted at CTC.

## **Other Discussions:**

### **I. RMBS Residual Position Presentation**

At last month's risk meeting, Kan stated that the Mark-to-Market Committee had asked for a complete review of the firm's mortgage residual positions. The review was conducted by the Mortgage Group risk managers within RMD (who are responsible for price verification as well as the typical independent risk functions). The net change to marks as a result of this review was not material. However, due to the magnitude of these positions we had asked for a detailed briefing of the residual positions by desk for this monthly meeting. This was also a follow up item from our securitization project as we wanted to see the current market value of these residual positions. We also wanted to discuss the impact that certain initiatives to sell out the residuals in quick order had on the ability to distribute out these residuals. Finally, the capital charge for these residual positions is much higher than any of the other securitization tranches and thus has a non-trivial impact on the total capital held by the firm.

#### **Summary of positions (including risk management and trends)**

In discussing the RMBS residual positions at Bear Stearns, it makes sense to define what the population is. The residual tranches here are the full residuals or the first loss (or equity piece) of the RMBS deals which has special tax consequences<sup>2</sup>. Historically, BS

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<sup>2</sup> John Schrader made it a point to state that these were the true residual tranches as opposed to lower rated subordinated tranches that one may casually lump in as residual tranches. In the agency world, for sequential-pay CMO structures, a residual tranche is the CMO tranche that receives the excess cash flow that remains after all of the payments due to the holders of other tranches and all of the administrative expenses have been met. When the residual is an accrual bond, it is often called a Z tranche or a Z bond. In REMIC CMO structures, one class of each issue must be designated as the residual for tax purposes.

would create a deal and a full residual (or the excess cash flow) would be created. The firm would then eventually sell off this residual tranche. The residual was not rated, did not produce significant cash flow at the beginning, and had a long duration and the investor base for these products was very limited. Now, the common practice at BS<sup>3</sup> (at least for certain products) is to break out the residual into two tranches: (1) Backend Residual and (2) non-Backend residual (NIM or front-end). The front-end (or NIM) and the back-end (or Baby NIM) combined are the full residual.

The backend residual tranche is non-rated and bears the most significant credit risk of any of the RMBS tranches. It only has a much longer duration and does not typically cash flow upfront. These tranches are typically held onto and seasoned (around 18 months or longer??) before being distributed out.

The front-end or NIM is generally rated, has a short duration and are cash-flowing from the start (I believe the 1<sup>st</sup> 18 months or so) and as such the risk is more diluted than the back-end residual. Typically, at least for subprime product, the cash flows for the first 18 months are fairly predictable allowing much of the front-end to be rated and results in a much larger investor base for this product. The risk for the front-end or NIM is more interest rate (prepayment risk) as well as the interdependence between rate and credit risk.

The amount that it bucketed into each of the two components is determined by rating agencies. For example, of the total residual for home equity (subprime) deals, Jon stated that 67% of the cash flows are being rated by the rating agencies with 34% of the cash flows remaining un-rated. This might have gone as far as only 12% being unrated in the subprime area today. I believe the other product areas have much less rated cash flows from the residual currently.

***Need to confirm if only the front-end gets rated and what the % refer to (do they refer to the entire full residual or just the portion of the front-end that is rated; does any of the back-end get rated?) Also, Jon stated that the “over-collateralization is pre-funded in the subprime space so that residuals cash flow right out of the gate”. How does this differ from other product areas?***

As of September 29<sup>th</sup>, the total MV of RMBS residual positions was \$1 billion across ARMS (\$553m), Non-Agency Fixed (\$315m) and EMC (\$136m) desks. The collateral backing these residuals consists of the following: (1) Alt-A hybrid ARMs (22%); (2) Prime/Near Prime Option-ARMs (33%); (3) Subprime (22%); (4) Alt-A Fixed (8%); (5) Second line/HELOC (13%); and (6) Scratch and Dent (4%).

There are several noteworthy themes related to the RMBS residual portfolio at BS since the data provided for the securitization project.

- The total residual position has trended upwards with the upward trend in the overall increase of inventory moving through the securitization pipeline. The

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<sup>3</sup> Apparently, the practice at ML was the opposite. They are now keeping the full residual as one tranche.

total RMBS residual position at 12/31/2005 (provided by Reg Controllers) was \$770 million<sup>4</sup> and now stands at \$1billion.

- There has been a significant shift in the make-up of the RMBS residual inventory positions. As of 9/30/2005, the largest contributor of residuals was the Non-Agency CMO desk with 48% of the population. The underlying product was Subprime (29% of the population) and Alt-A fixed (19% of the population). Now, the ARMs desk is driving the growth and overall make-up of the residual positions with a 55% portion of the total residual inventory positions.

***(This trend may not be industry-wide. At LB, the Subprime residuals are making up more of the residual vs. the Option-ARM and other products. See LB write-ups.)***

- The decline in subprime residual inventory (in absolute and relative terms) is the result of two factors:

- (1) the overall market for residuals in this product has increased as investors have gained confidence from the historical results of the product and the growth in the amount of rated product (see rating agency discussion above) and

- (2) Specific BS initiatives to pre-sell out subprime residuals- Bear Stearns and outside hedge fund investors created the Silverton Fund. The fund is a \$300 million fund that was created to invest in residual tranches of fixed non-agency deals (i.e. subprime and alt-A fixed deals). I believe this fund is to close shortly and BS is looking to launch Silverton II, which will be a \$150 million fund to invest in Static (i.e. existing inventory) Alt-A ARM product.

- The build up in ARM residual inventory is the result of two main factors:

- (1). First, BS production in this space grew rapidly during 2005/2006, particularly with respect to Option-ARMs. As of 09/29/06, residuals from the ARMs desk represented 55% of the total residual tranches (33% from Option-ARMs and 22% from Alt-A hybrid ARMs) and

- (2). The relative newness of this asset class (i.e. the lack of historical data upon which to perform analysis) and the modeling complexities of the product space (e.g. prepayment behavior) makes it much harder to quickly sell-off the residual tranches of these deals. As a result, the market is waiting to build up a performance history and thus the velocity of moving out the residuals in this space (particularly for the Option-ARM product) is slow. While the firm hopes that the velocity will pick up as the market matures further, it is likely that the market may never reach the capabilities seen in the subprime space given the inherent model uncertainties in this product space.

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<sup>4</sup> In error, I thought the balance was twice this amount or \$1.54 billion. They provided us the capital charge not the residual balance. I thought they were deducting 50% - but they were deducting 100%- 50% from Tier 1 and another 50% from Tier 2 capital.

- Residual Creation and Position (2005-2006) - Out of the \$76 billion of RMBS origination from 01/01/2005 through 08/2/2006, \$2.687 billion of residuals were created of which \$657 million<sup>5</sup> (or 24.47%) still remain on BS' balance sheet. As of 08/2/2006, the product type with the highest retention rate was the MTA Option Arm which had \$213 million or 54.62% of its residuals created still on BS' books. In contrast, only 22.72% of the subprime residuals created remained on the books.

### Capital treatment

Jim Collins gave a brief update on the capital charges for these residuals. First, the population of residuals subjected to the capital calculation discussed below was identical to the population discussed with the risk manager (and included in the presentation).

\$901 million of the \$1 billion in residuals are booked in the broker-dealer, BS & Co., Inc., and were deducted 100% straight from capital for the B-D capital calculation. For the holding company level capital calculation, 50% of the \$1 billion in residual MV is deducted from Tier 1 capital and 50% from Tier 2 capital for a total deduction of 100%.

At 12/31/05, the residuals were approximately \$770 million and were deducted the same way. At 08/31/06, the residual positions stood at \$842 million. The primary increase from 08/31/06 to 09/30/06 was a \$175 million increase in residuals from the ARMs sub-whitebook (\$146 million from the MTA Option-Arm product).

In addition to these residuals, Jim stated that equity tranches of CDOs (whether off of corporate credit, ABS, or loans) are deducted 100% straight off of capital. He estimated that for September, this number would be an additional \$150-\$200 million deduction from capital.

### II. Further discussion about re-organization

Mike Alix discussed the business re-organization again during this meeting. Some of the additional information (not in last month's write up) is as follows:

- The move of the firm's prime brokerage business ("Global Clearing Services") into the Equities Division was done to provide a holistic product to their hedge fund clients.
- Regarding independent risk management of GCS now that it is part of equities, Mike Alix just said that the independent risk management oversight will increase (but gave no details—we will follow up on in the future). He did discuss rolling out the "stress margin call analysis" for HF exposures to include PB risk as well

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<sup>5</sup> The total amount of residuals at 08/2/2006 was approximately \$825 million. So \$165 million of the residuals were from pre-2005 deals still on the books. Much of this came from the scratch and dent portfolios. There were two concentrated residual portfolios (purchased from Superior and UCFC) that were purchased rather than coming as a by-product of BS' origination and would be part of the pre-2005 residuals on the books.

as exposure from OTC derivatives (not sure how long this will take- but a good area to follow up on).

- With the roll out of significant trading at Bear Energy apparently set for December/January when the TriplePoint trading system is implemented, Mike Alix temporarily assigned Kristen ? of Global Credit to be the CRO for Energy. This is meant to be a temporary assignment until they find a permanent head of risk for the Energy group. She will move to Houston and be dedicated to risk management of the Energy group (market, credit, and risk analytics). ***(We should ask for another Bear Energy business and risk presentation when this is up and running again. I would suggest a discussion in NY first, followed by a trip to Houston once all the pieces have been put into place).***

- Principal strategies- Wendy L. de Monchaux (ex-head of Derivatives at BS) will form and lead a proprietary group which will house Bear's traders who face the Street as customers. They plan to incrementally grow the risk in these areas but no plans to change risk appetite drastically. Mike and Jeff envisioned 6-7 different areas to be moved into this group. However, from an independent risk management perspective, Mike said the risk managers will still be grouped and focus on product areas or risk factors (and won't be separated between flow and prop trading).

### III. New Product Approval discussions

- Purchase of Sub-prime Platform- Encore

On October 20<sup>th</sup>, Bear Stearns announced its acquisition of Encore Credit Corp.'s mortgage banking platform. ECC Capital Corporation will operate as a separate division of Bear Stearns Residential Mortgage Corp. This acquisition will substantially increase Bear's ability to originate subprime mortgages and is another step in the vertical integration of the residential mortgage business at Bear Stearns.

In this acquisition, BS is basically buying the people, particularly the sales force, of Encore. As a result, while the acquisition is small in dollar terms \$26 million, it represents a significant increase in headcount for the firm (approximately 600 new people or a 4-5% increase to the firm) and HR will be the biggest challenge.

They expect the subprime product to be done on BearDirect.Net similar to Bear Res' existing platform. Currently, Encore is originating \$500 million a month down from its peak and this acquisition will basically double Bear's originations<sup>6</sup>. Similar to the existing Bear Res platform, the Encore business is also a wholesale broker sourced business where its sales force call on brokers for product and close the loans in Bear Residential Mortgage Corporation's name.

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<sup>6</sup> Bear Residential Mortgage Corporation went from zero to \$500/600 million in origination per month in 18 months.

Getting this secure source of collateral is that much more important given that BS has lost some of its key sources of mortgage collateral (e.g. Bear no-longer has an exclusive arrangement with Greenpoint-which was a significant generator of the firm's Option-Arm product).

•Off-Shore Lending- approved

Bear will be establishing a Cayman Islands entity to provide stock lending/borrowing services to non-US customers (i.e. non-US hedge funds). This was done as a response to seeing some of its non-US business start to go to other firms that had this structure. It basically is about avoiding U.S. taxes.

•London Stock Loan Transactions- approved

Basically this structure was done to take advantage of a tax treaty between the Netherlands and the UK. Basically using a swap to acquire stock before a dividend is paid without having tax consequences. The swap is structured to include a voting prohibition in the acquisitions. Legal and tax signed off on the structure as acceptable.

•Superprime Installment Loans- approved but a moot point as the firm's potential business partner decided to partner with another firm. The business was going to be focused on making installment loans to individuals with really high credit scores (750 FICO or higher). The proceeds would be for virtually anything. The borrower would apply for the loan over the internet. Mike stated that a particular concern regarding this business was that it was at risk for identity theft and fraud (but that apparently did not stop the approval).

•Life Settlements (Insurance-Linked Product)- approved and business to start.

I believe this presentation was post September month-end (should show up in the October package). The business is basically to buy insurance policies from individuals at more than the cash surrender value but less than the actuarial value. The targeted audience for this product is an older person who has a seasoned policy and desires to no longer have the policy. Rather than just surrendering the policy back to the insurance company for the CSV, they would provide various information (including medical information) to BS and/or undergo additional medical testing and BS would make an offer on the policy. If accepted, BS would purchase the policy, pay the on-going premiums and be entitled to the death benefit.

This business would be subject to many risks including the risk that life expectancy differs from the actuarial estimate, operational issues, credit risk to the carrier writing the policy.

In the short term, the aggregate investment in this product will be in the tens of millions with the longer-term projection to be in the hundreds of millions. Currently, Coventry and Peachtree dominate this space. In the long run they hope to create a securitization market for this product.

In addition to the risks discussed above, the business faces the risk that the insurance companies wake up to this new product and push for regulatory changes to allow them to compete in this space as well. Mike and Kan seemed to agree that the economic profit from this type business has the real possibility of going away if it becomes a success as the insurance companies would then respond.

Steve Meyer- Co-Head of Global Equities (formerly Head of SEP) is sponsoring the business. In addition to this business, two other related proposals were brought to the NPC but were tabled: (1) Providing warehouse lines for financing this product for the Coventry/Peachtree's of the world and (2). Premium finance-- where BS would pay individuals to enter into a mis-priced policy. We discussed this last proposal with Mike and basically shared our thoughts that this would be a no-brainer to deny given the incentives for medical fraud, etc in such an arrangement. Mike agreed.

***In the bigger picture, we might want to pay special attention to the businesses going to new product committees as there seems to be a lot of non-trading type businesses, with unique, less understood and less hedgeable risks associated with them.***

### **For Memo**

- Bear Stearns corporate lending business has historically been the smallest and least concentrated of the five CSE firms. The firm has traditionally focused on smaller to mid-sized deals mostly in the United States. However, during September, the firm was a lead arranger in the firm's largest corporate lending commitment to date to an investment grade pharmaceutical company for the acquisition of another pharmaceutical company. In addition, the firm discussed another possible commitment for a multi-billion dollar leveraged buyout. We will continue to monitor these outsized commitments as they work through the syndication process and will discuss with the Chief Risk Officer the dialogue with senior management regarding the approval of these outsized facilities and whether the recent deals represent a shift in the risk profile and risk appetite of this business at Bear Stearns.

- On October 20<sup>th</sup>, Bear Stearns announced its acquisition of Encore Credit Corp.'s mortgage banking platform. ECC Capital Corporation will operate as a separate division of Bear Stearns Residential Mortgage Corp. This acquisition will substantially increase Bear's ability to originate subprime mortgages and is another step in the vertical integration of the residential mortgage business at Bear Stearns. While this is a small acquisition in dollar terms, it represents a significant increase in headcount for the firm (approximately 4-5% increase). We will continue to discuss with risk management the



on-going integration of this business into the broader Bear Stearns Residential Mortgage Corporation.

[Articles on Lending Deals:](#)

**September 25, 2006**

**Merck KGaA mandates Bear Stearns, Dresdner Kleinwort and Société Générale to finance Serono Acquisition**

Darmstadt, Germany, September 25, 2006 – Merck KGaA announced today that it has mandated Bear Stearns, Dresdner Kleinwort - the investment banking division of Dresdner Bank AG - and Société Générale Corporate and Investment Banking (“Société Générale”) as Mandated Lead Arrangers for the EUR 11.5 billion Syndicated Multi-Currency Term Loan and Revolving Credit Facilities (“Facilities”).

The Facilities will finance the acquisition of the majority share in Serono SA, fund a public tender offer and provide working capital lines. The Facilities have been fully underwritten by the Mandated Lead Arrangers.

Structure of the Facilities:

Term A: EUR 2.5 billion (tenor 1 year)

Term B: EUR 3.0 billion (tenor 3 years)

Term C: EUR 4.0 billion (tenor 5 years)

R/C: EUR 2.0 billion (tenor 5 years)

It is intended to launch syndication by mid of October 2006. Dresdner Kleinwort and Société Générale are the Bookrunners under the Facilities.

From Dealbreaker.com

**Merrill & Bear Stearns Land Cablevision Loan Deal**

Merrill Lynch and Bear Stearns have each committed to provide the family that controls Cablevision with one-half of the \$12.4 billion of debt financing the acquisition of the cable company, according to a letter filed with the SEC yesterday.

Of course, it's not quite accurate to say that the money is being provided to the Dolan family. The actual borrowers are Cablevision and a series of shell holding companies who secure the loans with Cablevision stock and assets. That's leveraged buyout magic—buying a company with money you don't have and collateralizing the loans with the company you don't own.

The competition to be the lead lenders on the deal was most likely intense, with at least a handful of banks submitting letters to the Dolans. The Cablevision assets are very valuable as collateral and the fees attached to loans of this size most likely quite large. One surprising aspect of the winning Merrill-Bear Stearns letter, however, is that it retains a full-throated due diligence “out”—a provision allowing the banks to refuse to lend money if their due diligence investigation turns up serious problems with the company. In heavily sought after deals, this language is often watered down.

Unfortunately, the real red-meat of the deal is not disclosed. We're talking, of course, about the bank fees and interest rates. These don't get disclosed because they are not considered relevant to public investors in a going private transaction. Since the public shareholders are being bought out, they don't have any economic interest in knowing what fees and interest rates the private company will be paying. So the fee letter gets kept under wraps.

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Heather found the article below on the Cablevision deal.

From WSJ

### **Heavy Borrowing for the Dolans**

The Dolan family plans to borrow about \$11 billion from the high-yield debt markets to complete its buyout of [Cablevision Systems](#) Corp., and will lean heavily on loan financing.

In a regulatory filing, the Bethpage, N.Y., company and its bankers at Merrill Lynch and Bear Stearns said the financing plan may include about \$3 billion of unsecured notes and \$8 billion in syndicated bank loans.

Sunday, the Cablevision controlling family said they intend to buy out the company's shareholders for \$27 each, for a total of nearly \$8 billion. The company plans to use remaining debt proceeds to refinance outstanding credit facilities.

Credit-rating providers have cautioned about the increased risk the new debt will place on the already highly leveraged cable company. Standard & Poor's warned yesterday that the mountain of new debt could push Cablevision's rating into the single-B category, from double-B.

Monday, Fitch Ratings put Cablevision's and subsidiary CSC Holdings' single-B-plus issuer ratings on "watch negative." If the buyout goes through, Fitch analysts said, those ratings could drop two notches. At the same time, Moody's Investors Service placed its B1 rating on Cablevision on review for a possible downgrade. Before the buyout, Cablevision had \$12.6 billion in debt outstanding, Fitch said.

## **Bear Stearns Packet Dated April 30, Meeting held on May 16**

### **DPG bullets:**

- Bear Energy, Bear Stearn's energy trading business, announced on May 21<sup>st</sup> its agreement to buy the power trading business of Williams Power Company, a subsidiary of The Williams Companies, Inc. for \$512 million. The portfolio purchased consists of a set of physical power plant tolling agreements, essentially power plant lease contracts, a set of full-requirements power supply contracts, and the resulted hedge book. In addition, Bear Energy will acquire various information systems and personnel from Williams in the deal. This acquisition when closed will significantly increase Bear Energy's risk profile. We will closely monitor this deal as it moves towards closing and plan to visit Bear Energy's headquarters in Houston, Texas in the Fall.

- As of the date of our meeting, Bear Stearns' corporate lending pipeline had reached a record high as the firm had multiple \$5+ billion commitments, including two commitments in the \$9 billion range. While the overall pipeline increased substantially, all the largest exposures remain unfunded, pre-closed commitments. We will continue to monitor these significant commitments as they move through the syndication process.

- The Head of Operational Risk for the firm came to this past monthly meeting to brief us on an issue that had recently come to his attention. In the past month, the firm discovered that one of its International Equities traders had been reporting fictitiously short sales in an attempt to hide a fairly significant long equities position he was running. Apparently, the trader was able to show the flat book in the firm's trading system by being able to continuously "canceling and correcting" the fictitious short positions. The activity was eventually discovered by the business itself when they noticed a high funding cost, from their internal Treasury department, for what looked like a flat position. Since the incident, the firm has reviewed the permissioning rights of its traders in the trading systems. It found a small subset of traders that IT had granted permissioning rights to "cancel and correct" trades. The firm has subsequently taken away these rights and is currently reviewing its policies and procedures around granting permissioning rights in the firm's trading systems to ensure that the requisite senior management approval is required to receive such rights. In addition, they are evaluating the reporting available to management of these businesses to spot such activity. We will follow up on any further action taken by the firm.

### **I. Price Verification**

#### **Mortgage PAUG Swaps**

At the last monthly meeting, we had been given a presentation on the price verification procedures around single name CDS on ABS. During that presentation we asked about the coverage in this area as the monthly coverage was not close to 100%. We were told that the policy states that there should be 100% price verification coverage on a quarterly basis. We asked the firm to get back to us on what the coverage for the last quarter was in this area.

During this meeting, Kan discussed the results. He said that the coverage was 98%. It appears this number was calculated by Noam (the person who did the price verification in RMD). He went over his last 3 month's of analysis and concluded that across the CUSIPS he tested, it represented 98% of the population. Kan said that they talked to Noam and told him that if he isn't going to hit 100% coverage, he needs to get this cleared by the MTM Committee. Kan also stated that his audit trail to be such that it generates out the percentage covered (i.e. this should be clear to the Committee).

Kan said that it was Susan Flynn's role (in Controllars) to check for the 100% price verification coverage as she was also doing the reconciliation work. Susan's role was filled by Lucinda (comes with Chip to the Price Verification meetings). ***We asked Kan to let Chip know that we want to have a discussion (at the next quarterly meeting) around the control procedures that exist to ensure the 100% coverage (on a quarterly basis) is obtained for the price verification process.***

Kan also said that Noam needs to breakdown his pricing results in a more qualitative differentiated way, such as High...Medium...Low quality results. For example, the Fitch data used to price verify positions in this space covers only 2/3 of the CUSIPS Bear has trades referencing and the Fitch data is avg. to good on only about half of these CUSIPS.

Finally, Kan noted that with Phil's resignation last month that he was the last remaining member of the original MTM Committee. Kan discussed briefing some thoughts about the Committee. He discussed the idea of more "active interrogation" of the results as part of the Committee process. Currently, the Committee's work is fairly "high-level" relying on issues to be brought to their attention. ***We will follow up on any changes in the structure or work of the MTM Committee at the next quarterly meeting.***

## **II. Model Review Update**

Kan gave us an update of where things currently stand with the Department in the wake of Slava's departure. He gave an update on personnel, areas of focus (and areas not currently focused on), as well as live issues the group (and RMD) is working on.

### Personnel update

Kan stated that they are close to hiring an individual who will work primarily on credit derivative model reviews. This would be a good development since they have not had a model reviewer for this product space for quite some time.

While they have a number of candidates-both in NY and LDN- that they are looking at for both potential Department Heads as well as less senior staff to grow the team, a hire of a Department Head doesn't seem imminent.

### Next Model Review Committee

Kan stated that they have scheduled a model review committee meeting for two weeks from the date of our meeting. They will give us a presentation on this meeting at our next monthly meeting.

Key Areas highlighted by Kan:

(1). 2-year schedule to clear the backlog of cash/mortgage models:

This work continues and has been much less impacted by Slava's departure as there are 2 people in NY dedicated to this effort.

(2). Business Developments or Issues arising from Risk Managers:

The group is concentrating its efforts on working on these "live issues".

A. FX models

The FX models have not been independently reviewed before. The firm relied on Fast's review as they were models purchased by vendors.

This recent review was initiated because of some significant mark corrections (through skew reserves or valuation adjustments) in the FX exotics business (i.e. barriers). In particular, there was a \$6 million dollar valuation adjustment on a recent large deal. This is a live discussion and they are in discussions with several traders. The Model review team has been showing them the capabilities of the equity derivative models that exist within Lynx as f/x derivatives have similar risk characteristics as equity derivatives. However, the practicalities of making such a switch would be extensive (i.e. if this happens it isn't going to be any time soon).

In the mean time, Kan noted that they have many reports that highlight the vega risk in these products.

B. Max Recovery model for UK claims

This review is being initiated do to the cash flows on the UK inventory have been coming in below model projections. About one year ago, the model was recalibrated. The Model Review team will be reviewing this calibration and also discussing whether or not the discount rate used within the model should be restated as well.

C. Interest Rate Derivatives

The review in this area is on the PRDC book out of Tokyo. Kan noted that recently, "PRDC Choosers" have taken hold in the market place. For these instruments the coupon depends not just on one currency pair but on two (both UDS vs. Yen and AUS \$ vs. Yen).

The business is using its PRDC booking model, a 3 factor model, to price these new “PRDC Choosers”. This booking model doesn’t capture the “f/x vol skew”; however, they have a 5-factor model in place that they can use on these trades (however not used as the booking model yet- I assume IT constraints).

Currently, there are \$14 million in adjustments for this aggregate portfolio. They have taken no P&L on these trades yet.

The risk manager in Tokyo, an ex-member of Slava’s team, is performing the review of the 5-factor model.

(3). New Model Development:

Still in dialogue with front office quants but depth of analysis conducted is “well less”. They are unable to maintain their previous standard of work given the current staffing level (For example, Slava’s group routinely built alternative or rebuilt models in its model review work.)

(4). Re-Review work:

Basically, they don’t seem to be doing formal, scheduled re-reviews currently. Rather, Kan stated that “a re-review naturally occurs through the normal process of looking at the output, model reserves, etc.”

**III. Vox Capital- Counterparty Dispute:**

The dispute continues between BS and perhaps another CSE firm on the price of a bespoke CDO trade between the two firms (see last month’s write up for the full trade details).

The disagreement with the CP widened during the month and Kan, Oliver, and others made two trips to engage the counterparties business and control functions to make sure that there were no obvious errors.

Kan stated that Oliver and his team had done a substantial amount of work and their conclusion remains that the counterparty’s prices don’t make sense. (Remembering they were able to hedge a portion of the trade at their price level and their feedback from Markit Partners survey also gave them comfort on their price).

Kan stated that the firm “showed neither confidence in their marks nor nervousness” and that the lion share of the conversation was conducted by the salesman for the counterparty.

*This represents a unique situation- should we proceed about inquiring into the name of the counterparty and if so how would we engage this counterparty.*

#### **IV: New Products:**

##### (1). Bear Issuance of ETN linked to MLP index

This was similar to the issue we discussed last month. The main reason for the product is to relieve investors of the administrative burden of multi-state and local tax filing requirements.

##### (2). European Energy Expansion

Bear is looking to organically build a similar style business as the one in Houston. They anticipate they will start slowly in the financial derivatives space and then move into physical. They want to move slowly into these markets-focusing initially on gaining the required expertise, systems, and controls.

They are looking to bring in a trader from a French bank that has experience trading in the European energy markets. They plan on bringing him as well as his team over (a handful of front office personnel and some IT people as well).

On the risk management side, they are already in talks with a candidate to be the senior risk officer in LDN for Energy.

##### (3). Saudi JV

BSAM is going to start a JV with a Saudi group (which is providing the access to wealthy individuals in the area).

This JV is meant to build a “Shari (spelling???) compliant” (i.e. religious rules against earning interest) investment business. Jeff Farber noted that the market for “shari compliant” investments is in the \$billions and “they want to get their piece of this pie”.

The biggest issues for this business long-term will be around AML and suitability.

##### (4). Gas Storage Arrangements

Basically Bear Energy is buying more gas storage operating leases. They are buying these leases to effectively “buy the optionality” that comes with owning storage capacity.

In the past, the NPC made the business come back to the Committee for every new arrangement it was looking at. Look’s like they won’t require future gas storage arrangements to come before the Committee to obtain approval.

We asked for them to send us the power point/memo that was presented to the Committee for these structures (*Follow up if we don't receive prior to next month's meeting.*)

#### **Post meeting- Acquisition of Williams Power Portfolio for \$512 Million**

(See presentation for details- Presentation is on the J: drive)

#### **IV. Global Risk Management Headcount**

They gave us a high-level org chart for all groups reporting up to Mike Alix, Chief Risk Officer. Interestingly, on this chart, there is no separate Head, COO or otherwise for Market Risk Globally. Kan is listed as Chief Risk Officer- Europe and Asia. All the functional product-line risk managers (e.g. Oliver Jakob, Marc Galligan, John Schrader) that are located in NY report up directly to Mike Alix.

Global risk management headcount has increased in both Europe and NY since 2005 (time of CSE exam) (U.S. currently at 130.5 vs. 120.5 in 2005 and Europe currently at 33 up from 24 in 2005). Most of the increase appears to have come in Credit (which now includes much of the personnel within the Office of CRO). Within market risk, the headcount increased from 42 (in 2005) to 45 (currently). The small net increase has occurred in Oliver Jakob's world- credit trading and energy.

The model review headcount of course is very low (discussed last month's write up) and stands at a mere 3 personnel with 2 of them being fairly new positions for cash/mortgage products.

Risk IT – is not included in the presentation. This group supports RIO, CreditLab, and GRMS. I believe they have 12 on RIO side in NY and 4 people in LDN (total).

(See presentation for details- I'll put presentation on the J: drive)

#### **V. Market Risk**

##### **VaR explanation**

Firmwide VaR was down \$7 million from \$71 million to \$64 million. The decrease was almost entirely from an increase in offset by Equities (\$4million) and FX (\$3 million) to Firmwide VaR.

The total \$64 million VaR came from \$46 million from the his simulation calculation and an additional \$18 million from the parametric add-ons.

From the divisional standpoint, all the Firmwide VaR is coming from the Fixed Income Division. Kan also stated that the parametric add-ons at the firm level are again all coming from Fixed Income- \$11 million from mortgages and around \$7 million from credit and rates.



## High Yield and Distressed

The Distressed Desk – made a \$29 million profit. The profit was driven by the Firm’s IPP positions which made \$26 million (on \$180 million in inventory). They lost \$3 million on Delta as the new equity has fallen 20% since the “when issued price” was given.

Top exposures were IPP (\$180 million); Enron exposures, which decreased \$15 million to \$175 million and airline exposures, which increased to \$365 million from \$250 million. The net market value of its positions decreased by \$77 million to \$1.18 billion.

## Leveraged Finance

On the Risk Summary by Trading Desk (Tab 1) they made some changes to the information/organization of the leveraged finance area. Now under the Leveraged Finance heading are three categories now: (1) Loan Trading and CLO inventory; (2) Loan Origination- Net MV (includes funded and unfunded closed loans) and (3) Pipeline Commitments- Net MV (basically accepted not closed deals). Between these categories, everything except one-signature commitments are included on this sheet. In Tab 4, the section we discuss monthly with Marc Galligan, we see the offered not accepted IG and non-IG deals as well.

### **The main story during the month was the huge increase in Bear Stearns pipeline.**

While there was a very large increase in the pipeline (with more increases to come as I believe some of the largest deals came post month-end), there were no big funding of commitments during the month.

The Offered-not-Accepted (1-signature) stage increased from \$10.1 billion at the end of the previous month to \$25.2 billion at the end of April (un-weighted). The ANC stage was up \$1 billion to \$10.2 billion and the closed loans were up slightly from \$5.770 to \$6.175 billion.

### **Bear had multiple outsized commitments (some of which were came about post month-end). As of the date of our meeting they had the following significant new commitments:**

- (1) Cerberus Capital Management acquisition of Chrysler.

BS along with GS, MS, Citi, and JPM is providing financing for the acquisition. BS’ portion of the commitment is **\$9 billion**.

Total of \$60 billion in financing from the 5 banks (on a pro-rata basis). Most of the financing will be asset-based financing (they will issue ABS backed by auto loans) \$39 billion, \$10 billion for the financing company (I believe refinancing of existing debt), and around \$11 billion credit line to the operating company. about for Chrysler Financial Services (e.g. the auto loans).

- (2) Cablevision – new offer by the Dolan family. The total commitment is for \$15.5 billion and BS has a 1/3 share or slightly over **\$5 billion**. While the independent board has approved the transaction, it is still subject to independent stock holders approval.
- (3) Thomson/Reuters- **\$9.4 billion** unconditional backstop as this is a funds certain deal. Thomson Financial is acquiring Reuters for approximately \$17.4 billion.

*(Look at the next capital submission-this should make a big hit I would think as they have stated they include all Funds Certain deals. Follow up on this one with Jim Collins.)*

*Probably worth having a follow-up call on the capital implications of these chunky deals with Jim Collins prior to the next monthly meeting.*

Bank Debt – made \$31 million as 17 deals were priced during the month. I believe they 8 of the 17 deals were LBOs and they made \$14 million in profit during the month on these deals. They continue to increase the HY index hedge they are running (amount??) and they lost some on the hedge as spreads tightened during the month.

The VaR for Leveraged finance increased \$1.5 million to \$25.5 million. However, the contribution to firm-wide VaR increased significant up \$11 million to \$23 million as overall there was a shift to credit sensitivity from interest rate sensitivity driving firm-wide VaR.

Reology- (the Coldwell banker acquisition discussed in previous write-ups) Marc said the sponsor gave a little on this one and Bear was able to still get out with some fees.

Great Wide Logistics- we followed up on this deal from last month. This was the deal where Bear funded the loan in advance of the close and some negative news came out on the company. At least some of the buyers backed away (Marc said they were within their contractual rights to do so) and they marked down the \$10 million piece of paper to 90%. Since then they have sold \$6 million at 95%.

## CLO

The CLO desk made \$4 million during the month. Inventory (including secondary trading in bank loans) increased slightly from \$4.4 to \$2.365 billion.

The only issue discussed this month in this area was an accounting issue. In the LDN CLO accumulation desk (as discussed in previous meetings) is grappling with when to recognize profit. They are currently discussing whether they should take a portion of the securitization profit when they have reached “critical mass” in the accumulation of loans (i.e. calculate a hypothetical securitization value at that point).

At the present time, they are not taking benefit of the expected forward securitization sale. (*Follow up on developments in this area.*)

## **Mortgages**

Overall, a much better month. Securitization profits were up from last month's levels. Aged inventory for all of Mortgages stands at \$5.8 billion down slightly; however the aged inventory for the ARM desk increased up to \$800 million.

VaR for Mortgages was up \$3 million to \$26 million and contributed \$9 million to Firm-wide VaR.

ARMs – made \$35 million. \$15 million came on 5 new deals (\$4.5 billion of collateral). Overall inventory decreased slightly from \$10 billion to \$9.7 billion. MTA Option ARM inventory stood at \$2.4 billion at month-end.

Non-Agency Desk - lost \$13 million. The losses came from two areas: (1) \$9 million loss from EPD claims against Ameriquest (reserved 100% against these claims during the month) and (2). \$8 million loss on short CDS on ABS as spreads tightened.

The deals for this desk were more profitable than last month; however, they still made only \$7 million on \$7 new deals of \$4 billion worth of collateral.

Agency CMO desk – Kan noted that the Flow desk had a \$13 million VaR as it had a significant FNMA TBA trade on. The desk expects to make between \$7-9 million on this trade in May. With that said, the desk did not contribute significantly to the Firmwide VaR (only \$1.5 million).

We asked if the recent increase in active positioning on this desk was a pattern (see the discussion last month on positioning in Freddie TBAs). Kan was not sure he would say it is a pattern quite yet.

Commercial Conduit – made a profit of \$18 million. The desk made \$15 million on 2 new deals (\$4.2 billion of collateral-\$1.2 BS collateral).

Kan stated that they were showing that the Commercial mortgage contribution had decreased from almost \$13 million to \$1.5 million at the end of April. While the net MV of the Commercial desk decreased \$3 billion to \$10 billion, this seemed to be too large a decrease in Kan's opinion and as such he is investigated this area further.

EMC- made \$13 million.

**Credit Trading** – had a large profit of \$66 million. The profit came from all businesses: (1) \$39 million on flow trading and \$25 million in Global Structured (managed CDO

programs in NY and LDN). Within the flow book, NY HG made \$18 million (\$9 million from Autos). They have a significant exposure to GMAC (\$1 billion- have of it is rolling off in June). Vox Capital was flat on the month with respect to profit (two months in a row).

VaR fell \$5 million to \$19 million as the desk flipped to short net spread risk. However, as stated before, they are more short in the lower spread names and long in the higher spread names (so the net spread risk metric has some issues). The contribution to Firmwide VaR remained at \$10 million.

**Risk Arbitrage**- Made \$20 million- \$14 million off of merger arb deals and \$6 million on the events book.

**Equity Derivatives** – made another very large profit of \$65 million- spread across the regions: (1) \$19 million NY; (2) \$38 million Europe; and (3) \$8 million Asia.

Kan noted that the \$38 million monthly profit for the LDN SEP desk may be a record. He said they made substantial profit on 2 large trades. One of the trades was selling a \$2.5 billion 2-year put option on the DAX index to the investment ARM of a high net worth individual. They made about 1 vol point on the trade which resulted in \$8 million profit.

He discussed the VW trade again and stated that Risk Management was in close dialogue with compliance to make sure there was no manipulation done on the part of BS. They found no issues with how they handled the trade.

**Fixed Income Derivatives** – made \$20 million.

The LDN interest rate derivatives desk made \$15 million- almost all came from the exotics business on MAST index (???)

IR Derivatives had a \$21 million VaR but contributed only \$4 million to Firmwide VaR.

**International Equity** – made \$21 million before mark down (see DPG section for details). The sales profits have been high for this book, and this month the limits on the prop book were increased to \$100 million long market value, \$100 million short market value, and \$40 million net market value (don't know what the limits were).

### **Credit Risk**

- The Credit Section included a set of reports that Judy prepared for the CPC. It is based off of reg cap reporting and thus is on a 1 month lag (i.e. March month-end data).

The reports have net exposure, EAD, RWA, and EL by rating, industry, and legal entity. They also have a report that shows the above and capital charge by transaction type.

- There was a \$862 million decrease in CE to \$30.123 billion largely driven by a reduction in placements. As a result, the bank sector showed the largest change in exposure by industry.
- Judy discussed the #4 top exposure, \$233 million exposure to Brevan Howard (a hedge fund). Typically hedge funds don't pop up in the largest exposures (particularly in the swap category). This was the result of a swaption where Bear decided to physically settled vs. cash settled a swaption (i.e. they entered into the underlying swap contract). Entering into the "in-the-money" swap generated a margin call. This exposure was subsequently covered by collateral within 1 to 2 days.

## **Bear Stearns Packet Dated August 31, Meeting held on September 19th**

### **Trading Revenues**

The Trading Division net revenues were a negative \$300 million during the month of August. The Division had net losses in several businesses. It was a “perfect storm” as Mike Alix put it.

There largest drivers of the poor performance were:

Leveraged Finance

Mortgages (including CDO)

Credit Trading

SEP Exotics

We discussed each of these areas in detail with risk managers. (See discussion below.)

The only material fixed income profits during August came from the Fixed Income Derivative business which posted gains of \$50 million as they benefit in a “crash scenario” as the desk is long Vega through short-dated options and also long gamma. International Equity also performed well generating \$25 million in revenues for the month. *(As discussed on the earnings call the firm also made \$225 on its structured notes from its own credit spread widening. This revenue is booked in the SEP group in equities.)*

### **Governance Changes**

#### **Management Committee**

The Management Committee is going to be expanded. The Heads of the business areas as well as Mike and the Head of IT/Operations are going to be on the Committee as well as the executive management (Jimmy Cayne, Alan Schwartz, and Sam Molinaro).

#### **Executive Committee**

No changes other than the previous announcement of Jeff Mayer joining the Executive Committee when Warren Spector resigned.

#### **Risk Committee**

Mike said that there was a “re-casting” of this committee. Traditionally, it had been a weekly meeting of around 20 minutes for trading managers to discuss P&L explains, etc. Directly after this meeting, the Executive Committee would meet.

Going forward this Committee is going to have much more of a focus on risk appetite and be more “policy driven”. It will be used for “information sharing- with more granular discussion of risk, return, and funding issues”.

### **Bobby Steinberg**

The infamous (and rarely seen) Bobby Steinberg is going to be retiring. Mike referred to him as a long-standing, highly respected member of the firm and a wise contributor to risk discussions. Someone people in the firm would bounce ideas off of. It was clear however, that his responsibilities, other than serving on the Management Committee, were “light”.

### **Specific Business Updates from Risk Managers**

For the second straight month we had targeted discussions with risk managers in specific areas (vs. an overview solely by Kan and a brief visit by Marc and Helen on leveraged lending). This approach was much more satisfying and we let Mike know that we were pleased with the format of the day.

Unlike last month, this month, we were briefed by all the senior risk managers under Mike: (1) Mortgage Update (Dan?); (2) Credit Trading update (Oliver); (3) Leverage Finance (Marc and Helen); and (4) Equities (James).

### **Mortgage Update**

Dan walked through a report detailing the firm’s mortgage and ABS exposure by desk and rating bucket @ 8/31/07 as well as a change report from the prior month. Also, intra-month, Mike Alix had given us a spreadsheet detailing the securitization activity for August.

The biggest story in August in the Mortgage space for Bear was in the higher rated tranches. While there were markdowns across the capital structure, in August, the largest negative P&L came from the liquidity-driven spread widening that occurred in the higher tranches (particularly the AAA tranches which the firm had chosen not to hedge from a credit spread perspective).

Total mortgage/ABS inventory stood at \$50billion @ 08/31/07 (\$26 billion resi; \$15 billion CMBS; \$7.3 billion ABS/CDO desks; and \$1.4 billion other desks (Max Recovery/tax liens) which was down from approximately \$55 billion from the previous month. As of 9/14, the firm had reduced Mortgage Inventory another \$3-4 billion, mostly in resi but also some in CMBS.

### **Residential**

During the month, they reduced residential mortgage inventory by \$6 billion, \$3 billion of loans being securitized (mostly Prime/Alt-A ARM loans), \$1.6 billion of AAA rated tranches sold (virtually no sub-prime), and \$2 billion decrease in Agency inventory. The

reduction in inventory in August was more a story of raising liquidity as the market risk remained as the lower rated tranches were relatively unchanged.

While securitizations took place during the month (they did 4 resi deals (\$3.2 billion in loans), they were unable to sell any significant amount of non-AAA rated tranches. As a result, BBB, BB, and residuals actually went up month-over-month from new securitizations of whole loans with these lower tranches mostly being retained). *In September, Dan said that they were able to do some recent MTA-Option Arm securitizations while retaining only 5-10% of the capital structure.*

However, while the securitization activity that occurred in August did not meaningfully change the risk profile of the residential mortgage inventory held, the firm does not have a significant un-hedged position in the lower or non-rated tranches. In the BBB space, where most of the CDS on ABS hedges are, they are over-hedged leaving a relatively small amount of un-hedged BB and below (\$626 million) and residual tranches. The total residuals stood at \$1.253 billion @ 08/31/07. They remain exposed to further widening in the higher rated tranches as they have over \$8 billion in (AAA-A rated tranches) and approximately \$8 billion of unsecured loans across all collateral types (Arm, fixed, subprime, S&D).

#### Origination activity

Mike stated (and so did Sam on the Earnings Call) that Bear Stearns origination channel was moving from Alt-A (subprime origination had already been stopped) to non-conforming prime (“jumbo”) origination. Bear Stearns continues to offer MTA Option Arms but in the “70-80% LTV range with documentation and high credit scores”. Mike said that “post change in the guidelines”, they are originating at wider spreads and a positive arb has returned for this product (although still left with 5-10% after securitization). **(Steve did you hear this.)**

#### Commercial Mortgages:

The vast majority of the exposure is in the Commercial Conduit business, \$12.7 billion, with the majority \$7.2 billion coming from U.S.

The desk did one securitization in August which was fairly successful in distributing the higher-rated part of the capital structure. Prior to our meeting, in September, the desk contributed \$700 million of whole loan inventory to the “New Power 17” deal. In this deal all the B-pieces were distributed.

Dan noted that the business, for the first time, has discussed the possibility of doing some direct selling of whole loans. ***Follow up on this next month.***

The desk is primarily hedged with TRS on AAA, although they also have some CDS on ABS in the BBB space as well. As a result, they took a markdown hit on their B-notes/Mezz to reflect the wider spreads.



## ABS/CDO Desks:

The biggest impact here was the increase in the inventory (CDO secondary/primary) for this desk, up \$2.366 billion to \$7.3 billion. The largest chunk came from the inclusion of the BSAM inventory taken from the \$1.6 billion Repo line which consisted largely of highly rated CDO tranches.

The desk also has \$1.795 billion in its CDO Accumulation book (an area which has seen new issue down dramatically). However, of this they show \$755 million as non-Bear Risk- (i.e. per risk-sharing agreements). Mike said that they do have some collateral for these credit exposures but did not go into specifics. He also stated that they have a couple of big deals in front of rating agencies now (including one based on BBB resi collateral). He expected to have much more clarity on their CDO warehouse positions by our next monthly meeting. ***Follow up on this next month.***

## Price Verification

We discussed whether there was any change with respect to the price verification of the CDS on ABS. The answer was basically no. They still use the consensus spread information (per previous discussions they use Fitch<sup>1</sup>) for a significant amount about 50% coverage. However, for some of this population, they will do further relative value & trade analysis since the std. Deviations of the broker/dealer data on some of the underliers is quite significant. *(Interestingly, at the LB quarterly meeting, they said they use both Fitch and Markit (using Markit now since it includes durations) and that they get around 96% coverage. When asked what they do about the underliers that come back with huge dispersion, they said that they just take the mean provided by the consensus provider since they throw out outliers. This seemed to contrast with what we have heard at the other firms regarding applying some other sort of analysis to this population. Also, they must have significantly smaller population of underliers to get such high coverage.)*

## Leverage Finance:

The outstanding leveraged loan pipeline was down slightly from \$6.9 billion to \$6.3 billion. The majority of the pipeline continues to be the \$5 billion Cablevision commitment. The remaining pipeline is comprised of small deals that are expected to be launched relatively soon.

The amount of funded loans from recent syndications was down from \$2.9 billion at 8/14/07 to \$2.68 billion at 9/12/07. \$1.5 billion of this is the loan to Chrysler AutoCo.

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<sup>1</sup> Interesting, at the recent LB quarterly financial and liquidity meeting, the mortgage price verification people said that everyone except BS were included in the 11 or so submitting info to Fitch and Markit as it had its own source. I didn't feel it was appropriate to challenge that statement but will confirm my understanding of BS using Fitch in this space.

They took mark-downs on all funded positions and commitments at quarter-end with the exception of the Cablevision and Hilton transactions (as discussed below). These happen to be the vast majority of their leverage loan and CMBS/ABS pipeline however.

The mark-downs for the pipeline of leveraged finance commitments and loans were approximately \$250 million.

Cablevision Discussion:

Bear's view on the likelihood of this transaction closing (in its current form) hasn't changed. The view seems to be that this transaction won't get the shareholder approval. *As a result, they did not take a mark down on this commitment at the quarter-end (i.e. they weren't reasonably certain that this transaction would close.)*

Marc said that the regulatory filing to kick off the Dolan's tender offer includes language about the "intention to sell certain assets after the acquisition". Marc conjectured that the idea that post-acquisition, the company would sell the cable assets may be a principle objection of some of the dissenting shareholders. (I'm not sure I follow as to why investors that are going to be cashed out would care about what happens to assets post selling out. I can only think that this might give more credence to the view that the assets are worth more than the offer.) If the LBO was to close and the cable assets were sold, Marc viewed that as a positive from a fundamental credit perspective (which might help in the distribution of the paper).

In looking on the internet, the shareholder vote is set for October 24<sup>th</sup> so that would confirm the previous comment that if this were to close, it would be in November at the earliest. See article below:

NEW YORK, Sept 13 (Reuters) - Cablevision Systems Corp, (CVC.N: [Quote](#), [Profile](#), [Research](#)), said on Thursday it will hold a shareholder vote on Oct. 24 to consider the proposal by the Dolan family to privatize the New York-based cable operator.

Cablevision's shares rose 2.2 percent to \$34.56 on the news, moving closer to the proposed \$36.26-a-share cash bid in May by the Dolans, who have a controlling stake, after two previously known attempts to take the company private.

In a filing with U.S. regulators, Cablevision included a letter to its stockholders inviting them to attend the special meeting at the company's Bethpage, New York, headquarters.

But some major shareholders have expressed doubts that the Dolan family's bid reflects the true value potential of Cablevision, which analysts say will soon start to benefit from years of capital investment in an advanced digital fiber network.

Fund managers at Gamco Investors and T Rowe Price said the company's assets are worth as much as \$50 a share.

"Today's filing -- indicating that the financing remains in place and the Dolans remain committed buyers -- is clearly welcome news," Craig Moffett, an analyst at Sanford Bernstein, said in a note to clients.

"Questions remain with respect to whether or not shareholders will support the deal, however," he added.

For the Dolan bid to go through it has to be approved by the holders of a majority of the outstanding shares of Cablevision Class A common shares held by unaffiliated shareholders such as hedge funds and others

The CMBS/ABS pipeline (within leverage finance) of \$4.805 billion is solely made up of the Hilton transaction.

#### Hilton Transaction:

The firm is still in negotiations with the sponsor. Bear was currently working with the rating agencies on the deal during our meeting and expects the closing to be October 22<sup>nd</sup>. The securitization exit would follow at least 60 days after the closing. We followed up with Mike Alix on why the "60 day" waiting period and he said it was because of the securitization of the franchise/royalty fees. (See previous email on Hilton transaction for specific details.)

In conversations with Bob Upton in Treasury, the firm is close to getting additional committed commercial whole loan facilities to provide the funding for this commercial whole until it can be securitized and sold (currently they have \$2 billion of committed facilities "locked up" for this transaction.)

From a market risk perspective, they believe that these securitizations will clear the market and are reasonably confident that they will not take a loss (net of fees) on this deal. *As such, there was no mark down on this transaction at quarter-end.*

#### Hedging Activity

The hedging of the leveraged loan pipeline was mostly hedged with CDX HY Index. While they had made money on this hedge during June and July, during August, the hedge significantly underperformed as the HY index tightened and the cash leveraged loans took heavy write downs. The hedge lost \$115 million in August. This hedge has since been cut dramatically from \$2.2 billion notional to \$1.15 billion at 9/12/07.

Mike discussed some brainstorming ideas around new ways to distribute leverage loans. These included taking parts of previous retained deals as well as "hung" deals and distributing via a securitized exit. Basically he said it would be using the CLO technology but for a different investor base and a different funding strategy. (We had heard similar ideas from Paulo at LB.) Mike also added that this might include the firm providing financing, which is something that BS has traditionally not done (i.e. never financed the purchase of BS originated leveraged loans before).

**Next month follow up on whether any of these ideas have developed further. Also, follow up on the Schering-Plough IG exposure. Last month they said they thought this exposure was going to go down and it hasn't.**

### **Credit Trading Update:**

Oliver gave an update of how the Credit Trading desks performed in August. It was the worst performance of the year, with Credit Trading losing \$125 million or approximately 28% of the YTD P&L coming into August.

The losses occurred mostly in the Flow desks (NY-HG, NY- HY, and LDN) with the most significant loss in NY-HG.

A primary cause of the loss was due to BS' significant steepner position which had largely been unchanged from the month before (i.e. long short-term credit and short long-term credit). This positioning worked well in the past when there were always several names rumored to be in LBOs. In that environment, 10 year protection is valuable but 3yr protection is "worthless" given that the names generally are good positive cash flow operations currently.

### **NY-HG**

However, in August, there were several liquidity-driven events that caused curves to invert, with shorter-term paper increasing in spread above longer term. To make matters worse, Bear had significant steepner positions on non-commercial bank financial institutions which were where this phenomenon was most pronounced. For example, they lost \$13 million on RESCAP as the curve widened and inverted. They also lost \$15 million on the curve inverting on homebuilders.

### **NY-HY**

On this desk, their shorts (or long protection positions) massively underperformed the longs. Oliver suggested that the desk has generally purchased protection on 7-10-yr HY from structured deals (i.e. they are purchasing longer-term protection from the correlation desks of other dealers). Overall they were short DV01, which would have led to a small amount of losses. However, the largest short positions tightened dramatically (e.g., Hertz Corp tightened 103 basis points over the month and resulted in \$6 million loss).

### **LDN Flow**

\$14 million of the \$22 million loss was actually related to losses on BS paper as the desk was long between \$350-\$550 million (MV) throughout the month and the spreads widened significantly from 93 basis points to 135 basis points. (Post month-end, this should have generated a healthy gain (assuming constant level of inventory) as spreads are in significantly (CDS 5yr around Libor + 80 basis points).

Overall, Oliver noted that there has been a lot of effort to cut positions in Credit Trading. He said they are bigger (gross size) than they want to be and would like to get to half that profile. As part of these efforts, he noted that he has had a fair amount of contact with Marc (Marc and Helen sit at the same desk with Oliver's group on the trading floor) and the desk about "what positions do they actually believe in."

### **Equity Exotics:**

For the first time (that I can remember), the SEP exotics desk lost a substantial amount of money, \$(61) million in August and is now down \$(10) million for the year. While the general risk profile of the business has remained the same for several years, movement in the "more second-order" risk factors, specifically correlation, and in the firm's choice of hedging strategies caused the losses.

The desk has two types of business: (1) market making activity in correlation (or options on volatility) with Hedge Fund clients and (2) providing of hedges for retail products—generally to European banks offering such products.

The desk generally runs a short correlation position from these activities. This risk is hedged by entering into variance swaps for "crash protection" when enables the desk to stay within its "stock market crash" limit (instantaneous 20% fall of all equity markets). However, during August, correlation spiked (as realized correlation was as high as it had been since 1987 and implied correlation increased dramatically as well). The desk lost money on its short correlation positions but the variance swap hedges did not perform well as their payoffs are dependent on changes in markets levels, and while volatility and correlation spiked, the overall market levels did not change significantly month-over-month.

In addition, the hedges the desk had bought were short-dated and became very costly to maintain over the month. The cost for this protection was \$7.5 million for the month. As the business has had more experience with these hedges in the recent high volatility environment, this hedging strategy is something they will consider changing in the future.

### **Structured Funds business:**

We asked for a quick update on the Structured Funds (i.e. hedge fund linked derivatives) business as well.

They said that there has been no increase in limits for this business. Currently the total size of the book was approximately \$7 billion with a \$5 billion loan equivalent amount (or "gap to zero" amount). James confirmed that there had been only 1 structure that had hit a trigger to de-lever and that they haven't had any losses here. He said the biggest hits to their trades were the ones that were in the BSAM funds. He reiterated that generally they have 20% of equity ahead of them in these trades and that most of the clients are the FofF managers. *However, James also noted that they didn't have in many of the August NAVs yet (definitely an area to follow up on at next month's meeting).*

He did say that the firm is rethinking this business as it considers the liquidity issues and regulatory capital associated with this business. “As the cost of funds goes up, how valuable is this business?”

### **Model Review:**

We asked if there had been in progress on the hiring front for the Model Validation Group. Kan said that they had hired Slava’s replacement and he was scheduled to start on September 28<sup>th</sup>. Kan said that he has a background in derivatives including front-office experience. Kan thought that since he actually had experience “using the models to make money” that this would help the model review function have a better connection with the business. The new head of the Model Validation Group will be located in LDN and will present to us at the November monthly risk meeting.

### **Counterparty Credit Risk**

#### Structured Counterparties to PAUG swaps:

The most interesting discussion we had was with respect to counterparty credit risk to SPVs from which BS has bought protection.

This came up in the mortgage hedging discussion (and in particular on the mark dispute side) and then again later in the review of top counterparty credit risk exposures with Judy.

Basically, they confirmed our understanding that there was a liquidity risk mismatch to how BS had hedged its MBS/ABS risk through basically buying protection from the structured vehicles (many times wrapped by a monoline) and being short protection with counterparties that they have bilateral MTMs with (other dealers/hedge funds).

The SPVs that BS bought protection from are partially funded up front (with liquid collateral) and many times are wrapped by monoline guarantees. However, Mike said that generally they are relying (from a credit perspective) on the collateral held in the trust to make good on any actual payouts related to actual credit events on the underlying securities. He also said that they take a CVA charge on these trades, but it is small (around 5 basis points) given the high rating of the counterparty. However, from a liquidity perspective, BS will not receive any cash from these counterparties unless a loss event occurs. I believe Mike said that the liquidity mismatch from this positioning is currently in the \$2 billion range.

**Mike also stated that in the (credit systems??) they are starting to create a flag that will highlight whether an exposure to a counterparty, such as an SPV, is insured or guaranteed by a 3<sup>rd</sup> party. They also want to be able to differentiate between direct and indirect exposure to counterparties that provide guarantees on these SPVs.**

**Again, they currently do this in a “crude way” through “guarantor flags” but are looking to enhance their reporting capabilities in this area.**

Several of the CEs > \$50 million are to these counterparties (many labeled as SPV) for industry but some which are under “commercial bank as the industry” where part of the exposure is from the bank or affiliate providing a guarantee for the SPVs selling the CDS on ABS credit protection (e.g. #1 Dexia (through FSA affiliate) and #2 (Robo bank)).

Financing, forward settlement(s), and watchlist names:

(1). Counterparty Credit risk from Fixed Income Repo Financing

They provided another roll-forward of the repo financing for counterparties (HFs (the lion share of the exposure), REITS, and originators) schedule that they had provided the last couple of months.

They highlighted a few themes. First, there was a re-class of some CDO financing from the “Other” category (which mainly consists of the financing of agencies, treasuries, etc) to the CDO line. The amount of financing, for all the various categories (CLOs, Subprime, Alt-A, whole loan, other), decreased month-over-month, with the exception of the CDO category which increased from \$656 million to \$762 million due to the re-class discussed above. The largest decline was for the whole loans category which declined from \$1.5 billion to \$551 million. (I assume this was largely in part to some of these positions becoming inventory on BS books)

See schedule for details.

***Follow up, since the warehouse lines for whole loans are done legally as Repos now, I assume the \$551 million of repo financing for whole loans at 9/14/07 would include the outstanding balances on the 2 ResCap facilities. (Steve, is that your understanding?)***

(2). New twist on operational risk in the mortgage space:

They had a forward trade for \$350 million sale of MBS (based on origination from American Home Mortgage) to a HF. The trade date was in June for August Settlement. The hedge fund balked on settling the trade based on the fact that the servicer had changed and they viewed that they were no longer obligated to buy it (apparently BofA took over AHM’s servicing operations). BS argued that the change was an improvement in servicer and that they were not delivering securities that were worth less. The resolution was that the HF agreed to take a smaller slug, \$150 million. The result of keeping the additional \$200 million in inventory was an additional \$12-15 million on mark-down during the month.

(3). Mike made the comment that there were more names in the ICU and then rephrased that to include in the ICU and the morgue, with most of the names being the independent

mortgage originators (really same as previous month). The two names discussed in particular were (1) IMPAC and (2) ResCap.

Regarding IMPAC, Mike stated that they have seized origination activity but had not yet filed for bankruptcy. BS' exposure was very modest, \$100 thousand in EPD claims. These claims probably come from the fact that Bear had provided warehouse financing for about \$300 million of whole loans for IMPAC which Wayne discussed last month.

Regarding GMAC's ResCap, Mike noted that the firm conducts a significant amount of activities across a wide range with this counterparty. BS has 2 \$1 billion warehouse facilities to ResCap: (1) a S&D facility- with a 20% haircut and (2) subprime whole loans- collateral terms are aggressive for this facility but they have the right to renegotiate and are attempting to do that. Overall, they are trying to restructure these secured lending facilities to shrink their size and get more margin. *Follow up on this at the next month meeting. Follow up on if there are any other facilities left (in the subprime space).*

### **For Memo**

- As discussed in previous memos, the head of Bear Stearns' independent Model Validation Group resigned earlier this year. During the interim, the Chair of the Model Review Committee (who is also the firm's Chief Risk Officer for Asia and Europe) had taken over much of the responsibility for this group. However, the capacity of the group was clearly strained during this time period and required a scaling back of their efforts as well as more involvement of the product line risk managers in model control work. It has taken several months, but the firm has now hired its replacement for this control function. The new head of the Model Validation Group will start on September 28<sup>th</sup> and will be located in London. He will provide an update during our November monthly risk meeting.
- During August, the Exotic Equity Derivatives desk lost over \$60 million, the first monthly loss of any significance in several years. According to most risk measures, such as VaR and a market crash scenario, the desk appeared hedged. However, the desk lost significant money due to its structural short correlation position and because of how that risk was hedged. As correlation (both realized and implied) spiked during the month, the desk lost money on its short correlation positions. However, the offsetting hedges, which were short-dated variance swaps, did not generate significant offsetting payoffs as the payoffs were dependent on changes in markets levels, and while volatility and correlation spiked, the overall market levels did not change significantly month-over-month. In addition, the hedges the desk had bought were short-dated and became very costly to maintain over the month. The risk manager highlighted that this hedging strategy is something they will consider changing in the future. We will continue to discuss the exposure metrics and hedging strategies used for this business.
- One of the primary hedges to Bear Stearns' long mortgage and asset-backed positions are its single-name CDS on ABS positions. A significant amount of this protection is



sourced from highly-rated structured vehicles or SPVs, many of which are guaranteed or wrapped by monoline insurers. Generally, Bear is relying (from a credit risk perspective) on the liquid collateral that is held in these SPV trusts to make good on any payouts related to actual credit events in the underlying MBS/ABS that the CDS reference. In addition, the firm also has other exposure to the monolines that wrap some of these SPVs. From a counterparty credit risk perspective, the firm wants the reporting capability to differentiate between direct exposures to the monolines and the indirect exposures they have to them via their guaranteeing of the above mentioned SPVs. Currently, they have a “crude way” of segregating these exposures but are looking to enhance their reporting capabilities in this area. We will monitor the progress the firm makes in this area.

**Bear Stearns Packet Dated December 31<sup>st</sup>, Meeting held on January 16th**

General Market Conditions and Opening Remarks (Kan)

The weekly meeting was a little different than normal as Mike Alix, Dan Chen and others were in the Firm's Risk Policy meeting when our meeting started. Kan ducked out of that meeting to come start our risk briefing.

Regarding the Risk Policy meeting, Kan noted that this weekly meeting had increased both in duration (from 1 hour to now between 1 ½ to 2+ hours) and as discussed before much more focused on strategic decisions. Kan also noted that this was actually the second Risk Policy meeting this week already and that the vigor and robustness of these discussions had increased. Obviously, strategic risk decisions appear to be vetted more frequently and with a wider group than in the past. The Risk Committee includes Mike Alix, Sam Molinaro, Alan Schwartz, and senior business management including Co-Heads of Fixed Income (Jeff Mayer and Craig Overlander), Co-Heads of Equities (Bruce Lisman and Steven Meyer), and Wendy de Monchaux (head of prop trading).

Kan walked us through a few interesting risk management organizational decisions and the firms' current thinking regarding strategic business direction in 2008.

- First, James Bell has taken over responsibility for Credit Trading as Oliver Jacobs has left the firm. James was previously the Head of Equities Risk Monitoring in RMD and is based in London. He is still based out of London but has spent 2-3 stints in NY over the past few months.

- Kan also discussed a slight change in responsibilities within the product line risk management function. The shift will be towards pushing more responsibility down to the mid to senior managers within each of the product areas. Including in this responsibility will be a more semi-formal responsibility for planning, resourcing, and development of the teams which will free up the SMDs in RMD to serve more like an executive committee above the individual product-line risk units. The hope is that this effort will help reduce the amount of key-person risk that the firm has had in some of the product areas, which was recently highlighted with Oliver Jacobs's departure which necessitated James Bell coming over from Equity Products to Head up RMD for Credit Trading. This shift is expect to take some time as Kan highlighted that this is where they want to be in the next 12 months. He also noted that there is a management offsite coming up this week for the risk department.

- We discussed with Kan the big themes with respect to where the firm planned to grow to make up for the losses in revenues from the mortgage area. Kan noted that the following businesses were areas where they planned to grow revenues (and risk) in the upcoming year:

- (1). Energy- obviously an area of growth for Bear Stearns. In addition, to growth in the customer and prop risk taking, they expect to monetize a portion of the Williams portfolio in the upcoming year (based on our discussions at the quarterly meeting which was the day after the risk meeting, the expect to have settled on a partial monetization by the 2<sup>nd</sup> quarter 2008, which they

expect to generated substantial GAAP earnings, which heretofore have not been recognized due to accounting rules.

In Europe, the business is in front of the New Products Committee to expand its business. Currently, it is just trading CO2 emissions credits but is now looking to trade financial power and gas. (Mike later came to the meeting and said that any growth in Europe power business would be minimal for FY 2008.)

(2) Equities- They expect to continue to grow the equities business, particularly internationally. Based on discussions with the Treasury department at the quarterly meeting, they have already begun to put more cash into that business in FY 2008.

(3) Interest Rates and FX- Within Fixed Income, the Mortgage Area has always been a 1<sup>st</sup> tier business whereas Interest Rate Derivatives has been a 2<sup>nd</sup> tier business. They plan to transform this business into a 1<sup>st</sup> tier Fixed Income business. They have recently moved the Head of ARMs trading (Mike Nierenberg) over to be the Head of Rates and F/X now. Kan expects a change in the limit structure going forward to accommodate the growth expected in this business.

As part of this increased focus on interest rates and f/x, they recognize that there needs to be an enhancement in the personnel in this area; particularly within the front office quants (i.e. FAST). As an example, Kan highlighted that they had only 1 person in FAST that works on construction and maintenance of yield curves (an area where they have noted issues in previous monthly risk meetings). In contrast, according to his knowledge, Barclays had 10 quants devoted to such activities for a purely “flow business”.

Interest Rates- whitebook made around \$300 million during FY 2007 but has already made \$200 million so far in FY 2008. Most of this revenue has come from significant curve steepners that the business has put on.

Kan expects the firm to be more competitive in “flow exotics”. When asked what exactly he meant by flow exotics, he gave “yield curve options” as an example. He basically saw the firm operating in products that it could trade/sell frequently but that were not “so plain vanilla”.

Given the recent change in management and mandate for growth in the business, in the next 3-4 months, after the new management has had time to more fully develop their business plan, we will have a special presentation by the business as well as from the product-line risk managers in RMD that covering interest rates and f/x. We will discuss both changes in focus, personnel, risk appetite, and risk management.

(4) Distressed ABS fund- although this is early in the process, there are conversations around putting Jeff V. (currently the Head of Non-Agency CMOs) in charge of both managing down the current non-agency (alt-A and subprime) book as well as starting a distressed ABS fund which would be

linked to EMC (Bear's servicing operation). They have said there is a lot of interest from clients (some banks and others hedge funds) around putting money into such a venture. Some of the outstanding questions would include: (1) does BS put some of its own inventory into the fund; (2) how much capital does BS put into the fund; (3) for those potential investors that would sign up only if leverage was available- where would they source the financing (my guess is it won't be Barclays). All of this is still in the very early stages of discussion, but we will continue to monitor the progress.

- The Risk Analytics team along with the Head of mortgage product-line risk management within RMD have been working on refining a customized housing-led recession scenario. While it is still under development and currently being presented to the firm's Risk Policy Committee, it has been included in the firm's group of Firmwide Market Risk Scenarios and is being used to drive the firm's hedging activities. The scenario includes all business areas but the focus is on the mortgage area where liquidity is the poorest. Given the initial scenario results, the firm intends to reduce its exposure by both (1) selling mortgage inventory where possible and/or (2) adding additional hedges, particularly macro hedges such as interest rate curve steepeners.

- Kan discussed recent risk management issues in the corporate credit space as well, both with respect to single-name credit trading as well as the structured credit book.

### Structured Credit

Kan noted that the firm had a particularly challenging month with respect to the daily P&L explain process for its structured corporate credit portfolio due to the wild swings in certain corporate credit spreads over the month. The firm is working both on changes to its pricing model, particularly with respect to mapping of the bespoke tranches to instruments that are covered by external pricing sources and additional scenarios and reporting for risk management. Given the poor calibration of existing modelling approaches in December and the overall size of the structured corporate credit book we have asked for targeted updates on the risk measurement, management and price verification of these positions at both our next monthly risk meeting and quarterly price verification meeting.

### Single name Credit Trading

Within the single name positions, RMD is pushing aggressively on the business with respect to credit curve steepeners that the business has on in certain sectors and/or names. (Last quarter, Credit Trading lost a lot of money on curve steepener trades where curves inverted (e.g. in the Financials).) Marc and Helen are basically meeting on a name-by-name basis with the desk and pushing back against limit breaches particularly where the business can't articulate or doesn't have high conviction in the strategy.

- Kan also stated that BS had put in orders (through 2 desks) to apply for the full amount of the largest ever Indian IPO (Reliance Energy). Kan said they typically liquidate in the same day they get an IPO allocation (I assume he was referring to overseas IPOs). ***Follow up on whether they won this and whether they liquidated the position (and P&L impact).***

### General Comments (Mike Alix)

As discussed above, Mike Alix was tied up in the firm's Risk Policy meeting for most of our meeting. He came in at the end and discussed a few areas, mainly answering questions we had and/or adding some additional color on the topics we had discussed with Kan or Dan.

- We asked Mike about his thoughts on ACA concerning what was likely to happen after Jan 18<sup>th</sup>. He again said that he thought ACA was "toast" but gave the caveat that BS is not a part of the steering committee and he had not additional insight into what their decision would be.
- Hedge Fund Counterparty Credit Risk- Mike said that there was nothing in hedge fund land that is on the edge of a cliff but obviously they are actively engaging in the surveillance process (i.e. lots of calls to funds).

Mike made the general comment that HFs typically meet margin calls even for those they are disputing whereas bank counterparties will dispute first and pay later. This of course is due to the fact that HFs are more worried about the signalling effect and being closed out.

- Structured Credit- Mike noted that they have resolved some of the disputes- in some cases by taking the dealer counterparty out of the contract through assignment to another counterparty (what type?). He gave the bespoke trades with JPM as an example with the result being that there are less disputes. In the aggregate, the disputes are in the low hundreds of millions (wasn't sure if that was for just structured credit or across all products).
- Regarding the direction of the Firm with respect to areas of growth, Mike confirmed Kan's comments on Energy, Equity, and Interest rates but also added that they will continue to focus on getting bigger internationally, noting the Citic investment in particular.

Citic was on-site at BS doing due diligence and BS expects the transaction to close in the next 2 months. Mike said that they expect to put substantial resources to participate across a suite of products/businesses in: (1) investment banking; (2) equity capital markets; and (3) Structured Equity Products.

He also mentioned LatAM, which is basically where BS is concentrated in the EM space. They are expanding their bank and broker/dealer licenses in Brazil to be able to enhance their local presence to enable them to source "on-shore" risk to either: (1) capture arbitrage differences in products or (2) source local product to distribute to clients globally.

- Mike also discussed having a new CEO. He noted that he had spent more time in the last "little while" with Alan than he did in the whole last year with Jimmy. He also said that he hadn't heard from Jimmy since the announcement.

• Mike also spoke to the Recession Scenario and said again that it was informing the firm's macro hedging. The big issue remaining of course is basis risk. He also said (in response to our questions) that for structured products (including 1<sup>st</sup> securitization products) both VaR and historical stress #'s (scenarios) were useless measures and that they were focused on the positions in balance sheet intensive activities (no shocking news there.) With that said, he noted however, that the VaR #'s had increased dramatically in spite of lower positions, as volatility has surged (reached a \$133 million 1-week Firmwide VaR).

### Mortgages (Dan Chen)

From a P&L perspective, the highlights were as follows:

- Commercial mortgages- lost \$75 million which Dan attributed to spreads tightening on the CMBX hedges (they have around \$4.5 billion of TRS and CMBX hedges) with no improvement on the marks for loans in inventory.
- ARMs desk lost \$45 million. Worsening remittance data (cum loss assumptions (at BS) now north of 10% for Alt-A).
- Agency CMO desk made \$22 million mostly on curve steepners.

### Residential

The major story in December was the desk's active macro trading- playing a view of a recession. The desks, like other areas such as rates, put on a lot of curve steepners (2s vs. 10s). For example, the Agency CMO desk made \$22 million on the month (mostly from curve steepners).

Dan noted that the better liquidity into January hasn't materialized in the mortgage area and that they were still "stuck in the asset deflation mode" which has hindered them from reducing inventory in any meaningful way. For the month of December, Dan said that they basically reduced inventory only about \$1 billion. The monthly package now has a section on mortgage positions (both resi and commercial) by collateral type and for securitized product by rating buckets. There is a cash exposure page, synthetic exposure page, and total exposure page.

With respect to cash inventory, the vast majority of the non-agency inventory is Alt-A inventory, \$ 11.4 billion net MV, with the majority of that inventory being Hybrid ARMs (e.g., option-arms, secure-option arms, MTA Arms, etc). \$2.2 billion of the Alt-A inventory is International (assume this is all Rooftop- confirm?).

See TAB 4 for details of inventory positions.

Regarding price verification processes, we asked at the quarterly meeting if anything had changed in the residential mortgage area. In a nutshell, there has not been a change in any of the methodology they have applied in the subprime area from the previous month. However, Dan noted that the main focus and issues were on the Alt-A side where the liquidity had tried up.

For the Alt-A inventory they are basically verifying traders marks by running the inventory through a F.A.S.T. (i.e. front office quants at Bear) cash flow model- with FASTs assumptions regarding projection of defaults and severity (to arrive at cum losses). While the methodology Dan's team has used has not changed since the prior month (or previous quarter-end), the model assumptions have changed based on delinquency remittance data.

See upcoming write up of the quarterly price verification meeting for more details.

Commercial:

We spent a fair amount of time discussion the breakdown of the commercial mortgage positions given their size (\$15 billion), the lack of liquidity, and the upcoming Commercial mortgage/CMBS price verification inspection.

Positions:

\$15.598 billion of Cash positions (offset by \$1.981 billion of synthetic shorts- mostly in the AAA range (\$1.477 billion) and BBB range (\$517 million)) for a net position of \$13.6 billion.

For the long positions, the vast majority of the inventory is related to the conduit activities (i.e. not secondary trading) and this is consistent with what we have seen from this business in the past. Most of the product is still in loan form, \$12.905 billion; with the majority of the securitized product is AAA (\$1.328 billion). With respect to the AAA securitized product, they are slightly over-hedged.

The geographic breakdown of the loan inventory is as follows: (1) \$1.5 billion in LDN; (2) \$1.2 billion in TK; and (3) the remainder (\$10 billion) is U.S. Of the U.S., the largest concentration is the Hilton loan (\$4.1 billion currently) with the \$1.3 billion Tishman loan (from deal done in July for an extended stay hotel property(s) being the 2<sup>nd</sup> largest concentration. The 3<sup>rd</sup> largest concentration is a Mezz loan to Extended Stay Hotels for \$700 million.

Of the total inventory, Dan estimated the B-notes and Mezz loans to be approximately \$4 billion, with \$2 billion coming from Hilton and another \$700 million from ESH.

Dan also gave what I would say was the most efficient discussion I have heard on the capital structure of commercial loan deals, quickly explaining the difference in mezz loans and B-notes for example. I believe this is also discussed in the cross-firm paper we did. I have included this discussion in the write-up as a reference for those not familiar with the process:

From the lowest part to the highest part of the capital structure:

- equity
- preferred
- mezz loan- not secured by the 1<sup>st</sup> lien- some investors buy this paper because they want the ability to take control of the property in a default situation
- then the 1<sup>st</sup> lien mortgage- which generally has two pieces- A note and B note.

The A-note is what is securitized and the B-notes are generally sold to a select set of buyers. They may also be held if there is a view that they will be able to be put in a security in the future (due to improvements in the property performance, etc).

From a risk perspective, obviously, the A-note portion is a story about spreads whereas the Bnotes/mezz is more a view on the fundamentals.

Most of the loan inventory is floating rate loans. Of the \$12.905, only \$2 billion are fixed rate loans. As Dan discussed last month, the floating rate loans more leveraged and not as easy to distribute in the current environment. These floating rate loans are typically made sort of as bridge loans for properties in transition.

Price Verification:

We asked Dan, given the lack of activity in the commercial securitization market, if there had been a change in the price verification procedures used on the whole loan inventory.

First, with respect to the fixed rate loans, they had not changed their methodology. They are still being priced verified based on a “mock securitization” model and there have been recently distributed deals on which they rely to verify the subordination levels for the various rating buckets (i.e. Power 18 mentioned above).

With respect to the floating rate loans, they are no longer marking to a securitization exit but rather a whole loan market. In the absence of whole loan sales, they look at mezz circles (i.e. where they have a sale pending on the mezz) to help assess the spread levels they should assign to the higher tranches. ***We might want to ask Dan to walk us through one of these examples as well.***

Hedges:

It isn't entirely clear what the hedges are that are showing up on the non-agency commercial mortgage line (\$1.981 billion in total) vs. the other credit hedges at the bottom of the sheet. On the bottom of the sheet, the credit hedges include among other things \$1.9 billion in CMBX index shorts (mostly AAA) and \$2.7 billion of CMBX TRS (all AAA). I assume that the hedges included on the commercial mortgage line include similar CMBX shorts as well as TRS on Lehman index and could include some PAUG swaps (i.e. CDS on ABS) referencing CMBS deals. In past presentations on PAUG swaps, BS has had some, although not significant, positions referencing CMBS collateral. *(Follow up on these with an email to Dan.)*

Securitization/Sales Activity in December:

Overall, they felt pretty good about their distribution of commercial loan inventory in December. They sold \$1.8 billion (\$730 million A-note sale in LDN (whole loan sale); \$600 million of BS fixed rate loans were included in a Power-18 securitization in December; and \$300 of first loss pieces of the Hilton deal were sold.

Hilton update:

Bear's current inventory position stands at \$4.1 billion.



Not much concrete action on this from what we knew last month. There is still an ongoing marketing effort to sell the mezz now (500 accounts being looked at to purchase the mezz paper). The only other interesting point was that Dan mentioned that they were also looking at alternatives to the securitization exit- for example whole loan sales with life insurance companies. \$2.5 billion of the \$4.1 billion of BS' Hilton exposure would be rated IG by the rating agencies.

### Kan's Risk Summary by Desk

December was a positive month with most whitebooks posting gains. The only large losses were within Mortgages with the ARMs desk taken an additional \$45 million loss (due to alt-A product) and the Commercial desk taking a \$75 million loss. From an overall perspective, the firm benefited greatly from putting on interest rate curve steepners across several desks both as prop positions and as macro hedges.

Outside of mortgages discussed above, the following were some of the larger or otherwise noteworthy whitebook discussions

**Leverage Finance** – had a \$12 million profit. The only noteworthy item was that the mark on the Chrysler position was discussed at the Executive Committee. The final mark was at 95 which was above the initial 93.5 mark that risk management had. Kan said however that risk management was ok with this mark (“don’t want to grossly undervalue the mark.”)

**Credit Trading** – bounced back from a terrible November. (See discussion above for details of discussion on focus structured credit and the single name exposures.)

**Fixed Income Derivatives** – made \$50 million. The desk made \$36-37 million from NY. The desk made substantial P&L from putting on curve steepners with reasonably large positions in the front-end (e.g., Eurodollar futures). They also made money from a 1 month/ 3 month Libor position as this. With that said they took some losses (no \$ given) on their vol position. The bulk of the rest of the P&L came from LDN.

**Equity Derivatives** – made \$52 million on a rebound in exotic P&L (the fourth quarter had been a very rough qtr for the BS' exotics books.)

**International Equity** – made \$20 million.

**Principal Strategies** – made \$14 million as the math arbitrage strategy continued to perform well (it contributed \$12 million). The book is now at \$1.4 X \$1.4 billion against a \$1.6 billion limit. There is currently a proposal outstanding to raise the limit to \$3 billion X \$3 billion. and they have asked for a limit increase to .

**Bear Energy**- made \$17 million (economic P&L) during the month but only recognized \$10 million of GAAP P&L due to the Williams portfolio P&L not being recognized. The recognized revenue came from shorting natural gas contracts in December.

The VaR for Bear Energy was up to \$45 million but excluding the Williams portfolio the VaR was between \$2 and \$2.5 million. As previously discussed, they are looking to monetize a portion of the “in-the-money” tolling agreements in the 1<sup>st</sup> half of 2008, with the expectation of generating significant P&L.

Steve, Kevin, and I are going to Houston next week for an on-site visit of Bear Energy.

### Counterparty Credit (Judy)

Judy went through the counterparty credit risk numbers. The only noteworthy items were as follows:

- Total CE was up \$1.8 billion (most of increase was in bonds/borrowed and stock loans and on the equity repo on the funding side. We spoke about the rationale (or lack thereof) of assessing credit risk to a lender in a tri-party arrangement where they don't have access to the collateral. Apparently, they were asked to do this during the CSE exam for capital reasons. With that said, I would think that the exposure should be to JPM or BONY as they hold the collateral. In any case, the current treatment is more conservative as I don't think the repo counterparts are as highly rated as JPM.
- We suggested on reporting enhancement- that is a pie chart with and without placements. Currently, all the industry classification of counterparty exposure on the existing chart is drowned out by the placements being included. As the energy counterparties start to pick up, this would allow this to be seen easier.
- As Judy highlighted last month regarding the Bear Energy Williams contracts, they have concluded the process of assigned trades where Williams was standing in the middle to the 1 or 2 dozen ultimate counterparties. This process resulted in about \$100 million greater CE because the netting benefits were diminished when piecing out the trades among the larger set of counterparties.
- Judy discussed 1 situation where BS and the trustee had a different view on the marks of a collateralized GIC. ***We asked for a follow up on this and also whether any monolines have had to top up the GICs that support some of BS' hedges. We haven't heard back from Judy yet.***

### For Monthly Memo

- The Head of the ARMS securitization and trading desk has been moved over to be the Head of Interest Rate Derivatives and F/X, as Bear attempts to grow this business and diversify its fixed income activities away from mortgages. The market risk manager expects that there will be a change in the F/X and rates limit structure going forward to accommodate the expected growth. After new management has had time to more fully develop their business plan, we will review this desk with front office personnel as well as the relevant product-line risk managers. We plan to discuss changes in product and risk focus, personnel, risk appetite, and risk measurement.

- The Risk Analytics team, along with the Mortgages product line market risk manager, is developing a customized housing-led recession scenario. While the scenario is preliminary and still being refined, risk management is now reporting the results along with other Firmwide Market Risk Scenarios. Furthermore, it is being used to drive the firm's hedging activities. The scenario includes all business areas but the focus is on mortgages, where liquidity is the poorest. Given the initial scenario results, the firm intends to reduce its exposure by both (1) selling mortgage inventory where possible and/or (2) adding additional hedges, including macro, non-mortgage related hedges.
- The firm had a particularly challenging month with respect to the daily P&L explain process for its bespoke structured corporate credit portfolio due to the wide swings in certain corporate credit spreads over the month. The firm is working on changes to its pricing methodology - namely in how it derives pricing inputs for less liquid bespoke tranches from observable prices on actively traded index tranches. Given the overall size of the structured corporate credit book we have asked for targeted updates on the risk measurement, management, and price verification of these positions at both our next monthly risk meeting and quarterly price verification meeting.

JTG 1/24/08

## **Bear Stearns (Package Dated February 28, 2007, Discussion on March 21, 2007)**

### **I. DPG Bullets**

- Bear's mortgage business incurred significant market risk losses on its residential mortgage inventory due to continued spread widening and collateral deterioration. The vast majority of markdowns occurred on second lien residential mortgage residuals (mostly based on Alt-A collateral but also including some subprime collateral as well). Losses for the 1<sup>st</sup> quarter on second lien inventory (both securitized product and whole loan inventory) totaled \$168 million. However, there were also non-trivial markdowns against whole loans and 1<sup>st</sup> lien RMBS in both subprime and Alt-A product. Although the business benefited from substantial protection purchased in the form of CDS on ABS, the mortgage business had its first monthly loss since Bear became a CSE.
- During this month's meeting we were informed that the head of Bear Stearn's independent Model Validation Group has resigned. In the past year, two of the group's model reviewers, who had concentrated on equity and credit derivatives models, have left the group. While the team has added two members dedicated to reviewing mortgage and other cash product models, most personnel focused on derivatives pricing models have left the group. Bear was able to completely clear its backlog of derivative model reviews since becoming a CSE, but this lack of depth could make reviews of the new models and re-reviews of existing models a challenge. We intend to closely monitor the firm's filling of these positions.

### **II. Market Risk**

#### **Update on New Reporting:**

Kan and others (Risk Analytics) continue to work on re-engineering the reporting to the Executive Committee (and us). However, they have not yet approved a format and as such the risk package we worked off of during this month's meeting had not changed.

Kan stated that much of the ongoing discussion is around different approaches for reporting the VaR across the divisional lines (individual VaR by division, marginal VaR by division, etc). Kan stated that their historical simulation approach with parametric add-on's for specific risk presented some issues that would not be seen in say a var/co-var approach. He believed they have agreed on presenting the total VaR (historical VaR plus parametric add-on for specific risk) in the new report.

As discussed before, the report will provide Firm-wide and Divisional risk information (including VaR and Scenario Results). The Divisional breakdown for purposes of this reporting package will follow along the lines of how RMD is currently organized:

- Fixed Income (excluding mortgages) - Oliver Jacob
- Mortgages- Phil Lombardo and John Schrader
- Equities- James Bell
- Principal Investments (combination of prop desks) - Will Chen

#### **Firmwide and Divisional- Market Risk and P&L Highlights:**

- The biggest news was that the Mortgage Business incurred a monthly loss of \$63million. This was led by a \$151 million loss in the Non-Agency CMO desk. The desk had losses on the write down of loans and securitized product across both Alt-A and subprime collateral. However, continuing January's results, the largest component was on mark downs on second lien residuals (approximately \$155 million during the quarter with the vast majority booked in February).

- Outside of Mortgages, it was business as usual with continued large gains in Credit Trading, Distressed Desk, and Equity Derivatives.
- The Equity Division was relatively unaffected by the sell-off on February 27<sup>th</sup> as the desk made money on its long Vega and gamma position as well as intra-day trading (i.e. lots of commissions). The only desk which was truly negatively impacted on February 27<sup>th</sup> was the Risk Arbitrage desk which incurred a \$12 million loss on the last two days of the month as deal spreads widened and ended the month basically flat (down \$800k).
- Firmwide VaR, 1-week 95%, (excluding Merchant Banking) increased \$5million month over month to \$61.9 million. On a risk factor basis, this was attributed to an increase in Credit factor VaR. However, Kan stated the increase was driven almost exclusively from the concentrated EOP position in Mortgages. Firmwide VaR including Merchant Illiquid stood at \$77million. Kan also discussed the idea of them taking Merchant Illiquid out of VaR for internal risk purposes (already out of VaR for regulatory purposes since this book's reg cap is not VaR-based).
  - Fixed Income (excluding Mortgages) VaR increased \$15million from \$34 to \$49 million. The increases were across the board in interest rate derivatives, leverage finance, and credit trading. However, these increases were diversified away at the firmwide level.
  - Mortgages- As of the end of February, Mortgages cut its interest rate sensitivity and VaR was now driven by a credit spreads widening scenario. The overall MBS desk whitebook VaR was relatively unchanged at \$53.5 million. However, both the Commercial Conduit desk (where the EOP position resides) and the Non-Agency CMO desk had increases in VaR. Commercial Conduit desk increased from \$7.9 million to \$10.0 million and Non-Agency CMO increased from \$32.2 million to \$36.58 million.
  - Equity Division VaR decreased \$1.5 million to \$14.5 million. This decrease came largely from additional variance swaps purchased in Equity Derivatives and the firm selling out of a \$115 million block it held at the end of January (*follow up on where this block was in the January report*).
  - Principal Investments (or Principal Strategies) VaR – was not discussed. However, from the current VaR report, its VaR increased from \$7.25million to \$8.13 million.
  - Merchant/Illiquid- VaR remained at \$45 million (was not included in this report-Kan stated verbally). As discussed above, they are looking to take this out of VaR for internal risk purposes (including the Firmwide VaR limit). ***Follow up on at the next monthly meeting.***

### Bankruptcy/ High Yield Area:

Distressed Debt desk- made \$34 million. The largest profit came from MacGen (\$15million) as a refinancing took place in the name. The position was subsequently cut in half to \$90 million (???). The only major loss was on Delta (\$5 million and another \$5 million post month-end). However, the airlines positions increased (e.g., Delta up \$28 million to \$130 million and Northwest up \$17million to \$125 million month-end).

The total MV of distressed debt dropped \$235 million to \$902 million. The largest concentrations at month-end were as follows:

Enron- up \$18 million to \$170 million.

Airlines- up \$44 million to \$340 million

IPP- down \$55 million to \$285 million.

Bank Debt- made \$19 million on 3 loan deals (Merck, MacGen, and Hughes) and on 5 bond deals. The macro hedge also performed well this month for the desk as spreads widened a bit.

The total leverage finance VaR increased \$4.5 million to \$26 million. Bank debt VaR increased from \$10.8 million to \$13.6 million as the portfolio became more heavily concentrated in Non-IG exposures. Kan noted the \$550 million funded commitment to BMHC, which included \$115 bridge equity as a noted driver. **Follow up with Marc next month on this as he did not discuss this commitment.** CLO collateral VaR increased from \$12.6 million to \$14.1 million as inventory increased \$494 million to \$2.7 billion at month-end.

#### Leverage Finance Update (Marc from RMD):

- Marc gave a brief update on the market noting that it was still robust. He noted that the Valassis acquisition (discussed several months ago) closed on February 27<sup>th</sup> at the tightest spreads (in deal talk- I assume an industry rag in this space). However, Bear did have one commitment, Apollo's acquisition of Reology (i.e. Coldwell Banker), on which they had to flex quite a bit to syndicate out the senior secured debt. However, Marc viewed the syndication problems on this particular commitment as an idiosyncratic credit story rather than a story of absolute leverage being too much for the market to take. This particular deal was for the acquisition of the holding company that owns Coldwell Banker (real estate brokerage), a company with its viability obviously tied directly to the strength of the housing market. **Bear still has \$82 million of the subordinated bridge left.**
- The most noteworthy deal during the month was a \$4.1 billion commitment to Beacon Office products for the purchase of some of the EOP assets. **Follow up on the syndication of this commitment at next month's meeting.** The large commitment that showed up in the prior month's offered and accepted schedule was in fact the EOP deal.
- As highlighted in last month's write up, Bear is changing its process/thresholds for delegated approval for leverage finance commitments. We asked Marc to reiterated what the exact thresholds were:
  - \$50-\$100 million- "deal cops" in IB due diligence and David Glazier (Head of IB) and Marc (or in his absence Mike Alix) must sign off.
  - Over \$100 million- requires full PAC quorum meeting.
  - \$250 million or lower- PAC has delegated authority
  - Over \$250 million- requires Executive Committee approval.
- As stated above, the desk made some profits on its macro hedges. Most of the hedging activity was in the form of selling the HY 7 index; however the desk also had \$100 million worth of options and is looking to do more. Marc also pointed out that the desk may buy some way-out-of-the money puts on the S&P 500. Kan noted that the CDX HY 7 index hedge was cut from \$750 to \$700 million during the beginning of March.

#### Mortgages and ABS

For the first time since becoming a CSE, Bear's Mortgage business (as a whole) had a monthly loss (\$63 million). As discussed above, this was attributable mainly to the severe marking down of second lien residuals (mostly in Alt-A product) during the month.

#### Monthly Mortgage P&L highlights for the largest desks:

Non-Agency CMO Desk- lost \$151 million during the month. (See summary of write downs below for details.)

EMC- lost \$20 million on write downs on residuals and subs.

Agency CMO- the desk made a profit of \$23 million. The desk made \$13million on 14 new deals on \$2.6 billion in collateral.

ARMs- the desk made a profit of \$14 million. The desk made \$16 million on 6 new deals on \$1.8 billion in collateral.

Commercial Conduit- made \$25 million, largely a function of fees on the EOP deal (*ask for more detail next month*). The Net MV jumped from \$4.9 billion to \$10.493 billion with the EOP commitment included.

CBO desk- made \$26 million. \$19 million came from 4 new deals on \$2 billion of collateral (\$1 billion was CLO; the other \$1 billion was asset-backed (probably not subprime collateral they said)).

London- made \$16 million on sale of some equity CDO and leftover equity from a deal packaged last year.

Pass Throughs- made \$10 million on a favorable basis between mortgages and treasuries.

During this month's risk meeting, we were given a comprehensive update on Bear's Subprime Mortgage business from both a market and credit risk perspective.

◦On the market risk side, the focus was on position size; price verification work performed during the month; and expected securitizations. While there were markdowns of subprime inventory, both on unsecuritized loans and residuals left from prior securitizations, the losses were relatively minor. The total subprime inventory including residuals from prior securitizations was just over \$4 billion, with a couple of residual securitizations expected soon. We will follow up on the firm's ability to move this inventory, particularly the subordinated and first loss tranches.

- The write downs on RMBS and Structured Product were due to both spread widening and collateral deterioration. Total RMBS and Structured product write downs in 1<sup>st</sup> quarter: \$240 million
  - Second liens (\$168mm) - \$155 mm write down on subs (off a base of \$429mm)- mainly on NIMs and residuals and \$13mm write down on whole loans awaiting securitization. The write downs for these cash products are mostly due to actual collateral deterioration (i.e. truly a fundamental story). Cumulative loss estimates on these second lien products have increased dramatically: 7-8% in Sept 06; by Dec 06 up to 10%; now see estimates up to the middle teens. Risk management ran through a variety of models in its price verification exercises with respect to this product which confirmed their initial work (which was based on shocking the loss curves to different management assumptions).

More than half of the second lien whole loan inventory came from the purchase of a \$1.8 billion pool of second liens from Sovereign bank during December. The business purchased these loans at a significant discount and due to the quality of the loans not meeting representations BS was able to restructure the transaction at a more favorable price. Bear is currently working on structuring a securitization of this inventory which they expect to close in the next 3-4 weeks.

***We will follow up on this at the next monthly risk meeting.***

- Subprime (\$19mm) - \$6mm write down on whole loan inventory and \$13mm on subs (including residuals). The CRO made a couple of points regarding the subprime inventory (\$4 billion in total made up of approximately \$1 billion in subs and the rest in whole loan inventory): (1) on the whole loan inventory, they have marked down the product to a level that would generate a "very small arb" on the securitization. In essence, with the current mark, they still expect to make a profit on securitization. However, the risk manager noted that it is not an insignificant risk that the rating agency will re-rate deals and change their rating criteria. This

would of course change the pricing of this inventory as well. (2). \$2.1 billion of the \$2.8 billion in whole loan subprime inventory is slated for 2 Silverton deals. In these deals, the Silverton partnership (30% owned by BS) buys the residuals (at the pre-determined price??) and as such 70% of the 1<sup>st</sup> loss risk on a large portion of the subprime whole loan inventory should be off the books soon. **We will follow up on this at the next monthly risk meeting.**

▪Near-Prime (\$14mm) - most of these mark downs were on first lien Alt-A residuals (excluding Option-Arm residuals). With respect to the Option-ARM residual positions, the risk manager noted that valuations seemed reasonable and that 1 week prior to our meeting, they saw trades (30% up from current marks). With that said the firm still has a large amount of residuals of this product and would like to see the distribution of this risk before these loans start to reset. If Alt-A show more signs of problems in the future (e.g., when all these loans reset), this could be an area where Bear could take a big hit. **We should continue to monitor this area and ask for the size of these Option-Arm residuals at the next monthly meeting.**

▪EMC (\$20mm) - \$8.5mm of this was on residuals and the other \$11.5mm of the loss was on other subs. The risk manager noted that these markdowns were more due to concerns around liquidity rather than a function of impairment.

▪ABS CDS (\$7mm) - these mark downs were the result of Bear Stearns being off Markit consensus. The synthetic profile of the firm at the end of February was Long (short protection) the ABX index which they lost money on and short (long protection) on single name CDS on ABS (approximately \$2 billion notional) on which they made substantial profits. **As part of the price verification meeting at the next monthly meeting, we should ask them to walk through in some detail the price verification around these synthetic single name CDS on ABS positions (I believe \$2billion in total notional).**

◦On the credit risk side, we discussed: (1) the firm's warehouse lines to subprime originators; (2) outstanding EPT claims; and (3) subordinate (including residuals) financing and (4) Subprime synthetic positions.

▪The outstanding warehouse lines to subprime originators were very small and did not contain any material exposure to those names highlighted in the news over the past couple of months (e.g., New Century). In fact, BS total subprime warehouse lines only total \$1.332 billion (with collateral on the line of \$1.378 billion) and none of these subprime lines are committed. Bear has a larger amount on its near-prime warehouse lines, \$2.147 billion (with collateral on the line of \$2.224 billion). One of the near-prime lines, the GMAC Mortgage/Walnut Grove line, is a \$1 billion committed facility. There is also a \$2 billion temporary limit approved to Newcastle Investment Corp which was approved specific to the Fremont transaction—Securitization scheduled within 3 months. There is virtually nothing on the line currently; **follow up on this at the next monthly meeting.**

In addition to the warehouse lines to large Mortgage Banks/REITs, Bear has warehouse lines to small originators as part of its conduit program. The EMCR small warehouse group (based in Dallas) has \$51 million outstanding in warehouse lines with \$53 million of collateral backing these loans (avg. 96% advance rate). Similar to the large warehouse lines, the EMCR warehouse lines are bigger in the Alt-A product space (\$285 million with \$289 million of collateral (avg. advance rate of 99%)) than in the subprime space. EMC has recently (over the last quarter) terminated, suspended or restricted product eligibility for 70+ sellers and has tightened its underwriting guidelines, specifically targeting High



LTV and “risk-layered” products. Wayne stated that most of the emphasis was on valuation, LTV limits (reduced to no more than 90%), and the tightening up of appraisal standards. One particular example of the tightening of appraisal standards discussed during the meeting was that now the firm is using the lower of the appraisal or the value from their desktop valuation system (in the past they used the desktop valuation to make sure the appraisal was reasonable but did not limit the loan based on small differences between the two) in determining the value of the property with respect to determining the amount the firm will lend.

- Regarding EPDs, Bear again has a relatively minor amount of expected losses from these outstanding claims as they were one of the first firms that aggressively asserted their claims on EPDs. The amount of unreserved potential losses at this point is immaterial. Total inventory exposure as of 03/12/2007 was \$59million (based on a presumed loss of 15-20% of principal and as such the total outstanding EPD claims would be in the \$295-\$400 range). These EPDs are for all RMBS product (Alt-A; Subprime; 1<sup>st</sup> and 2<sup>nd</sup> lien). As of 02/28/07, Bear had already reserved \$27 million towards this exposure. Their reserving policy is to reserve all aged claims at 50% and if the credit is a problem to reserve 100%. Wayne also mentioned that the mortgage banks/REITs are doing much more financial settlements (vs. buying back the loans at Par) now (a story we have heard for a while at other firms).

- We discussed the firm’s financing of subordinate subprime CMO tranches (including the 1<sup>st</sup> loss residuals) for investors. The counterparties are both Mortgage Banks/REITs and Hedge Funds, with the HFs making up a much larger share of the 1<sup>st</sup> loss tranches. The haircuts for the 1<sup>st</sup> loss tranches are in the 40% range. The largest concentrated exposure in this space is to Accredited, where Bear is financing \$43 million in 1<sup>st</sup> loss subprime residuals against a 40% haircut. See page 8 of the Subprime Mortgage Credit Update for details of the subordinate financing. Mike noted that margin calls have been made and met and that the margin calls have obviously been larger than in the past. They also stated that there has been less debate with hedge funds than they would have expected. **However, Mike cautioned that his worry is that this last move in the market has used up a lot of these funds liquidity and they might not have the cash if the underlying assets deteriorate further. We will follow up on this at the next monthly meeting.**

- Bear provided some detail on their synthetic positions- both single name CDS on ABS and ABX positions (sold and bought) and the type of counterparty on the other end of the trade: mortgage banks/REITs or Hedge Funds. The largest position was for single name CDS on ABS on BBB tranches sold to hedge funds (Bear is long protection) \$2.341 billion notional. **We should confirm that Bear gets margin on these and just doesn’t get margin where the HF is buying the protection. As long as this is the case, then follow up on margin calls in this area. As stated above, Mike didn’t see any missed margin calls on the financing of residuals and other subs but I don’t think he mentioned margin calls on this product. Let’s call Wayne intra-month or ask Mike at the next meeting and get some clarification.**

Credit Trading — did very well again, making \$85 million. The desk switched from being short \$1.3 million spread DV01 at the end of January to long \$900k spread DV01 at the end of February (and at \$1.7 million DV01 as of the meeting). As a result, the VaR for Credit Trading increased \$2 million to \$17.9 million at the end of February.

- Vox Capital made \$28 million, predominantly from 3 trades on \$250 million notional of 3-5% attachment point tranches of a basket including 50% HY names. Risk was very cautious about taking this profit as these trades were with dealers. However, the desk

was able to execute almost identical trades in the opposite direction (just at much smaller volumes) with other dealers to gain better transparency. The conjecture is that the dealer in the large transaction was trying to syndicate out a large client trade and was willing to give up some of the profit. They were also accepting of the MTM difference given the quality of the counterparty on the opposite trades (i.e. accepting that this opposite trade was done by a sophisticated counterparty). ***Let's walk through the price verifications for these trades in detail at the next price verification discussion.***

- Global structured desk made \$21 million. ½ came from originating 15 structured trades (i.e. the Greylock program). LDN printed 1<sup>st</sup> set of managed structured trades- 13 similar trades for a French manager.

- Flow- NY HG made \$12 primarily in index trading; NY HY made \$9 million across a variety of names; LD HG made \$8 million from FRN book (AA and higher rated instruments).

**Risk Arbitrage** – loss \$800 thousand for the month after dropping \$12 million over the last two days of the month. The business is running right up against its new \$1.5 billion long MV limit (was at \$860 million just two months ago). Its \$125 million position in Endessa (spelling) remains the largest position. The VaR increased from \$10.5 million to \$12.3 million.

## **Derivatives**

**Equity Derivatives** – made \$55 million.

Europe made \$20 million and North America made \$25 million- key driver in both regions was volatility trading. Asia made \$11 million, another great month. Majority of profit came on general vol trading.

VaR for Equity Derivatives was down \$1.2 million to \$5.7 million (or \$6.1 in Tab 5- follow up on discrepancy). The large market drop loss decreased significantly from a loss of \$105 million at the end of January to a loss of \$29.30 million at the end of February. The largest contributor to the reduction in VaR and large market drop was the purchase of variance swaps.

**Fixed Income Derivatives**- made \$26 million. On February 27<sup>th</sup>, the desk made \$17million as it was long substantial vega. The vega was through short-dated options partially offset with long-dated options. Since the short-dated vols moved much more than longer dated vols, they made substantial gains. As the market has calmed down somewhat post month-end, they have given back some of these gains.

VaR increased \$8 million to \$16.7 million as vols spiked.

***\*\*\* Kan discussed an operational error that resulted in a \$3 million loss. There was a set of interest rate swaps (each with a DV01 of \$100k) that had not been booked by the trader. It was also not discovered by the middle office which the risk managers were surprised by. The error was eventually caught through the confirmation process.***

***While they have no proof that the trader intentionally did not book the trade, they expressed concern that this amount of interest rate sensitivity was high enough that a trader should have know his daily risk was incorrect. The trader has been fired.***

## **II. Credit Risk**

- Much of the Credit discussion this month was on the mortgage space and corporate lending which were highlighted above.

- The only other major Credit topic was the distribution and discussion of the hedge fund counterparty lists we asked for intra-month. These lists included:
  - (1) Lists of HFs providing no initial margin (for all OTC derivatives excluding short-dated f/x) – they gave the #of funds (40) and # of families (32)- these are the number of funds where BS does not collect upfront margin for the plain vanilla instruments. They also provided the top 5 names (with exposures) for this activity.
  - (2). List of HFs doing F/X with no initial margin- they gave # of funds (46) and # of families (25). However only 15 families approved for this have activity. They also provided the top 5 names (with exposures) for this activity.
  - (3). List of HF Derivative and FX Limits with Call Levels or Thresholds > than \$5mm - # of funds (4) and # of families (3).
    - 2 JMG funds have \$10 million minimum transfer amounts (call levels) each. However, they are clearance clients and Bear has the right to change this call level at any time.
    - The Paradigm Fund has a \$15 million threshold with \$500 thousand minimum transfer amount. Currently only has \$3 million of PE. The account is guaranteed by Weyerhaeuser Company Master Retirement Trust (pension plan).
    - Trade Process Corporation- \$20 million threshold with \$250 thousand minimum transfer amount. The account is for foreign exchange. It is guaranteed by other Moore Capital Funds and they get information from JP Morgan Chase on unsettled trades.
- They also provided information on other areas such as:
  - HF corporate forward limits- for leverage lending and distressed loans- i.e. unsecured pre-settlement exposure. A lot of this comes from the sale of Delta Trade Claims to HFs. The total net exposure of these forward transactions is \$162 million. The firm has both PE and notional limits on this activity.
  - Unfunded participations- I believe this is for revolvers that BS has sub participated out to Hedge Funds. These are unfunded and total approximately \$50 million. As such they have bought \$50 million of notional protection from HF for which if needed the hedge funds would then have to fund the revolvers. With that said, based on the current prices on these revolvers (generally in the 90s vs. Par), they estimated that they have around \$2 million of replacement value (i.e. could sell to someone else for \$2 million and get the same protection). ***I assume these are from relationship positions not leverage loans—confirm at the next meeting.***

Mike talked about something the LTSA was working on in this area... I didn't catch the details (Did anyone hear this?)
  - HF to whom Bear lends initial and variation margin unsecured- this is to one hedge fund (Tudor Prop Trading, LLC) and is for exchange traded derivatives. The agreement is to lend up to \$10mm under a promissory note.
  - HF stock loan/stock borrow limits- they have separate PE limits on this activity. The always expect to have some positive exposure here. (Not sure what the margining practices are here?) They gave the top 5 exposures which are small.

- The most interesting comment of the day was that Mike said that putting these lists together was a **“useful exercise and would tailor some of their internal management reporting around this”**. Maybe we should share this feedback anonymously with others who seemed to resist providing this information. Mike agreed to provide this information quarterly.
- One final point- between the information provided in the subprime credit update (on subordinate financing) and the additional information provided in these margin reports (HF Corporate Forward limits and unfunded participations) we have the beginnings of some useful information on areas where our firms distribute or syndicate risk out to HFs (i.e. where they convert market risk to credit risk, sometimes collateralized and sometimes not). If we got this same information, but for only that inventory which was originated/secured by BS that would be great. It would help answer the question, “How much of this leverage lending (or RMBS subs) exposure has the firm really disposed of?” (This was a follow up item we came up with from the trilateral hedge fund counterparty credit risk project).

## **Bear Stearns (Package Dated January 31, 2007, Discussion on February 21, 2007)**

### **I. Market Risk**

Kan explained that they have made progress in re-engineering their process for reporting to the Executive and others (including us), and said they should have a prototype for them on Monday. So we should be seeing this next time.

There was also some discussion about re-arranging the organization/coverage of the product line market risk managers. Risk management is splitting all of fixed income into mortgages and everything else (Ex), with Phil responsible for mortgages and Oliver responsible for Ex. Separately, there are risk managers responsible for Equities (name?) and Principal Strategies (Will?), which has been separated as a separate prop desk. (We should probably get a new org chart soon).

### **Limits**

Kan noted that lots of traders/desk around the firm have been asking for a little more risk/limit capacity. While the firm's top level limits have not been raised (recall these were initially set well above usage), the glass has been filling up some. Furthermore, certain desk level limits, particularly in the mortgage area, have been raised. This also led us to a discussion about a new limit scheme being implemented for the firm as a whole - there are now Tier 1, 2, 3, and 4 limits. We will discuss limits more broadly in an upcoming meeting. (It seems that Bear does not have the sort of systematic, annual review of P/L and limits we have seen elsewhere. It appears things have historically been handled more on a one-off, as needed basis).

For Mortgages, trader pops will no longer be used for Tier 1, 2 and 3 limits. The Tier 3 limits are those used for the Fixed Income business (right?, Jeff Mayer and Craig). This was seemingly a big deal, as pops were used for 20 years. VaR will now be used instead. At the desk level (Tier 4), Tom Morano apparently is still going to be using pops.

In terms of limit magnitudes, the ARMs desk had its limits increased significantly. The net product (MV) limit was raised to \$15 billion (from 10.5), and the VaR limit to \$45 million (from \$35). The increases in the two limits were not proportional, with the message being that the business will have to "keep better hedged". We have talked about this desk for a long time as running over limit. It sounded as if one of the reasons senior management has been slow in raising the limits is because every time they did the desk head immediately ran against or over them. However, he has had a great track record and the quickest product turnover of any mortgage desk.

The Non-agency CMO desk's NMV limit was increased from \$10.5 billion to \$13.5 billion, and VaR from (\$27? million from \_?). This limit increase is driven by the growth in the conduit business - in order to grow that the limits must be increased (have relationships to consider I suppose). This trader has also had a good track record, although he has "had some issues recently".

The Risk Arb long market value limit has been raised from \$1 billion to \$1.5 billion. The single deal limit was raised from \$100 million to \$120 million and the associated deal break risk limit was increased by \$3 million to \$15 million. It sounds like all of these metrics have been limiting factors in the past, as the trader (2/3 of this is run by a guy out of London) has been running some large positions (e.g., he got approval for a \$120 million position in Odessa). The market value sub-limit on Rumortrage was also increased from \$150 to \$( ). Finally, the Gap risk/20% down limit is now \$225 million (I think the point here was that the Gap risk was not grown proportionally with market value). These limit increases are somewhat surprising given that the Risk Arb desk was a source of P/L volatility for the firm in 2006 (especially Rumortrage), but it appears this particular trader/manager has the faith of people at the firm.

### **Bankruptcy/ High Yield Area:**

The Distressed Debt Desk – continues to do well, and made \$38 million. They decreased their net market value position by \$169 million to \$1.1 billion, by selling positions in Delta, Refco, and Calpine. The desk's VaR reduction of \$2.5 million to \$19.5 million corresponds to the NMV decrease. \$12 million of the desk's profit came from its Macgen position, which was going through a refinancing the day of our meeting and was spinning off some equity (which would lead to further profits). The desk is close to making \$100 million in total profit on that one name. The desk also took some losses on its airline positions. **Interestingly**, the desk closed on a purchase of an insurance company that it has taken a 90% stake in (with a \$25 million investment). This investment has a three-year time horizon, which involves “working through” the policies. PWC is their partner, and it sounds like they are the ones actually taking the operational role. (We have heard from Kan that this sort of investing of buying whole companies could be coming. Ask about this sort of thing at PE review?)

Bank Debt– Don't believe P/L was given on BD Funded, but think commitments had a small loss. The high yield hedge discussed last month lost \$12 million as the CDX tightened by 30bps. Four new deals were closed. The total BD VaR decreased from \$12 to \$11 million due to the hedge, as well as the (Time Warner I believe) bridge loan being replaced on a new bond deal.

### **Leverage Finance Update (Marc and Helen from RMD):**

- The market remains strong. While new volumes have tapered off a bit, things keep selling. Marc said that in spite of all of the ups and downs he has seen in the last 30 years, he has never seen a market like this before. He also noted how this boom is so much different than previous ones, such as the LBO boom in the early 90s, because back then banks held most of the debt. With all of the diversification in the system now, it should be interesting to see if losses are contained to the junior tranches when the cycle turns.
- The Merck commitment is down to \$200 million.
- Looks like there was a new commitment for \$6 billion that was not discussed.

**Follow-up?**

- Marc provided some numbers on the EOP deal (handout says closed but doesn't appear so by other numbers?). The handout reflects the expected capital structure of the CMBS deal, but that will change because Blackstone is selling over \$3 billion worth of properties (apparently driven at least in part by the offer price getting pushed up). Bear's debt commitment has been reduced to \$3.9 billion and its Equity Bride to \$525 million. They have sold down their commitment by bringing in "a slew" of other investors. The business thinks that the Mez CMBS will "fly in the market". Apparently the most junior tranches are actually in the highest demand, as these investors will get paid from the asset sales.
- Bear is changing its process/thresholds for delegated approval. I believe he said anything under \$50 million will be approved internally by the business, and anything under \$100 million will be signed off on by Mike Alix or Marc (as well as Keith and David). Not sure I got what now differentiates PAC versus Executive Committee approval.
- Marc worked with the Leveraged Finance folks (and did some outside research) to get some numbers on covenant-lite. These are presented with the caveat that it is hard to get one definition for covenant-lite; some deals look just like bonds with no financial covenants, while for some only pieces of the financing package (revolvers) are covenant-lite. In any event, so far this year about 25% of all syndicated loans have been covenant-lite, versus 8% last year. Marc noted that a much higher percentage of private equity deals are being quoted with and without covenant-lite, and of course the pricing is usually higher without. The implication of all this is that bank loans are becoming more like bonds and the lenders will have to wait for a Payment Default (to put a company into default). This of course prolongs default. Marc's feeling on this is that as companies start to deteriorate we will see vulture/rescue funds coming in and taking out the existing creditors, which could push defaults even lower.
- The other new thing that Marc mentioned (which was actually in the WSJ that morning) is the appearance (or reappearance) of toggle loans, which give borrowers the right to defer payment if they run into trouble. (Bear doesn't hold much of these in the CLO book, he gave some numbers but I'm not sure exactly what he was quoting).
- We had sent in a follow-up question after last month's meeting regarding the short CDX hedge that management made the Bank Debt business put on (the question had to do with the hedge ratio and relative spread volatility of the high high-yield index versus ). I believe Helen said the standard deviation of spread moves in the HY bond index was about 20%, versus 11% in loans. Another factor they have to carefully examine in coming up with a hedge ratio is the amount of flex and fees the business would have to eat through on their positions before taking losses. Finally, we had heard before that market risk had questions about whether or not the hedge chosen was most efficient. Apparently there is some thought about putting on some out-of-the-money options hedges, which are better for a Gap out event, and "spreading out the options on a quarterly basis".
- CLO Accumulation – Note, The CLO Accumulation Desk is run separately from the Bank Debt business, but Marc spoke to it as well. There is a graph at the end of the handout which shows the average number of deals in the pipeline, average deal accumulation size, and average time to closing for deals (from the first loan purchase

to deal close). So far in 2007 the quantities are (respectively) 19, \$150 million, and 6 months.

The CLO line decreased by \$148 million (to \$2.2 billion) as two new deals priced. This led to a \$1 million reduction in VaR for this desk. Interestingly, the total Leveraged Finance VaR decreased by \$3 million, even though CLO and BD only decreased by \$1 million a piece. The benefit of the hedge was improved at the business level as the CLO desk had more overlap in names with the hedge than did the BD desk.

### **Mortgages and ABS**

The ARMs Desk- made \$74 million. (I missed the number of new deals). \$15 million in profit came from trading markups on agency and hybrid securities, and \$15 million came from mark ups on residuals (discussed below). The NMV position size decreased by \$555 million to \$12.6 billion (and I believe Kan said there was \$8 billion in turnover?).

The Non-Agency CMO Desk – made \$38 million. They did 9 new deals on \$3.2 billion in collateral. They took \$18 million in mark-downs on second liens (see below) and spread widening in single name CDS, but had some gains on trading activity.

The Residential Subs Desk – net market value position size increased by \$1 billion to \$1 billion. This was due to going long the BBB- ABX index (\$500 million) and cutting shorts on single name hedges. The short ABX position reflected them trading around the market moves, as they thought the index had oversold (but continued to widen, check on next time). Prior to this position change, the desk was short the BBB- and long the BBB.

The Commercial Conduit Desk – made \$10 million on a \$2.1 billion securitization that the desk contributed \$500 million to. The Commercial Secondary's net market value increased by \$826 million through synthetic exposure. The desk went long \$1 billion of a tranche, which is like a warehouse position for a customer and will be unwound (I think makes sense).

Credit Trading – did “very, very well”, making \$90 million. \$25 million came from Structured Credit. \$12 million of that came from the printing of a number of bespoke deals for CSO managers (a notable one for a mid-sized French portfolio manager). Separately, the risk manager noted that the desk has now executed 16 trades to dealers where Bear is selling protection (don't remember what the point of this was – that somewhat of a 2-way market is developing perhaps).

Vox made \$11 million on 19 trades of \$1 billion (typically when Kan speaks about Vox completely a trade it means that they have completed/hedged the capital structure enough to take P/L). The desk's valuation risk exposures, as evaluated per the Markit bespoke survey, is down a little bit but is still being watched closely by risk management (see previous write-ups for further discussion).

NY flow made \$30 million and London flow, which has a curve steepener on, made \$13 million. The risk manager describes the credit market in general as still being a tremendous market. The business's emerging market trader in London is currently



being very cautious (has little risk), and the risk manager noted they probably needed to find a new emerging market strategy. Apparently the previous head of the Credit Trading was pursuing local credit, currency and FX trading before he left for SAC. (Long story short, the emerging markets desk is finding things “tough”).

The Credit Trading VaR decreased slightly from \$16.8 million to \$15.9 million. One dominant driver of the VaR currently is auto spreads, which tightened.

**Risk Arbitrage** – made \$18 million. The desk’s long market value increased from \$860 million to \$1.05 billion. The VaR increased from \$8.2 million to \$10.5 million; the risk manager said the VaR increase was actually higher than it would have otherwise been if not for some punitive fall back calculations on some deals that were not being modeled.

### **Derivatives**

**Equity Derivatives** – made \$64 million. Asia made \$12 million, meaning they have made \$25 million for the year (2 months), as vol trading has done very well. This performance was described as pretty extraordinary for this desk. Kan also mentioned something about the business’s share financings program (done in swap form I assume), in particular some trades done on India shares. He said this business, which is about “market access” (e.g., offering shorts), is small in size but very credit intensive. That is, risk has to be on top of the margin terms, etc.

Referring back to Volkswagen volatility trade mentioned in previous months, the desk ended up making \$10 million (is basically out of risk it sounds). It was very interesting that the desk was able to make this much off of another dealer (Kan thought the position was going to be trough to cover).

The large market drop loss decreased from \$105 million to \$82 million (Kan wasn’t sure why). The VaR was down a little from \$7.7 million to \$6.9 million (think this was due to them taking off a risk arb position in Taiwan).

**Munis** – made \$18 million. Kan mentioned that at some point we **should take a look at** proprietary muni trading, as they have done well.

**International Equity** – made \$20 million, despite the fact that their loss ratio has been increasing.

**Principal Strategies** – has now been broken out as a separate desk (recall business reorg). The desk made \$25 million, and has a VaR of \$7.3 million.

### **VaR Specifics:**

- Most VaR points that arouse are discussed above. One other thing mentioned was that the total Mortgage VaR has been up somewhat at month end for the last two months (\$55.9 million and \$54.5 million) due to rate curve steepening exposures. And I believe he said that this month’s increase in spread pops actually had an offsetting effect to the increased rate curve risk (which is currently dominant).

- Firm Investments VaR increased from \$3.2 million to \$9 million due to an equity block trade, which was since sold down for a \$400 thousand profit. (Apparently this shows up under firm investments instead of Block because Ace was involved?)

## **II. Credit Risk**

- Judy did here normal discussion. She again mentioned that the prime brokerage exposures (due to netting not being applied) should be coming down throughout the year. The changes will occur in both directions. That is, with our new portfolio margining rules some loans will be coming over to the US. But also in some cases the securities will be going to London (where there is also a funding benefit for the business due to rehypothication). Separately, it was mentioned that one of the fund exposures on the top exposures list was due to a forward settling bank debt sale (I believe we heard about this during Tri-lateral, typically taking less than 90 or 180 days). Apparently the settlement horizon on distressed debt can be as long as a year.
  - As an aside, we asked about why we never see any netting applied across the product areas in the risk reports. Judy said they don't have netting across these areas because they are all in different entities (even for bank counterparties). The netting that occurs is done within this broad categories (recall almost all derivatives show up in the "swap" category).
- Kan reported there has recently been some increased trading activity with emerging market counterparties. While Bear's fingerprint in emerging markets is still quite small, he said this is where the most change in the profile is coming from, and said this was a topic of discussion at the last BSIL Risk Committee meeting (when the Board meets?) The firm has recently established credit lines with financial institutions domiciled in countries such as in Kazakhstan (Bank of – Kan noted this was actually one of the better jurisdictions), Russia and Mongolia (Central bank of). The Russian transaction involved financing \$200 million Russian shares for a Russian broker (at a 50% haircut – actually not sure if \$200 is the loan amount or the securities amount). The firm has also done a few derivatives trades in the Middle East, with counterparties such UAE and Saudi Arabia. Kan said that expanding into these areas involved a lot of legal work. (Might want to get Mike Alix's perspective on the credit work that has been done).
- Mike Alix was not at the monthly meeting. Subsequently I spoke to him on the phone to discuss the recent issue that has come out with respect to FX derivatives trading without any collateral agreement with Bridgewater. Mike said they had declined to have an FX relationship with Bridgewater because they did not like the terms. He did say they have one relationship with a sizeable threshold, and that is a \$20 million threshold for FX trading with one of the Moore Funds (Trade Process Corporation). I informed him of the new lists we are requesting of funds with terms of no initial margin and no variation margin and/or sizeable thresholds (\$5 million).

## **III. Special Presentations:**

### RMBS Remarks – Second Lien Residuals

- We discussed remarks on Option Arm and Second Lien Residuals. The Option Arm residuals are on Alt-A loans, and most of the Second Lien Residuals are on second liens (what we would call home equity loans) of Alt A loans, but some are sub-prime. We did not discuss Bears sub-prime residual inventory, but will next time.
- Since late January, the desk had made \$35 million marking up and trading option Arm resids. However, they have lost \$58 million writing down second lien resids, on a total position of \$300 million (all of these losses do not show up on the white book discussions above because most were taken in Feb, will revisit next month). Furthermore, they had taken \$25 million in mark-downs in December. Both the mark-ups and mark-downs were driven by new delinquency rate data coming in - **data specific to the deals/underlying collateral** - and residuals trading in the month. See handout. On a positive note, “quite a few more” Option Arm trades are slated.
- Bear’s use of the term “mark-downs” is somewhat confusing, especially when they present these numbers next to their cushion/exposure metrics that come out of the MTM control process. However, our understanding is that these were market risk losses, as the mark-downs followed new market information. (I tried to explain to John that we wanted to distinguish between market risk losses and valuation risk losses stemming from forced re-marks. He made the comment that the two are related, but nonetheless we let the conversation go on).
- It was noted that a lot of analysis and discussion went into deciding how much to mark the positions down by. There was also discussion about whether the mark-down came soon enough, which everyone seems pretty satisfied with. In terms of the magnitude and speed of the underlying collateral deterioration, Phil stated this is probably a worse scenario than they would have thought up ex ante (my word, not Phil’s). I believe he used the word meltdown to describe the situation.
- There have not been any remarks on the second lien loans that Bear is holding. These are not as aged as the loans in the resids, which are also highly leveraged. The feeling is that the business will still make money when they securitize the loans they are holding. (goes to what is more or less the historical cost accounting used for loans perhaps)

### Structured Funds Business Update

We requested updated numbers on the size of the Structured Funds business, and risk management actually prepared a slightly more comprehensive update:

- The Loan Equivalent (for most products this is the same as the Gap to Zero amount; but I am not sure if the “Exposure” numbers we have from before are GTZ or LEA) amount of the business has continued to grow, reaching \$5.8 billion, versus a limit of \$6.5 billion. As of November 2005, the LEA was \$3.2 billion, which represented a total trade notional amount of approximately \$5 billion.
- Consequently, the business has requested a LEA limit increase to \$10 billion. Risk managers report there are currently extensive discussions going on at the firm about where the limit for this business should be. In addition, management is currently thinking about the economics of the business in terms of how they should charge it for equity and long-term debt usage. Bottom line, it sounds like the longer the

maturity of the trades the business enters into, the harder it is going to be for those trades to be profitable.

- Risk managers report the market has become more competitive since 2005. This is reflected in the P/L, which is up only 30% despite LEA being up over 80% (P/L to LEA spread is down from 1.7% to 1.56%).
- Risk managers also report competitive pressures in the market on trade capitalization/cushion levels. However, so far Bear has managed to hold off these pressures. The current trade risk profiles yield an aggregate capital add-on charge that is 4.10% of LEA (recall the base case structures yields a 5% capital charge). Add on capital has increased to from \$128 million to \$193 million, simply due to growth in the size of the business.
- Risk management reports that the market is moving towards single fund trades, although Bear has not done these in any size **yet. We will definitely watch out for.**
- There has been an increase in recourse trades (swaps), to counterparties such as pensions funds.
- We asked about any efforts to take a more holistic approach to understanding hedge fund Gap risk. Kan said Mike has asked Barbara Biel to try to better coordinate the understanding of risk across business, which is of course challenging.

#### **IV. For Memo**

- We requested an update of Bear's Structured Funds Business (see OPSRA report dated June 26, 2006 for detailed business overview). The business, which primarily generates GAP risk to baskets of hedge fund shares, has continued to grow steadily. The loan equivalent amount of the desk's position has reach \$5.8 billion, and thus is approaching the current limit of \$6.5 billion. Consequently, it has requested a limit increase to \$10 billion. In addition, while the vast majority of transactions done to date reference relatively diversified baskets of hedge funds shares, risk managers note some trend in the market towards single fund underliers. We will continue to monitor this activity and discuss any shift in risk appetite, including willingness to enter into riskier trade structures, with risk managers.
- The risk manager for Europe and Asia reported there has recently been some increased trading activity with emerging market counterparties. While Bear's fingerprint in emerging markets is still quite small, the firm has recently established credit lines with financial institutions domiciled in countries such as in Kazakhstan, Russia and Mongolia. We will continue to monitor this activity as a potential trend going forward.
- As discussed in previous months, risk management has been considering "re-engineering" the process for reporting market risk to the Executive Committee. A prototype risk report should be available for our review at the next monthly meeting. In addition, Bear has been in the process of refining its market risk limits framework (also mentioned in previous memos in the context of establishing firm-wide limits). We intend to discuss the new framework in more detail in the coming months.

- Bear's mortgage business incurred significant market risk losses on second lien residential mortgage residuals. In January the firm marked down approximately \$300 million of inventory by \$58 million, following \$25 million in mark-downs the previous month. The mark-downs are the result of deteriorating performance in the underlying loans (i.e., increased delinquency rates), as well as residual sales. While these losses are not material at the group level, or even at the level of the overall mortgage business, risk managers note that these events reflect a more rapid and severe deterioration in collateral performance than one might have anticipated as a realistic scenario. Separately, Bear's second lien product is comprised primarily of Alt-A credit quality loans, while other CSE firms have reported losses primarily in the subprime RMBS space. We plan to discuss the firm's positions and performance in both the second lien and subprime residual products again next month.

## **Bear Stearns Packet Dated July 31, Meeting held on August 15<sup>th</sup>**

### **Trading Revenues**

Rough trading revenue estimates were provided for the period of July 28<sup>th</sup> to August 8<sup>th</sup>. These numbers were given with many caveats (constantly changing) and do not incorporate non-trading P/L.

Firmwide: -\$570 million

Mortgages: -\$250 million

Leveraged Finance: -\$165 million

Credit Trading - \$100 million

Fixed Income Investments: -\$80 million

Principal Strategies: -\$30 million

Muni (bond swap arb business): -\$25 million

Equity Derivatives: +\$45 million

Rates (largely Fixed Income Derivatives): +\$40 million

Distress Debt: +\$25 million

FX: +\$10 million

### **Mortgage Update** (Mike Alix and Dan )

The new Mortgage market risk manager, Dan ( ), was introduced. His title is actually co-head of Fixed Income Risk Management (with Oliver), but he is going to be focused on mortgages and will be “re-vamping” the risk management framework. Dan just spent 3.5 years as the mortgage market risk manager at Barclays, apparently building out their infrastructure (he said Barclays’ mortgage business is relatively small in overall size but now covers a wide range of products/asset classes). Prior to Barclays he spent 10 years at Greenwich Capital Markets, where he worked on the trading desk doing fixed income options modeling and started their price verification group.

Dan’s first priorities are to get a handle on the firm’s positions, develop independent views on the price verification process, and develop risk metrics. As part of this “risk management initiative”, Barring Point has been hired to review the mortgage risk architecture, and Phil is coming back to work for a couple of months on the project.

Mike Alix echoed the sentiments of some of the other firms in describing the mortgage environment as having deteriorated significantly further in July and August. Not only have things been challenging in the Alt-A markets, some prime originators were under distress. Securitizations had virtually stopped (there was a “factory disruption”), which was attributed entirely to investor demand, and Bear was originating loans at a much slower pace (they also laid off a lot of people at BearRes/Encore, we saw in the newspaper). The greatest area of concern is the possibility of the asset backed conduits and money markets evaporating as a source of funding for market participants. While Bear has no direct exposure to the conduits in that it is not a placement (or re-marketing)

agent and is not a liquidity backstop or market value swap provider, the potential impact on the market as a whole of so much paper trying to find a home at a new price is significant. Compared to the troubles with Alt and subprime securities, which can be attributed to fundamentals (i.e., relating to cash flows to underlying tranches), more recently investors were placing much higher risk premiums on “better assets” – thus pushing out high quality paper (AAA paper backed by jumbo prime collateral for instance). Dan noted that one year high grade paper was trading at Libor plus 100, which is a wider spread than the Libor plus 90 to 95 observed in 1998. (After our meeting, we learned that Bear has about \$4.4 billion in funding through ABS CP type vehicles).

Mike feels the price verification process will be very important throughout this market (currently a lot of effort is being placed on getting prices right for the upcoming quarter end it would seem). There are many challenges given the lack of liquidity. Mike used the marking of the BSAM ABS fund to illustrate the diminished willingness of dealers to price things. He said historically the fund would receive multiple prices on each of its 600 CUSIPS; now it gets no quotes on 10% of its book, one quote on some positions, and a wide range of prices on CUSIPS for which it receives multiple quotes. (This calls into question the ability of hedge funds to come up with fair NAVs). We indicated that at some later point in time we would like to receive a fairly granular reporting of Mortgage P/L.

In terms of loan origination, Bear previously (2005-2006) bought around 60%-70% of its loans through bulk purchases, and the remaining came either through its conduit or its internal BearRes/Encore origination platform (which is also broker based but the loans are closed by Bear and Bear controls the underwriting standards). Currently, no loans are being purchased in bulk and there is almost nothing coming in through the conduit. Furthermore, the amount of origination has fallen drastically, resulting in the total amount of loans coming into the factory being down to “tens of millions” (USD) per month, versus the hundreds of millions that previously came through. While Bear stands ready to originate through its platform, hardly any borrower quality now. The largest contributor to whole loan inventory recently has been distressed repo counterparties, where Bear has taken financed product into inventory. Along these lines, Mike remarked that the line between market and counterparty credit risk in the mortgage space is not a bright one.

The business was still moving AAA paper, but this is more through secondary trading it seemed, as securitization activity was so slow. The desk was expecting to have some new AAA's price soon, but would probably retain most of the risk from the deal (believe this was an ARMs securitization, we later heard it priced on Aug 20<sup>th</sup> and would settle a week later). In total, the mortgage business had a “few billion” USD of sales in the last week. Bear has been running a net short BBB (or BBB-?) synthetic position, which hedges its various longs. The widening of the higher rated tranches (longs) relative to the hedges has been greater than expected, resulting in net losses.

#### Counterparty Credit Risk to Originators (Wayne Buchan)

Many bankruptcy/distressed stories were evolving in real time. Wayne felt that in general Bear had fared well/was in good shape, but there have a couple of bumps along the way. Probably the most important high level takeaway is that higher quality companies, which originate a lot of Alt A and prime in addition to subprime, are coming under distress. The main culprit cited is reliance upon ABS CP, and (to a lesser extent) not being able to decrease origination. Another takeaway is that counterparty failures are putting the firm longer inventory than it would otherwise like to be. Three names that Bear had exposure to that that filed for bankruptcy during the month are:

- American Home Mortgage – Had to file for Chapter 11 because it “ran out of time”, as it couldn’t roll its CP. At the time of filing Bear was holding \$237 million of collateral it had financed (didn’t get the loan amount). This collateral was auctioned off. The way this works is that a bid list is prepared and sent to the sales force, who then contract clients. Bear has the right to bid, but prefers not win (Bear must enter its bid first). With AHM, Bear won the auction(s) for all but \$17 million of AAA bonds, and it was the only bidder on \$150 million in whole loan collateral. The prices were above the repo principal, so there were no credit losses; although they now have a market risk position. Separately, some derivatives trades were voluntary unwound, resulting in no loss.
- Home Bank – filed chapter 11 on Aug 9<sup>th</sup>. This firm, which had a REIT attached, had been struggling for at least six months, partly due to high costs. It had basically given its origination business away (in order to reduce liabilities) and was left with its REIT, which it was unwinding. Again, the liquidity of the REIT dried up (don’t know if this was a story just about secured funding or equity as well). Two auctions were held for the \$60 million in collateral Bear had financed, and Bear won both auctions at prices slightly above the loan amount.
- Aegis – A privately owned subprime and Alt-A originator (partly owned by Cerebrus), filed on the 13th. This one came as somewhat of a surprise to GCD. Bear was financing \$122 million in whole loans, \$10 million of which turned out to be scratch and dent. They auctioned the collateral the day before our meeting; there were no other bidders and Bear incurred a \$1.7 million credit loss. (Although they think they will get some money back on refis).

There were also three names that had not filed but were in the ICU:

- Luminent – is a Fixed Income Customer Clearing (FICC) client. The firm recently could not roll its paper, and made a call to rally its lenders, which had the opposite effect of scaring them. Its repo providers sent default notices and its ABS CP program extended. Wayne said there probably will be a loss to CP holders (no market value swap?). He also said that this is a pretty good company. Bear has lent \$328 million at a variety of haircuts ranging from 3% on AAAs to 38% on some subordinates. They are netting all calls and will probably put the counterparty in default soon. They should have ample collateral (but “you never know”). Bear also had some derivatives on with Luminent, which it sounds like have already been unwound.
- Thornburg – is a jumbo prime and Alt A originator (and if you look them up you will see that it has been around for a long time). On Friday Thornburg looked ok, but it turned out they had \$8 billion in ABS CP (surprise to GCD?). Once it knew



its CP was not going to roll, the counterparty began selling assets to meet liquidity needs, and was actually able to sell around \$6 billion between Friday and Monday at prices in the 98 to 99 (they have actually sold a tremendous amount of AAA assets over the last few weeks). It looked like they “were going to make it” until Barclays sent them a default notice on Tuesday, and liquidated the collateral it held in the afternoon (without an auction), which Thornburg disputed. [Wayne clearly thought Thornburg had a legitimate grievance]. This is also a FICC counterparty, and Bear feels they have “plenty of collateral”. The fact Thornburg was able to sell assets at 98-99 was somewhat reassuring in that it meant there is some smart money out there, but up until a week ago these bonds would have sold above par (given the quality of the assets, it would have actually been surprising for the AAAs not to move).

- Impact – Bear is financing about \$300 million of whole loans. Wayne believed they would be able to sell these off the line and there would be an orderly liquidation.

Bear had no exposure to C-Bass.

#### Counterparty Credit Risk to Product Purchasers (Barbara Biel)

Barbara provided statistics for the financing of various collateral (ABS CDO, CLO, Alt-A or Subprime MBS, whole loans, etc.) by non-IG counterparties. See handout. What this table does not include is counterparty credit risk stemming from PAUGS or other synthetic exposures (they are currently trying to understand their synthetic risk better, there are some challenges such as how to look at relative value portfolios). Note the very large “other” collateral category on this table includes all other fixed income, such as Treasuries and agencies (equities financing not included, but Barbara said it is unlikely any of these counterparties deal in equities).

Interestingly, the table shows that the bulk of loan/advanced amounts are with 28 counterparties. Most of the counterparties on this list are hedge funds (some REITS, etc, as well), and most have received multiple margin calls recently, which have been met. In some instances Bear has been able to increase haircuts, especially when willing to provide longer terms/maturities as a trade off (there has been a fair amount of interest in this from funds). Barbara said they have also been engaging in “much deeper” conversations with their counterparties regarding what they consider qualifying as liquidity; a lot of funds are keeping upwards of 20% of assets (or NAV?) in liquidity and what they are counting as liquidity is more cash like.

Barbara did not walk through specific names this month to the extent she did last month (see that write-up), as there was not much new in terms of distressed exposures to speak of (she did note that Basis “was resolved”). Some PB clients had taken serious losses on Strat Arb, but nothing that exceeded the GCS risk managers’ risk tolerance levels (given the level of collateralization). Separately, regarding Stat Arb, apparently Bear’s Math Arb desk in its Principal Strategies business would have fully recovered its losses had it not cut its positions.

### **Mark/Margin Disputes (Barbara Biel and Mike Alix)**

Breaks in the valuation process have been putting stress on Bear and others. More disputes are occurring not only due to disagreements on marks, but also due to trade reconciliation issues. Often, Bear is even finding that both counterparties (itself and the CP it is facing) are simultaneously calling each other for collateral. Also, as a result of the infrastructure challenges, Mike noted that the novations protocol had been relaxed to extend the 6:00pm affirmation deadline, so as not to stop assignments from occurring.

The issue of agreeing on the set of trades in place is apparently specific to OTC derivatives, as CUSIPS allow for a single number for two counterparties to reconcile to with ease on the repo financing activity. For OTC derivatives, dealers often do not put each others trade identification numbers into their systems, and reconciliations only occur when there is a dispute. Expanding upon the use of a centralized data warehouse like DTCC is seemingly the long-term solution, as processes are very laborious right now. However, in the interim one possibility suggested for improving the things would be for counterparties (particularly dealers) to perform bilateral reconciliations more frequently (despite whether there are disputes).

In terms of Non-IG counterparties with margin calls outstanding, there were three with calls outstanding more than 10 days, of which the total call amount was only \$5 million. There were six counterparties with calls outstanding between 5 and 10 days, of which the total call amount was \$37 million. Separately, the Citadel Equity Fund was on call for \$35 million, but this had to do with them taking on another portfolio (Sowood's I believe), and Bear and Citadel were in the process of matching trades and agreeing on numbers.

In terms of margin disputes with dealers, there a couple with disputed amounts greater than \$100 million. One of these is JPM, which Bear has more than 25,000 trades with. Another is UBS, who they have 11,000 trades with.

### **Leveraged Lending Update (Marc and Helen)**

Bear did not have a PAC meeting in the month prior to our meeting, and there have been no new deal approvals in six weeks. The total leveraged bank loan and CMBS pipeline is nearly \$12 billion, which is largely made up of Cablevision and Hilton (\$5 billion and \$4.8 billion respectively). (See handout provided.) There is also about \$3 billion in exposure remaining on deals that have been recently syndicated (with the \$3 billion representing the pieces that were not syndicated). About half of this is Chrysler, despite the fact that the desk syndicated the majority of that exposure at \$95, losing \$28 million in the process.

If the Cablevision deal closes at all, it is expected to be restructured, and there is a strong feeling that that would occur in November at the earliest. The Hilton exposure of \$4.8 billion is down from last month because the business syndicated about \$800 million; it also has circled another \$300 million (still included). This deal is not expected to close until September or October, and CMBS group is apparently very optimistic about this

deal. Bear is again the #1 lead banker, like with EOP (Mike is calling on August 23<sup>rd</sup> with a Hilton update). More immediately, in the next two months risk management estimates that about \$1.5 billion in bank loans will fund.

In terms of the mark downs (see \$165 million referenced above as a rough estimate), the firm has marked all ANC commitments down with the exception of Cablevision. The feeling is that most other deals are relatively certain to close and thus were marked to the mid 90s. In terms of the hedge performance, Marc said he felt the hedges served really well until August, as since then they have given back some gains (although they have been slower to mark the loans back up, for instance Chrysler is now trading around 98).

Bear has \$3 billion in its IG pipeline, which they expect to be reduced by \$2.2 billion soon (due to Schering-Plough I believe). The firm has a retained IG portfolio of \$4.3 billion (these are Bear's small portion of larger backstop facilities). While these revolvers are not expected to fund, the firm is going through an exercise of estimating what it could have to fund, which obviously depends on the types of assumptions one makes about the corporate CP market.

Marc and Helen provided a hand out summarizing the CLO Accumulation desk's positions as well (broken by rating and placement in capital structure). The net market value exposure stood at \$2.3 billion. While we did not get separate CLO p/l numbers (not sure if that is included in the Leveraged Finance total above or not), Marc did say that term loans in the secondary market had backed up to around 96.

### **For Memo**

- The top concern of the chief risk officer at the time of our meeting was the market for asset-backed commercial paper. While Bear does not have any direct market risk exposure to this market in that it is not a dealer (or placement agent) of asset-backed paper, nor does it provide liquidity backstops or credit enhancements to asset-backed conduits, the potential implications to the market as a whole of so much paper trying to find a new home at a new price are significant. In the weeks preceding our meeting, numerous higher quality mortgage originators, focusing on Alt-A and prime products, came under distress largely due to an inability to roll asset-backed paper. This led to the firm taking more mortgage inventory onto its balance sheet from prime and alt-A mortgage originators that it had provided warehouse lines to. However, in contrast to the size of the subprime warehouse lines last year, these repo facilities were much smaller. The credit losses from the closing of these warehouse lines were negligible but it left the firm longer inventory than it would otherwise have liked to be given current market conditions. Separately, another area of focus for the firm currently is the marking and price verification of mortgage inventory, which is quite challenging given the current lack of liquidity for many products. We will continue to discuss with risk managers developments in this space.
- Bear's leveraged lending business had not entered into a new loan commitment in the six weeks prior to our meeting. Thus the firm's commitments pipeline is currently

relatively small, and is dominated by two large exposures: one which is expected to fund in early October and one which if it closes at all, is likely to be restructured and done much later in the year. The concentrated commitment that is expected to close in early October is for the acquisition financing for Blackstone's purchase of Hilton Hotels. Bear is the lead on this deal and its share of this commitment was \$5.3 billion, which has subsequently been brought down to \$4.8 billion by bringing in other banks into the syndicate. Unlike most leveraged loan acquisitions, the take-out for this transaction is meant to be in the CMBS market rather than the bank loan market (similar to previous real estate deals such as Equity Office Properties and Extended Stay). However, this deal is more unique in that roughly half of the securitization exit is planned to be CMBS collateralized by the franchise and royalty fees that Hilton charges its franchisees (with the other half of the CMBS being collateralized by the hotel properties). If the securitization of the fees is pulled either because of unfavorable rating agency action or lack of investor demand, this portion of the financing would revert back to a traditional leveraged bank loan, which would likely be a loan that required a non-trivial mark down to be able to syndicate. We have will continue to discuss with the firm developments regarding this transaction from both a risk and funding perspective.

## **Bear Stearns Packet Dated June 30, Meeting held on July 18th**

### **DPG bullets:**

- **Bear Stearns Asset Management (“BSAM”) Update:** Bear Stearns’ goal in providing a secured lending facility (repo) to the BSAM “High Grade” fund was to allow for an orderly liquidation in hopes of preserving the remaining equity in the fund. This goal has proved unattainable. As of our meeting, the High Grade fund had lost approximately 91% of its equity. The net Repo facility that Bear provided High Grade was down to \$1.345 billion. However, with the continued decrease in the value of the collateral, most of the over-collateralization of the loan has eroded and based on June month-end marks the value of the collateral was very close to the amount of the loan. The market for this collateral has deteriorated further in July and there is a real possibility the firm may not recover the full loan amount. However, at the current time, they still plan to sell these assets in an orderly fashion and will not force a quick liquidation as the current market conditions are making it hard to come to a quick resolution.
- The Hedge Fund Credit team within Global Credit Risk recently underwent an extensive review of its counterparties to which it provides financing for lower rated and equity tranches of asset-backed Collateralized Debt Obligations (“CDOs”), Collateralized Loan Obligations (“CLOs”) and residual tranches of MBS. While the amount of financing in this space is not trivial, the amount of loans to those counterparties currently experiencing distress is small and at this point over-collateralized. However, with increasing initial margin levels (primarily due to increases in spreads) coupled with increasing variation margin calls, the liquidity of some of these funds are or will come under stress. The firm expected to move to liquidate one of these counterparties in the next couple of days. We will follow up with the firm to see if these problems remain contained to a small subset of counterparties.
- While Bear Stearns was not involved in any of the recent, well-publicized leveraged lending deals that got “hung” during June, they do have a few significant deals in the pipeline that given current spread levels, they expect to take losses on in order to distribute. However, expectations are that these losses will be fully offset by the advisory and commitment fees on the related deals. These deals, while very large in size, do contain covenants and do not have deferred amortization features such as Paid-in-Kind (“PIK”)/toggle provisions, likely making them easier to distribute than those deals “hung” in June which were either covenant-lite and/or included PIK/toggle provisions. We will follow-up on the firm’s ability to distribute these outsized commitments.

### **BSAM Update**

In addition to the points highlighted above in the DPG bullets section, the following were some of the more interesting comments made regarding the BSAM funds by Mike Alix.

•Mike/Jeff said that the decrease in NAV from the previous month was both (1) from digging into the marks (“the values were a little less than they thought”) and (2) from further deterioration in the market.

•Mike said that it was “devilishly difficult to find values for these complex products that are not currently trading”. Basically the only trades they see are the forced liquidation trades. There is a lot of “triangulation” in pricing this collateral.

•The hardest piece of collateral (to price and sell) is the shares in Everquest (the vehicle that acquired equity interests in CLO/CDOs owned by BS funds and Stone Tower). The Everquest IPO was obviously cancelled. They currently value the Everquest shares held by High Grade at \$216 million with a \$146 million loan against it. This is “the most illiquid investment in the fund”.

•With the over-collateralization on the repo gone and further deterioration in the collateral a very good possibility, they stated that they could lose money on the repo. Mike then added that we should have a discussion about the right way to capitalize this position given that it is a repo with a distressed counterparty with collateral that has gone through unprecedented volatility. “Is an 8% capital charge enough- probably not?” Revisit the 100% RWA given the over-collateralization has gone away.

## HF Update

Deleted: ¶

As discussed in the DPG section above, Barbara Biel and the Hedge Fund credit team did an extensive review of its counterparties to which it provides financing for lower rated and equity tranches of asset-backed Collateralized Debt Obligations (“CDOs”), Collateralized Loan Obligations (“CLOs”) and residual tranches of MBS.

Basically, they were looking into their financing of the same general type of asset-backed collateral that the BSAM funds had: (1) CDO<sup>^</sup> of ABS collateral; (2) CDO; (3) CDO equity; (4) residual interests. She said that the financing in this MBS/ABS space is approximately \$2 billion (**Steve I assume this is for all of the MBS/ABS type financing???**). They finance, CDO tranches, CDO equity, residual interest as well as lots of other securities backed by subprime, alt-A, and commercial loans. Barbara did say that they do not have hardly any financing of CDO<sup>^</sup>. (See handout from last month for some detail of the financing of less liquid/lower rated assets.)

While the amount of financing in this space is not trivial, approximately \$2 billion, the loans to those counterparties currently experiencing distress is small and at this point over-collateralized. Mike added that with increasing initial margin levels (primarily due to increases in spreads) coupled with variation margin calls, the liquidity of some of these funds are or will come under stress. Headline: “**Liquidity management for HFs in this sector is challenging.**”

Barbara walked us through the troubled names in their portfolio (which for the most part have been well publicized recently). Most of the activity has come in the Repo space (only have 6 counterparties that financing ABS type collateral synthetically with BS??). However, Barbara also discussed the review they performed on Fixed Income PB counterparties. Below are the details.

Repo Clients (and limited OTC):

• Basis Yield Alpha

BS has a \$4.3 million loan (repo) outstanding with this client. This is more than 2 times the market value of the underlying collateral. However, with “trapped P&I”<sup>1</sup> (i.e. the cash flows coming off of the structured products) that BS can withhold (i.e. not pass on to the HF), they have \$6 million in collateral.

The fund has suspended redemptions; asked for forbearance from creditors and its NAV is estimated at \$220 million – down from the \$485 million as of May month-end. Barbara said that Bear was one of the 2 smallest creditors of this fund. Bear has drafted a default notice.

• Basis Pacific Rim

Bear has a \$22 million repo line outstanding to the client with \$35 million in inventory collateralizing the loan.

This fund was down 9.5% had a NAV of \$500 as of June month-end. They have not suspended redemptions and are current on margin calls. However, they failed to settle on a CLO equity tranche trade executed on June 22<sup>nd</sup> that was supposed to settle on July 13<sup>th</sup> (as we know-extended settlement risk-variation margining does not current take place). In order to facilitate the HF in settling on the CLO Equity trade (i.e. give the liquidity they needed), Bear agreed to buy some of the assets they had financed. This is still a live situation and will update next month.

• Highland Special Opportunity Fund (the NY fund)

Bear currently has a \$11.7 million repo line outstanding against \$16 million in market value of collateral. However, Bear has an outstanding margin call out to the fund. The firm met half of the call yesterday- by posting securities (not cash) (see section below on differences between repo and OTC collateral and terms). Similar to the Basis Pacific Rim situation, Bear may be willing to buy some of this collateral of the line. The fund in total has approximately a \$112 million in repo (BS- has only a 10% position- good place to be in based on what we saw in the BSAM situation). The fund’s NAV stands at \$93 million down from \$115 million 3 weeks ago.

Bear also had an interest rate derivative with the fund in which BS owes the fund \$100k. The fund decided to terminate all its OTC derivatives (across all counterparties). Bear

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<sup>1</sup> In the ordinary course of operations, these principal and interest payments would flow through BS to the owner of the security (i.e. the hedge funds financing the securities with BS). Now, BS has altered the standard operational processes for these funds and is not sending the cash flows to them.

had a cross-default provision in the derivative contract but not in the standard Repo contract (i.e. only works one way). ***I assume this means that legally BS can't keep the \$100k because the derivative contract is not in default???***- Steve, Lori, or Kevin do you know which way it is going?

- Horizon funds

Bear has exposure to 3 of the horizon funds (ABS, LP, and III). All the funds trade the same products which include: equity and mezz of ABS/home equity and maybe some CLOs.

Across the 3 – they have \$23 million in loans (all std GRMA documented repos) at a 40% haircut on the collateral. The roll date of the repo line is July 20<sup>th</sup> at which time they will be charging a 50% haircut (on all collateral- or the avg. new haircut?). They noted the manager is continuing to reduce lines by selling securities.

- Braddock Funds

Bear had no financing left for the particular fund with an issue (fund name??). However, it has financing out to the Mortgage Opportunity V fund. However, they think this fund is in better shape.

- Barbara talked about the UK funds that have closed or are closing: Cambridge- ?? and Queen's Walk. Bear didn't have dealings with these funds.

Regarding Cambridge Place- she said that Bear had done some trades with them. She also noted that a number of counterparties (no Bear though) had committed facilities with the fund.

None of these fund managers discussed above are Fixed Income PB clients.

Fixed Income PB clients:

Barbara noted that some smaller guys (in the \$25 million range) in the Fixed Income PB business are clearly in trouble.

With help from the business they put together a list of "highlighted accounts" to follow up on (i.e. make calls to the funds) similar to what they did with the repo counterparties. These flags have been put out based on the desk's view of the illiquidity of the positions being financed. For these accounts they are getting notices of all their purchases.

The following were funds specifically discussed:

- (1). Barrier- Bear only clears for them; no financing
- (2). Ivory Multi-strategy- this fund fundamentally has very illiquid positions
- (3). Tranquility- the fund put down its gate and is in the process of raising cash by liquidating in an orderly fashion. The fund holds \$5 million as a clearance deposit at Bear.



(4). Commonwealth Advisors- have clearance deposits of \$2 million. They are on special approval process for purchases.

Finally, they mentioned Susquehanna- a private company (not a hedge fund). They also said that they have a substantial relationship with ML and that the company is reasonably highly leveraged, has migrated from its core equity strategy into credit, and routinely tries to maximize their leverage.

Bear has recently made several calls to the company and is in dialogue to increase margins. This company gives Bear virtually no transparency (and apparently is still unwilling to do so) and as a result with respect to financing of fixed income products Bear is going to increase its margin terms. Mike also stated that the firm transacts with the company in all products.

#### Hedge Fund Stress Tests

**Mike said that when all the dust settles, they will be re-looking at their stress tests and will be increases the shocks for certain asset classes (and rating classes). However, right now they are “doing hand to hand combat”.**

#### **Leveraged Lending (and CLO accumulation)**

##### Leveraged Lending –origination

##### **•Update on Portfolio**

The closed loan inventory increased \$516 million to \$7.234 billion. The only closed loan that remains significantly above its hold level is the Reology loan (amount??) (this commitment was discussed a few months back).

The non-IG pipeline as of July 17, 2007 had **\$4.2 billion of offered not-yet accepted** commitments, a fairly low amount recently due to two things: (1) virtually no new approvals this month (**per Marc- “PAC committee process significantly tightened”** **“they actually denied a deal and were so conservative on another they lost the deal”**) and (2) most of the deals offered-not-yet-accepted last month were either terminated (\$3.2 billion) or accepted (\$7.2 billion) this month.

The non-IG ANC category stood at a large (for BS) \$16.9 billion. Bear Stearns’ three largest non-closed commitments are as follows (all of these three deals have covenants and none are PIK/toggle):

(1). **Chrysler-** \$7.650 billion total commitment (\$5.850 billion for Asset Backed conduit; \$1.85 billion for operating company- \$300 million of which is slated for second lien.) This deal is slated to close by the end of the month.

With fees and M&A fees- they should get out close to break-even (i.e. they will eat through \$30 million in advisory fees as well as their commitment fees). They hope to

have no more than \$200 million of revolver and \$100 million of term loans after syndication. JPMorgan is the lead on this deal.

(2) Hilton (purchase by Blackstone) - \$5.250 billion (BS is the lead on this deal) - unlike the other two this is expected to be a pure securitization deal (**I assume it is still in the overall loan origination numbers- confirm this**). The financing is expected to be two different financings. Roughly 50/50 split between (1) securitization of mortgages backed by real estate and (2) securitization of the franchise and royalty fees the company charges its franchisees.

The securitization of franchise/royalty fees for a hotel has never been done (per Marc) and as such there is a feeling of more risk here (this was also referred to by Chip at MS as novel). As such, Marc stated that a portion of this part may need to be funded via bank debt instead. If this occurs, they will be drawing on their fees to get out of this one.

They expect to get \$30 million in advisory fees only on this deal. Not sure if they said where they expect to get out on this deal (in total).

(3) Cablevision- they have sold down from 33% to 28% of the deal (not sure the total-but it's in the billions). The buyout by the Dolan family is still subject to shareholder approval. The stock recently was trading \$2/share above the Dolan offer and the Dolan family came back asking for more financing to be able to offer a higher price. Bear did not agree to that (at least currently).

If this deal goes through it is big (carries a \$50 million M&A fee) and Marc believes (net of fees) they would come out on a positive basis. That obviously implies that without taking into account fees they would have a substantial loss trying to sell out this paper.

#### Biomet

They had to commit \$12 million to a "stabilization fund" to be able to syndicate out the Biomet leveraged loans. They get this money returned to them after the HY bond is done (**follow up on this**).

**They also have a couple of commitments about to close that they expect to have small losses (\$2-3 million) on net of fees (Highland Intl & Florida East Coast).**

**Unlike many firms, they currently do not have any funded bridge loans or equity-bridge loans.**

#### • Market Commentary:

Similar to what we have heard elsewhere- covenant-lite and PIK/toggle features are dead. Spreads on HY CDX index have blown out to over 400 basis points as of our meeting and the LCDX has followed suit.

#### • Hedging:

They continue to have fairly sizable hedges on: (1) \$1.6 billion notional protection- mostly on HY Index (7 and 8 and usually on 5-year) but have also bought some put options on HY index (100 basis points out of the money). They made \$20 million on these hedges the 2 days prior to our meeting.

#### CLO Accumulation:

They are dramatically shrinking their CLO Accumulation exposure (no numbers given??). They are shutting down CLO accumulation warehouses (at least in the U.S.). The desk has on a lot of hedges (about \$450 million). In LDN (and NY) they have also bought some bespoke puts (talked before about these). In NY, they have also sourced \$300 million of 1<sup>st</sup> loss protection (from HFs like Old Lane- on a collateralized basis) on baskets.

For some of the lesser known managers, they are terminating the deals and plan to sell out the inventory (and will rely on their hedges as they have bought 1<sup>st</sup> loss protection from HFs). They stated that unlike CDO accumulation deals, the managers do not put up collateral on these deals (this was news to me-concerning BS- there must have been some miscommunication on this in the past).

For the more well-known managers, they will try to get the deals done (???)

#### Market Risk

Kan was in LDN and conducted the briefing via phone. Due to the time spent on other topics (and the late start time) the Market Risk overview was brief. We discussed high-level VaR results briefly, talked through the major P&Ls, and discussed a few risk areas. See highlights below:

##### I. VaR

Kan said that he is getting more confident in the VaR attribution now (although still a work-in-process). He added that they have begun running some additional drill down reports.

The Firmwide 1-week VaR remained stable at \$63 million. The Fixed Income Division VaR was also \$63 million. On a marginal basis, Fixed Income contributed \$53 million, Equity and Global Energy contributed \$4 million each, and Principal Investments contributed the remaining \$2 million.

Within FI, the VaR for mortgages has fallen (from \$48 to \$44 million) as the rest of FI has increased (from \$43 to \$51 million). We asked whether there were any surprises at the lower levels (i.e. whitebook level) and Kan said that there were none (however, we did not go through the report line-by-line during the meeting).

## II. Major P&Ls

- There were no big losses this month. The largest loss by a whitebook/desk was Risk Arbitrage which lost \$15 million (predominantly from the “Events” book).
- All the mortgage desks were profitable with many desks having VB profits:
  - ARMS (\$35 million- ½ from IO and residual mark-ups and 1/3 from pricing 9 new deals on \$3.9 billion in collateral);
  - Agency CMO (\$33 million- pricing 10 deals on \$1.9 billion of collateral),
  - Global Commercial (\$32 million- \$18 million CMBS (\$8 from EOP); \$10 million from Secondary trading; and \$3 Tokyo CMBS.
    - In Tokyo, they made a \$1.2 billion funding of a loan to Mitishubi Fusho- which was backed by a lot of properties in Japan. They hope to securitize before the end of the year. This is Bear’s largest Tokyo deal ever.
- Non Agency desk- was up \$23 million.
- Credit Trading, Equity Derivatives, and Distressed continue to perform well. Fixed Income had a very good month.
  - Credit Trading- \$62 million.
  - Equity Derivatives- \$40 million (\$25-NY; \$9 LDN; \$10-Asia)
    - the business slowed down a lot in LDN. The exotics desk lost \$5 million- between NY and LDN- lost money on being short correlation and on some Vega dispersion trades (long single stock vega; short the index). They lost money on that predominantly because the hedged with the S&P which had been more volatile than other global benchmarks.
  - Distressed- made \$21 million. Made \$11 million on shorting the HY index and subprime credits; made money on IPP names; gave back \$5 million on Northwest. The desk’s net MV was down slightly to \$1.207 billion.
  - Leveraged Finance- made \$23 million. \$16 million from origination and also made a good deal of profits from their index hedge. However, they lost \$17 million on relationship loans during the month (*ask if this was on just the upfront mark-downs or if this was on un-hedged positions in the book*).
  - Fixed Income Derivatives- made \$42 million. LDN contributed a lot on FI exotics. However, the desk gave back \$5 million post month-end on increases in pricing reserves on NY options (low strike options were overpriced).

## III. Risk Areas:

- Risk Arbitrage

Last month the desk had come back for an increase in limits. This request has been put on hold at the desk lost \$15 million during the month. As previously stated the losses were concentrated in the “events” book (\$10 million). Kan said that currently there is a lot of scrutiny around the “events” strategy.

•CLO Accumulation Warehouses

Kan said that in LDN, one deal proved difficult to sell down. I believe they may be having difficulties in a couple of other deals as well. As stated previously, they have a lot of protection on the CLO accumulation desk, including the first loss protection purchased from the likes of “Old Lane”. Follow up next month.

•Structured Funds

Mike noted that BSAM High Grade was in a number of the Hedge Fund Derivative Contracts. Due the losses suffered, one structure was forced to de-lever. I believe this was the first time one of their structured hedge fund derivative contracts was forced to de-lever. All-in-all, it seems the diversification guidelines have proved to be fairly good given only one de-leveraging in this market. With that said, follow up on this area again next month.

•Credit Derivatives- VoX Capital

The trade with JPMorgan that has resulted in margin call disputes over the past several months flipped to being a receivable for BS. JPMorgan is now contesting Bear’s margin call. Will follow up on this again next month.

Credit Update

- CE was up dramatically, \$7.9 billion, to \$35.6 billion.

•Placements:

The main driver was placements which went up from \$14.305 billion to \$18.925 billion. Judy commented that this was driven by Treasury’s new L&F approach (consistent with what Bob Upton has discussed with us previously- putting more out on secured funding should increase the parent liquidity pool).

Looking at an entity-by-entity level the increase at the parent company, BSC, was \$4.665 billion from \$6.6 billion to \$11.3 billion. Last month, the CE at BSC increased \$4.5 from \$2.1 billion to \$6.6 billion (again- I assume from placements- **see last month’s write up**)

On potential area for follow-up is with respect to the make up of the placements. Judy said that they were both cash and ST Investments. The ST Investments included money market funds and Asset-Backed Commercial Paper. Maybe we should get some color on the maturities of this CP and how solid the sponsors are for this paper. In thinking about

this, I believe it is a much different issue than the topic at MS (investing in structured ABS product); but maybe worth discussing at the upcoming BS quarterly L&F meeting.

- Judy did mention one new exposure. They had a \$221 million CE on an equity repo with Allianz A.G. (German insurance company) based on an over-collateralization on an equity repo. This repo, however, was done on a tri-party basis with JP Morgan Chase the custodian.

- PB exposure continues to decline (peaked at \$2 billion in Nov. 2006) now down to \$867 million as they have largely moved positions out of BSIL (to avoid the cross-entity netting issues) and into portfolio margining or other mechanisms to provide enhanced leverage (i.e. beyond Reg-T). Judy also mentioned that this helps with the “perception of HF risk in BSIL by FSA”.

### **Hedge Fund Counterparty Credit Risk**

During the meeting, we went over most of the risk management questions related to the Multi-lateral Hedge Fund Counterparty Credit Risk project. We had a subsequent call on July 19<sup>th</sup> to discuss the remaining questions and to go over the data tables (??)

See separate write up for details.

JTG 07/20/07

## **Bear Stearns Packet Dated March 30, Meeting held on April 18**

### **Price Verification**

#### **Mortgage PAUG Swaps**

We requested to discuss specifically the process used to price verify single name CDS on ABS (see Presentation). In short, there are three approaches taken, neither of which is a benchmarking of single name CDS to the indices (i.e., using index betas by underlier groupings/cohorts).

The first approach is to use the Fitch vendor data (I believe we have heard that Morgan relies strongly on this service, whereas Goldman doesn't use it at all). The Fitch survey is performed monthly. Each broker submits marks for all cusips it has in its inventory, and then gets back results on just those cusips. Bear currently has CDS positions on about 1,100 cusips for which it gets about 50% Fitch coverage. The metrics the dealers receive back from Fitch are high price, low price, average price, stdev of prices, and number of brokers/quotes. While Bear does not know exactly how many brokers participate, the most marks RMD has seen submitted for one cusip is eleven. In terms of the quality of the data, RMD divides the cusips up into two groups: those for which there is a small price range and the data look sound, and those which need to be examined more closely to filter out bad entries. RMD does not use any golden rule in terms of how many minimum quotes are necessary in order to verify a mark through Fitch, as some discretion must be used. Also, risk managers spend the most amount of time focusing on trades with the largest discrepancies between the consensus data and trader marks – concentrating on the tails.

The second approach to price verifying ABS PAUGs is to perform relative value analysis based on security rating, vintage, recent trade levels in the different rating buckets, and performance of the underlying collateral. The risk managers describe these analyses as being used to “triangulate” on a price when good vendor data is not available.

The third approach is to price verify the derivative based on the underlying cash bond directly (with some adjustment for the CDS cash basis). This is the least preferred method due to the fact that the basis between CDS and cash instruments can be significant (significant technicals driving the CDS). We asked if it was more or less difficult to price verify the underlying cash bonds versus the CDS. The responses were that it “is a good question” and that “it depends”.

We also asked how helpful the counterparty collateral process was for informing the price verification process. Kan said the collateral process does not tend to lead to changes in marks for P/L purposes – suggesting it was not helpful – but Mike Alix said it could be helpful (not sure if the mortgage guys actually gave a straight answer).

Due to RMD resource constraints, only 65% of the swap inventory is price verified monthly. However, the same 65% is not price verified each month, so there was an assertion that over the quarter essentially everything was verified. **We requested some more detail in this respect, suggesting that sampling was not necessarily something we were comfortable with/accustom to seeing. Also, it sounded as if Bear's accounting policies actually require 100% coverage on a quarterly basis, but there was some reluctance to commit to whether that was achieved here.**

Vox Capital

We asked to discuss further the work done to gain comfort around the large (around \$25 million) profit the VOX desk made from a trade(s) with another dealer in February. To recap, the desk was able to buy protection on a bespoke tranche at a very “attractive” price. When RMD saw the resulting P/L, it took a close look, being naturally suspicious of the ability to make money off another dealer in such a manner. Also, Bear found itself in a dispute with the counterparty over the mark used for collateral purposes (a multi-million dollar disagreement).

The trade involved purchasing \$250 million notional of 7-year protection on the 3-5% tranche (non-standard width/points) of a customized basket of names. The basket was about 25% high yield and 75% IG, with a mix of US and European names. The average spread on the portfolio of underlying names (without tranching) was between 150-160 basis points. In spread space, the difference in the marks on the tranche between Bear and the other dealer was 1,700 basis points versus 1,300 basis points (**Wow!**).

Risk managers performed several exercises to gain comfort around the desk’s mark. First they looked to the last Markit survey for the tranche that was closest in characteristics to the one in question. The average spread on this underlying comparison portfolio was 101. The Markit results on the tranche showed Bear pricing low, rather than high (didn’t get the Markit tranche characteristics). Next, Bear contacted the counterparty and was able to rule out the possibility of the difference coming from the spreads used on the individual names in the basket (which I interpret as meaning that the difference must be coming from the correlation mark or correlation methodology). Next, Bear (we think) introduced to Markit a pool extremely close to the one considered, with an average spread of 155 basis points, which again showed Bear pricing slightly low (again, didn’t get tranche attributes). Finally, the desk was able to trade out of \$20 million in notional on the tranche with another counterparty, at Bear’s mark.

Ultimately, risk management gained comfort around the desk’s mark, but ended up conceding to the counterparty for collateral purposes. Bear then turned down a different trade with the same dealer, because the transaction “didn’t make economic sense”. It sounded as if the desk desperately wanted to do the trade, but risk management intervened, and even reported the situation to the other dealer’s CRO. (**We said that we hoped the CP was not a CSE firm, and the reaction strongly suggested it actually was a CSE**).

As an aside, sometimes in the past when we have talked about this desk recognizing P/L, it has been because it was able to fill out (or closely fill out) a pool capital structure, essentially locking in the gains. That is not what was going on in this instance. This was a story about the mark on this one tranche.

### Energy

The P/L for the trading portion of the Energy Business (versus the asset investing business) is still only a couple of million dollars. Chip said that the business is still setting up a lot of the infrastructure, and that the headcount is now around 150 – about 75 in the front office and the remainder in support and control areas. We asked about the mix of exchange traded versus OTC trading, and he said that more of the trades were OTC. We later asked Mike about this and said they had signed up over 100 counterparties that they could trade with (although hadn’t trade with all of them). They were also trading with some producers/users without collateral on right-way trades, in



accordance with industry practice (e.g., buying forward from a power producer). Currently all trades are shorter dated and vanilla gas and power (not even any options yet it sounded), but the business is starting to think about longer dated, structured transactions.

### **Market Risk**

We did not receive, or discuss, any revamped market risk report (ask again next time). Kan did say that more work has been on risk attribution tools, and he began to incorporate more of those results into our market risk briefing.

### **High Yield and Distressed**

Having heard some concerns elsewhere that relatively few equity tranche buyers might be supporting the CLO bid, we inquired as to whom the equity purchasers for Bear deals are.

Risk managers have seen data that suggests that over 70% of all bank loans are going into CLOs, with at least one source indicating that more recently that number could have gotten as high as 90%. There are two classes of buyers of equity from Bear deals: European insurance companies and banks, and dedicated US-based CDO/CLO equity funds (which have a lot of European and Asian investors). Of the \$850 million in equity from Bear deals, \$425 million was bought by funds and the rest by foreign banks and insurance companies- \$150 million sourced out of Asia, with the rest from Europe. We didn't get the actual number of investors, but the CRO responded the number of investors was actually less important than the how diverse those investors are in their investment opinions.

Marc explained that with bank loan spreads as tight as they are, those spreads will either have to widen some or the CLO issuers (like Bear) will have to decrease their fees in order to keep deals clearing; and there appears to be a strong desire to keep product flowing, even at lower margins. Also, Bear has "tightened up" its hedging though customized hedges on the actual portfolios being accumulated. We asked if these conditions make the business seem less attractive. Mike's answer was essentially no, stating this was a generalizable issue about whether one should reduce risk through hedging when there is less opportunity. Mark also added that he thought the impact on fees would be temporary.

The Distressed Desk – incurred losses during the earlier part of the month, but rebounded to finish with a \$12 million profit. The net market value of its positions increased by \$350 million to \$1.25 billion. This was primarily due to the desk taking off a \$200 million short high yield index hedge (might have taken part off last month), and also extending a \$150 million bridge loan to Trilogy Partners to finance the purchase of some Delta trade claims. We asked if it was strange for this desk to fund a loan, and it appeared to be the first Kan had ever heard of such activity here. The desk did the loan at Libor plus 200 bps, possibly with some equity component as well. This transaction

obviously increases the desk's exposure to Delta. Separately, IPP exposure was reduced by \$90 million to \$195 million.

The resulting VaR increase of \$659 thousand for the desk was small compared to the net market value increase. This was attributed to exposure to names that are low spread names by distressed standards (not sure I follow this, don't distressed assets trade in price space, often being mapped to equity returns? Maybe meant low volatility names?).

Bank Debt – made \$35 million (\$23 on fees), as many deals closed during the month. Mark noted deals were occurring at still higher leverage levels and at lower credit ratings. He said more deals are getting done at the 7x leverage range, with ratings in vicinity of B2.

In syndicating its commitment for the Coldwell/Apollo buyout, the business had to give away all its fees to reach its hold level, plus the sponsor had to give “some concessions”. This has apparently been a very controversial deal from the beginning, given that it was a housing market sensitive leveraged loan, and went through the PAC several times before being approved.

There was a 1.2 million loss on a loan that had been sold in primary syndication in January, which was then declined by the customer in March, come settlement. (Kan didn't have much color, **follow-up?**).

Bank Debt Funded net market value decreased by \$666 million to \$2.05 billion, while Commitments increased by \$509 million to \$3.7 billion (note these numbers are just for closed deals, not one or two signature – see Tab 4 for full pipeline). The combined standalone VaR fell by \$2.3 million to \$24 million as the aggregate spread risk fell. The marginal contribution of Leverage Finance (which is Bank Debt and CLO Accumulation) fell from \$20 million to \$14 million, which likely related to interest rate exposure becoming a more dominant VaR driver at the FW level, relative to spread exposure (as rates rise, spreads tighten in the time series).

CLO Accumulation – had a small profit. There are actually two Accumulation desks: one in the US and one in London, and Kan discussed the hedging (mentioned above) done by each. The US desk bought default protection on an exact basket it is holding. The London desk recently bought 650 million euros of collateral from a previous CLO deal to go into a new 1 billion euro deal. It initially bought 100 million euro notional in Itrax puts to hedge this exposure, which has considerable basis risk (“weaker than” the NY hedge). But it then bought an additional 250 million Euros of protection on the actual names (with a preferential feature that allowed for the exercise on a name-by-name basis). Even though these hedges eat into the desk's fees, the “risk reduction looks good”. Kan said there is some question as to how these hedges should be marked, which has to do with the basis between marking to the basket directly versus marking to the individual loans - posing the question of whether one should consider a hypothetical securitization value. He said he wanted to have a conversation about this issue more broadly at the MTM Committee. (**follow-up?**)

We mentioned to Mike we had some interest in the accumulation businesses, both corporate (CLO) and mortgage (ABS CDO). He said that ABS CDOs are probably dead, and less important than CLOs. (But why is the Mortgage CDO accumulation size just as big, at \$2 billion, which is up a \$1 billion from last month? Maybe find out how important this was in terms of P/L?). I mentioned we were a little curious about the economics (risk-return profile) of these businesses versus their own securitization businesses. He seemed puzzled by that point of interest, and said one was simply non-recourse financing with upfront margin. (I was a little surprised by this reaction, given what we have heard elsewhere, and given that they seem to refer to themselves as the issuer of these deals, earning fees?).

In any event, they offered to have some business folks come in next month to talk about this activity, as well as the CLO equity buyers (is that right Jim, I think two conversations started to blend together, because Mark was simultaneously offering to bring someone in on the equity topic?). We said they could hold off, and we would get back to them, as this is something we might do on a cross-sectional basis.

### **Financing of First Loss Pieces**

Following up on the issue of the number of CLO equity tranche investors, we also inquired into the financing of such assets, post sale. Credit had recently examined all financing activity of “first loss pieces” (corporate as well as ABS), and Barbara Biel brought in the numbers. The market value of financed positions was \$813 million, which \$386 million had been advanced against. Of the \$386 million, \$250 million was to hedge funds. \$230 million of the \$386 was on CDO/CLO equity tranches (with the rest being things like CMBS tranches), and \$50 million of the \$230 million was on CLO product (against \$101 million in collateral value – implying a 50% haircut). \$14 million of this \$50 million was to hedge funds.

### **Mortgages (Get aggregate P/L? Looks like was probably positive)**

Phil has resigned (is retiring), and John is taking over as the head market risk manager for mortgages. Mike mentioned something about some further augmenting of resources to come.

ARMs – made only \$8 million. \$4 million of this came on six new deals of \$5 billion. The desk wanted to price things to move to try to get some momentum/flow into the market, bringing customers back. Interestingly, the net market value of the desk’s positions only decreased by \$813 million to \$10.1 billion, meaning it must have purchased around \$4.2 billion in new loans. The stand alone VaR decreased by \$3 million in accordance with the net position decrease. But the desk’s contribution to FW VaR increased, likely for the same reason as in the Leverage Finance discussion above, which is that rates became a larger VaR driver relative to spreads.

Non-Agency CMO Desk – lost \$5 million. \$39 million of the mark-downs discussed last month were taken in March. Approximately two-thirds of this is on 2<sup>nd</sup> liens and 1/3 on

subprime product. Meanwhile, the desk made \$16 million from 10 new deals on \$5.5 billion of collateral. However, \$10 million of this came on one \$1.4 billion deal, which was largely comprised of second lien collateral. In other words, like with the ARMs desk, the other deals were being printed very close to cost. The desk decreased its net market value position size by \$1.9 billion to \$9 billion. It decreased its total second lien position by \$1.5 billion and its total subprime position by \$340 million, while increasing its Alt A exposure by \$250 million. However, the desk's stand alone VaR only fell slightly from \$34 million to \$33 million, due to its long rate exposure ("probably").

Agency CMO desk – made \$18 million. It did 15 deals on \$2.4 billion in collateral, making \$7 million. More interestingly, it made \$15 million "rolling" Freddie TBAs, by buying forward in April and selling for May. Apparently getting into position to earn this sort of carry in the Agency market is "extremely rare". It also sounds as if the desk has gotten into a similar position on some Fannie TBAs (look for profit next month).

CDO Accumulation – desk was not discussed, other than as a potential future topic as discussed above. Note however that that the net market value position size doubled to \$2 billion (will ask about what the P/L for this desk has next month).

Commercial Conduit – made a large profit of \$28 million. The desk did two new deals on \$4.5 billion in collateral, \$1+ billion of which was Bear collateral. The desk also made \$5 million on the EOP financing, for which the position was further reduced from \$4.5 billion to \$3 billion. The net market value of the position size decreased by \$764 million to \$9.7 billion, but the VaR increased by \$2 million to \$12 million. Kan thought this looked a little strange, but one possible explanation was the large reduction in EOP spread risk.

London – made a rather large \$18 million on a "confluence" of deals. The desk closed its third Rooftop deal, now called Man South, which was on 215 million pounds of collateral. It also sold a portion of a 400 million euro CLO that originally sold slowly, reducing its equity exposure from 36 to 6 million (euros I assume). Third, it did a 200 million euro financing of an office in Frankfurt, for which it kept 8 million euros in junior mez exposure. The desk made around \$4 to \$5 million on each of these. Separately, the desk has yet to sell the B piece of the Tokyo office deal discussed several months ago, and that position is now on the risk management watch list.

**Credit Trading** – had the first lackluster month in some time, with a flat P/L (following two strong quarters). The IG business lost \$12 million, driven by \$25 million in losses on autos in the last couple days of the month. The (LF?) desk made \$8 million, a good portion of which came from the quarterly index roll and the desk's curve steppener position going into. The Global Structured desk is structurally long mezzanine bespoke offset with short positions in the indices, which has bad gamma profile in choppy markets, and thus caused \$7 or \$8 million in losses. Kan noted that while this is a natural way to hedge correlation exposure, he is not sure the desk fully thought out how well this position might perform in a volatile market, and he thinks they might be trying to get out of it (perhaps by trying to source protection on bespoke equity- we will see over time).

The VaR for the desk increased from \$18 million to \$25 million. The desk was showing a large rates contribution, which didn't tie to the daily P/L explain and requires investigation.

**Risk Arbitrage**- Did very well, making \$22 million as the equity market rebounded. The desk made \$12 million on merger arb deals, and \$10 million on events (is this rumortrage?). There is currently a live request to grow the Events Book from (my numbers don't make sense, I have from \$30 to \$50?). This is following the increase that was approved several month ago (see Jan notes), which was apparently subject to the hedging being approved by risk management. Also, more risk arb names are popping up in the equity derivatives business, and that trader is being interviewed to move into Risk Arb. Separately, the desk took of its Odessa position, which was its largest. The net market value position size decreased by \$324 million to \$1.2 billion, as did VaR. **The contribution of equities exposure to firmwide VaR is almost zero.**

**Equity Derivatives** – made a very large profit of \$82 million, \$20 million above its run rate. A chunk of profit came from the closing of a transaction related to Univision restricted stock. This trade required the customer to deliver restricted stock, and apparently the desk would have lost the restricted-ordinary differential if the trade didn't close (which was therefore reserved against).

Asia “continues to fly”, making \$14 million on the same sorts of trades. Regarding London's previously discussed Volkswagon position, WestLB's (the counterparty) position has been raised publicly (with some of its traders being fired as they lost money it appears). Apparently this is big news in Eurpe, and articles have mentioned that a US Bank facilitated the trades. While no issues have been identified, this was flagged as something to just watch.

The desk's VaR decreased by \$1.9 million to \$3.8 million. In an attempt to manage Large Market Drop risk, the desk had purchased some variance swaps during the month at high implied vol levels (because it had some expiries during a fairly turbulent time). It then lost \$6 million on these hedges, as implied vols fell. This apparently called this hedging strategy into question. But in any event, it was the associated increase in positive gamma that drove VaR down. While the Large Market Drop loss impact increased from \$30 million to \$85 million, it would have gone up more without these variance swap hedges.

Kan said that the gains on the Large Market Drop stress test that we asked about last month were investigated, and there was actually a problem in the RIO aggregation (that actually had to do with the Principal Strategies desk I believe).

**Fixed Income Derivatives** – made only \$7 million. The (?) desk has been running over its VaR limit. However, it is long short dated vega (options) and short long-dated vega, which gives a lot of benefit at the Firmwide VaR level (\$10 million in offset). Apparently this being a good defensive position for the firm is part of the reason why the

desk has been allowed to run over limit (note, someone appears to actually be looking at aggregate metrics these days).

**International Equity** – made \$25 million. The sales profits have been high for this book, and this month the limits on the prop book were increased to \$100 million long market value, \$100 million short market value, and \$40 million net market value (don't know what the limits were).

**Principal Strategies** – VaR increased by \$2.2 million to \$10.4 million, driven by the MathArb book. Its gross market value of its positions increased from \$1.25 billion to \$1.5 billion.

### **Model Control**

At the end of the meeting we discussed with Kan the current status of the Model Review function in RMD, given the most recent departures. His focus is on finding a new manager for the group. He is also looking at junior candidates, but seemed to think it would be better to let whoever takes over handle that staffing. RMD has found itself asking what protocol it should follow during this interim period, when they don't have sufficient staff (the March Quarterly meeting still hasn't occurred). The answer was to get the more technical product line risk managers involved (e.g., James Bell on the equities side). Some of these people, such as one of the Tokyo risk managers who use to do model review, are "very technical".

While we didn't discuss the circumstances surrounding Slava's departure, Kan did express a bit of a lack of satisfaction with his ability to communicate with senior/business managers. Therefore Kan wants to look for people with technical skills similar to those of front office quants, but who can better communicate. He also discussed getting people to do work that can be communicated; for instance being knowledgeable of trades and relating the technical issues to P/L (which gets people's attention), dubbing these "soft skills". Along these lines, Slava's approach of building a model for everything new will probably be sacrificed. Finally, it was has decided (even before Slava left) to go to a committee structure that is product line specific, as opposed to having one central committee.

### **Credit Risk**

- See above point Kan made on \$1.2 million loss from Jan loan sale to March settlement, perhaps follow up next month.
- As a result of the industry initiative, Bear has started breaking out bond and stock borrow/loan exposures to the principal level, versus having all of the exposure allocated to the custodial banks (don't think I am really familiar with this initiative). This caused several new names to appear on the exposures list. There are still some not rated counterparties as a result, but Judy said not as many as expected, meaning they did a good job of getting ratings in place in advance.

- We asked Mike if he was satisfied with the shocks applied to the scenarios for the hedge fund counterparties. He said that in general (for market and credit risk purposes it seems) he is happy with the historical scenarios, but that more work needs to be done on the hypotheticals, by business/product area. He said of course one challenge is that some products weren't around during some of the historical scenarios – e.g., in using the Fall of 98 for managing mortgages. We asked specifically about the effectiveness of the scenarios in capturing relative value positioning (thinking in the hedge fund context). Mike's response was that the changes in curve shapes, etc. that occurred in the historical scenarios are applied (in the risk factor bucketing), but of course portfolios could be sensitive to other moves. (Talk with Rupert more at some point).
- Judy mentioned they were thinking about how to change reporting to the CPC, which meets weekly; saying they currently give them a ton of data, but not necessarily a lot of information. We asked that they share with us any new packet, if it comes to be. She also asked about increasing the threshold on the top exposures list, which we said we would be open to (currently at \$25 million). We have to think about if we want to request anything else, like top PEs, or top CE and PE changes?

### **For Memo**

- Following a material loss in February, Bear's Adjustable Rate Mortgages (ARMs) and Non-Agency CMO desks, which are the most significant to its overall Mortgage business from a risk and P/L perspective, had a combined profit of just \$3 million in March. However, the desks were able to securitize and sell over \$10 billion in collateral throughout the month, in an attempt to keep things moving through the pipeline and create some momentum in the market. We will continue to discuss in detail the success of the mortgage desk's in turning over assets, as well as the work done by risk managers in price verifying existing inventory.
- As discussed last month, Bear's Independent Model Validation Group (within the Risk Management Department) is currently operating with insufficient staff. As a result, the Model Review Committee did not conduct its most recently scheduled quarterly meeting. The chair of the Committee (who is the also the Chief Risk Officer for Asia and Europe) is currently focused on hiring a new manager for the group. In the interim of re-staffing the dedicated model review team, he is having the more technical product line risk managers perform the most pressing model control work. We will discuss the status of the model validation function again next month.

## **Bear Stearns Packet Dated May 30, Meeting held on June 20**

### **DPG bullets:**

- **Bear Stearns Asset Management (“BSAM”) Update:** As of late June, both the BSAM “High Grade” and “Enhanced Leverage” funds had been significantly de-levered, largely via bilateral agreements involving the sale of BSAM assets to the fund’s secured lenders. Consequently, total asset values as well as the size of outstanding repo lines had been reduced to a fraction of April levels for both funds. During this unwind period, Bear Stearns (parent) agreed to become the sole secured funding provider to the High Grade fund, taking all remaining repo counterparties out of their positions. While Bear’s June 22<sup>nd</sup> press release asserted the firm was establishing a \$3.2 billion repo facility in order to accomplish this, only \$1.6 billion was required (as of June 25) due to further success in selling High Grade’s positions, thus repaying credit lines. At that time, the value of the cash and collateral securing the new repo line was estimated to be between \$1.7 and \$2 billion. Meanwhile, Bear has not replaced any of the Enhanced fund’s outside funding, as it appears there is no remaining investor equity to preserve.<sup>1</sup>
- As discussed in last month’s memo, Bear Energy announced in May its agreement to buy the power portfolio of Williams Power Company. The portfolio consists of power plant tolling agreements, a set of full requirement power contracts, and an associated hedge book (which includes futures and other contracts). OPSRA staff reviewed the proposed regulatory capital calculation for the William portfolio during the June meeting. The standalone one-day 99<sup>th</sup> percentile VaR for the portfolio is currently estimated to be around \$50 million, which is greater than the current Bear Stearns holding company VaR of under \$40 million. Separately, during the month risk management hired a new Chief Risk Officer for Bear Energy. This individual, who is coming to Bear from Suez Energy, brings considerable risk management experience in the power and gas trading space.
- Bear’s Non-agency CMO desk lost approximately \$110 million in May, largely due to write downs on second lien and subprime residuals. However, the Mortgages business as a whole made nearly \$200 million due to gains elsewhere. For instance, the Global CDO desk, which was long credit protection in 2006 vintage subprime and second lien tranches, made approximately \$90 million. In addition, the ARMs desk made over \$100 million due to a combination of factors including new deals and mark-ups on option ARM residuals as well as structured IO positions, the latter of which was driven by slowing prepayment speeds. We will continue to discuss mortgage P/L in detail with mortgage risk managers, as well as the price verification work done in this space.

### **BSAM Update**

At the time of our meeting Bear was focused on executing de-levering transactions in order to maximize the funds available to return to investors. From an internal risk

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<sup>1</sup> Bear personnel have articulated that the firm was stepping in as creditor to the High Grade fund in an attempt to prevent a fire sale liquidation and maximize recovery to the fund’s investors.



perspective, there was \$36 million in Bear money invested in the two funds, and Bear had done a de-minimus amount of trading with each fund (see also earlier emails from Matt E.). Mike Alix pointed out that BSAM had its own Risk Management department, which has a focus on monitoring the portfolio managers adherence to the stated fund strategies (we actually didn't talk about the BSAM Risk Management department during our principal investments meeting – only the existence of a Risk Committee and the capabilities of Bear MeasurRisk). Subsequent to our meeting, we learned that the Executive Committee asked to have Mike Alix take a more formal role in the risk oversight of BSAM, especially from the perspective of liquidity risk management (it was subsequently reported in the 7/3 WSJ that BSAM risk managers would start reporting up to Mike).

At the time of this discussion the proposal for an all creditor stand-still, with Bear taking on 15% of all the secured lending, had just died, as many of the creditors were not comfortable with the proposal. Separately, four counterparties had reached bilateral agreements to buy portfolios they were financing, and several others were in the process of negotiating such purchases. Mike A. said that we could end up seeing \$4 or \$5 billion in assets sold in this manner, with cash coming in/lines being repaid (it actually ended up being more than \$5 billion – see 6/25 update email from S. Spurry). He noted such bilateral agreements represent the middle ground between a creditor stay and creditors seizing collateral and putting it up for auction. Through the latter approach, the fund would not be agreeing to the price at which the collateral is sold, and the lender could be introducing the assets to a bunch of new parties that don't know those assets well.

While the High Grade fund was not in default/had not missed any margin calls, creditors were cutting off its liquidity by increasing haircuts or not rolling repo facilities. At this point it was felt that Enhanced's investors would have significant losses (while the fate of High Grade investors seemed less clear). By the end of the week the perception was that all of the equity in Enhanced had been wiped out, as well as part of the mez loan provided by Barclays.

We asked about the possibility of other funds (i.e., third party funds that are counterparties to Bear) who have ABS strategies running into similar difficulties, as it seems this sort of pain could not be isolated in the way that the Amaranth losses were. Bear's credit risk managers have been looking at counterparties active in this space; Bear has approximately \$1 billion advanced against CDO, CDO-squared, and CLO tranches across "dozens" of hedge fund counterparties. We asked how likely it is that there are other funds out there that should be getting hit as hard as BSAM Enhanced. Mike said that the Enhanced was net long quite a significant amount relative to its capital, and that the funds Bear was facing as counterparties did not appear as long or levered in the more complex part of the market. (Jeff Farber made the comment that it only would have taken a 2 or 3% decline in the underlying assets to put Enhanced down 18%.

Mike noted that, going forward, it was going to be important to see the reaction of investors with redemption rights (particularly FoFs) in this space.

## CDPCs

Intra-month we requested to make credit derivative product companies (CDPCs) a discussion item, given that Bear was planning to launch a CDPC, but also from a broader counterparty perspective. This initiative was actually being sponsored by BSAM, by “some of the same individuals” involved in the High Grade and Enhanced funds. Consequently, the plans to launch the company had been put on hold/cancelled. It was also noted that it was unclear what the status of the Evergreen IPO was, as Evergreen was also managed by the same fund manager (we later heard that Bear had cancelled the Evergreen IPO).

From a counterparty perspective, GCD’s view has been one of “enormous skepticism”, as “the ability of the counterparty to meet the claim is going to be impaired by the market condition causing the claim”. As a result, Bear has “modest” exposure to these vehicles. Namely, they did some trades with Primus, which was the first CDPC and did only single name trades. Rupert thought there was only one other CDPC that Bear had done trades with, and actually had a CSA (with a non-trivial threshold) with that one. We asked about who was buying protection from the new CDPCs, which sell super senior protection at massive leverage levels. Rupert thought it might simply be dealers or banks that had sold super senior protection to customers and were hedging their MTM P/L volatility.

Mike also said they viewed monoline insurers in the same light as CDPCs.

## Market Risk

Kan noted that the quality of the VaR attribution was still something that he was looking at, as some of the marginal numbers he gave us last month changed quite a bit after the subsequent VaR re-run. He wasn’t quite sure what to make of those results at that point.

Firmwide 1-Week VaR was down slightly from \$63.6 million to \$60.3 million. Interestingly, while Fixed Income VaR was essentially driving 100% of firmwide VaR last month, its contribution had fallen to around 85% this month. The main driver of this was Bear Energy, which exhibited a VaR increase of \$2 million to \$5.3 million (not including the Williams Portfolio).

## **High Yield and Distressed**

The Distressed Desk – made \$33 million, having an “overall good month”. Large gains were made on Safety Clean (?) and Adelphia. \$5 million was lost on Delta, bringing YTD losses on that name to \$25 million (LTD is about flat). The total airline exposure is approximately \$340 million. The desk is also close to buying \$180 million in airline pension claims (it already has \$170 million). Kan didn’t really know the details of the nature of this type of position (perhaps follow-up).

This desk (as well as Credit Trading) also has a growing number of equity positions. Most notably, it lost \$5 million on a \$220 million short position in subprime names, as

some of those names rallied during the month. Separately, the desk also increased its short position in the high yield index (I didn't know they had an index short on, Jim?).

### **Leveraged Finance**

Leveraged Finance as whole made \$31 million - \$14 million came from eight bank debt deals and about the same was made on 4 bond deals (Capital Markets desk). The firmwide VaR attribution for LF fell from \$20 million to \$7 million, which is a number that Kan has been watching due to its instability.

Bank Debt – We did not meet with Marc due to a relatively full agenda (and Kan had to go to a 2:00 meeting; if this happens again we might need to request they block out until 3:00). Looking at the bank debt report, Bear's Offered-not-Accepted Non-IG commitments fell considerably, after reaching an all-time high last month. These 1-signature commitments grew from \$10.1 billion to \$25.2 billion from March to April, and then fell back to \$13.4 billion in May. The decrease occurred as \$11 billion in deals were terminated, and nearly \$10 billion were transferred to the Accepted-not-Closed (ANC) column. Consequently, the ANC non-IG commitments were up from **around \$5.2 billion - check** to \$12.7 billion. (I believe this is high for ANC, check history).

It appears that no outsized commitments were approved by the PAC in May, as the largest approved commitment was \$3.45 billion (rated B-).

Note the ANC total on Tab 4 doesn't tie to the new Pipeline Commitments line on Tab 1; ask why. In any event, Pipeline Commitments were up from \$10.2 billion to \$19.2 billion, due to the increase in Non-IG ANC commitments mentioned above, as well as an approximate \$3.5 billion increase in IG commitments (from beginning of May, check versus April end).

### CLO

CLO Accumulation (note CLO Accumulation is no longer its own separate line) moved approximately half of its second lien inventory, reducing that position to about \$120 million.

### **Mortgages**

Mortgages as whole made \$190 million; however, this was the net result of many significant ups and downs. As noted below, there were significant mark-downs on subprime and second lien residuals, and there continues to be deteriorating performance in the 2006 subprime and second lien loans. In total, there was approximately \$280 million in remarks that were largely offsetting (some longs and shorts), which are "significant revals". Last month Kan had largely had described the mortgage market as exhibiting a recovery. This month he said that it turns out this wasn't really the case.

In terms of VaR attribution, Fixed Income currently accounts for \$50 million of the firm's \$60 million VaR. Within Fixed Income, \$30 million is attributed to Credit, Rates, and FX, and \$20 million to Mortgages. Finally, within Mortgages, the \$20 million is split evenly (10 and 10) between the ARMs and Non-Agency CMO desks.

Agency CMO Desk – made \$20 million, \$15 million of which came on 22 new deals (on \$4 billion in collateral). The desk had been running a fairly significant VaR of \$13 million last month due to a TBA roll trade. That trade settled and the VaR fell to \$7 million.

ARMs Desk – made \$110 million. \$23 million was made on 6 new deals of \$2.9 billion in collateral. \$45 million was made on mark-ups on Option Arm residuals, and \$40 million was made on servicing and structured IO positions. The net market value position fell by \$243 million to \$9.5 billion.

In terms of the Option Arm Residuals, John explained that the desk had gotten some trading volume going, and was able to observe cumulative loss curves at different levels than where it had been marking. He said they also could have taken similar mark-ups on subordinated notes, but did not due to the lack of trading volume there. The gains on the structured IO positions, and to some extent servicing, were attributed to slowing prepayment speeds (longer annuity stream), which was overwhelming the increase in delinquencies. (There was also something about “catch up payments” on the servicing side).

Non-Agency Desk – lost \$110 million, driven by write-downs on second liens and subprime residuals. The desk did do 3 new deals on \$6 billion in collateral, making \$12 million. It also made \$9 million on a bulk sale of \$450 million of subprime loans. The net market value of the desk’s positions decreased from \$9.24 billion to \$7.3 billion (lowest in a long time).

More of the Non-Agency losses came from long synthetic positions than from cash positions. John described this as the third waive of write-downs, which involves the same sort of analyses we have talked about for the previous waives. (I believe he also said that the desk was currently holding about \$600 million in second lien loans, which it can’t do much with; and is not buying any more). Broadly speaking, he said they expect to continue to face re-pricing in the market.

Commercial Conduit –made \$31 million, 80% of which came from EOP.

Global CDO – made \$93 million, as the desk was long protection on 2006 subprime and second lien CDO tranches (the CDS actual reference CDO cussips). We also asked about how hard the CDO Accumulation business had been hit. John said they recently did 2 multi-sector deals that took \$25 million in losses on (Neptune and one other), and that CDOs were “dicey deals” with “dicey collateral pools”. We asked if this business was winding down; he said it would continue to shrink and that laying off risk there is a big focus right now, but he didn’t know if it would go away altogether. (I believe he said that could still be as large as \$2 billion currently – follow up next month).

**Foreign Exchange** – made \$14 million, and the desk’s VaR grew from \$400 thousand to \$5.3 million. The risk manager suspected the desk’s options risk may be overstated, and is being investigated. (Look for next time).

**Fixed Income Derivatives** – lost \$12 million for the month, as this business is having a “tough time”. The NY Flow options desk lost \$14 million on “core positioning” (rates backed up 25 bps) and on a volatility calendar spread position. The risk manager noted that this desk recently hired a new trader, who is already down \$15 million.

This business has been building up its ASIA operations, and did its first Vietnamese swap and Malaysian FX option during the month.

**Municipals** – a prop desk within Munis lost about \$10 million on rate moves. In all, the firm lost about 30 million on rates during the month.

### **Fixed Income Investments**

Max Recovery – made about \$30 million, \$12 million of which was due to a change in the valuation methodology to a yield based approach (I don’t have very good notes on what this change entailed, something about essentially changing the discount rate by using a perspective yield?). Separately, the risk manager noted there was some re-calibration occurring for the UK model, due to the fact that the servicer was “slow to pass on some data points”.

**Credit Trading** – had a “stellar month”, making \$85 million. Vox made \$18 million on about 30 trades, and the desk currently has a pricing reserve of about \$18 million due to mark differences with Markit. Regarding the previously discussed dealer dispute, Kan said that, because the two sides were unable to reach an agreement, the next step was to go to a dealer pole (apparently this is in the CSA). However, (I believe the other counterparty relented before that actually occurred). Kan also clarified the fact that Bear had never actually posted the margin it was on call for by the other dealer.

Trading was good basically everywhere else in Credit as well. Global Structured made \$18 million, HG Flow made over \$20 million, and HY Flow made \$18 million.

Credit Trading’s equity position is currently at its largest level the risk manager has scene (I thought he said \$25 million, but that seems too small?). Some of this is comes from restructurings, while other positions come from capital structure arbitrage and other prop plays. The business is also currently running a fairly significant short spread position (- \$35 million Pops). Also, the risk managers are looking into changing the manner in which spread sensitivities are computed for risk purposes. The current methodology entails bumping each name individuality, but due to the current significance of the cross terms, this approach is being re-visited. (Note the Credit Trading VaR moved very little, which was not discussed; look out for next month)

**Equity Derivatives** – made \$74 million. The Asia business “continues to do well” (didn’t get P/L breakdown). The business had an operational risk issue, where there was

a “mis-processed” corporate action on 1 of 6 exotics transactions (a trade dating back to 2005).

**Risk Arbitrage** – made \$18 million, but has since given all of that back in June. The desk has requested another limit increase to \$2 billion (long MV), which is currently under discussion. (Follow-up next time, it seems a little counter-intuitive that they would keep feeding these guys with all of the P/L volatility they exhibit).

**Principal Strategies** – made \$34 million. There was a noteworthy trade that came out of the “CDO Arb book”, that involved a distressed high yield backed CDO that was downgraded to CCC following 1998. This CDO was bought in the 30s (when?), moved into a trust and restructured, and some of the resulting paper was put into another re-securitization (Rhino deal?). The result of this was (I believe a re-mark on the remaining position up to the 60s?).

Separately, the Math Arb book, which is about \$1.5 billion in size, made \$8 million.

### **Model Review Update**

RMD did hire the individual mentioned last month, who will work primarily on credit models. Also, two additional hires could be imminent; although it did not sound as if RMD has honed in on a candidate to head the group. The Model Review Committee did meet intra-month, and Kan described the meeting as productive, with a good variety of FAST and other business people present. He said they needed to really re-establish the framework by year end.

As part of our update, Kan walked us through the “High Level Summary” of the meeting. See handout

**Bear Stearns Packet Dated November 30, Meeting held on December 19th**

General Market Conditions and Opening Remarks (Mike Alix)

Mike kicked off by saying that it was a "historically disappointing" month, quarter, and year, and that there was "no sense of happiness" at the firm. The mortgage business incurred subsequent losses to the \$1.2 billion announced mid month (for the quarter), driven by continued erosion in values for Alt-A, ARMs, and commercial mortgage assets, as well as the underperformance of hedges. The book has been further reduced by billions of dollars and the firm is actively restructuring its hedge program (more from Dan below). Mike remarked that they had "blown a hole in the mortgage business". Along these lines, it does not seem clear that there will be many revenue generating opportunities for the residential securitization business in 2008 (Mike said they would "hopefully" restructure and restart the factory in 08 - see last month's note as well). But there should at least be good distressed investing opportunities in the mortgage space.

The remittance reports for Alt-A and ARMs trended badly into November, resulting in an increase in cumloss expectations. The desk is finding that HPA is a much more important driver of loan performance relative to credit quality (FICO) than was previously observed. Mike said that mortgages may be becoming viewed more like margin loans by some people. With a margin loan, a borrower might consider whether he/she really wants to own a stock when faced with a margin call. Along these lines, a lot of home owners who bought at LTV ratios greater than 80% from 2004-2006 are now in "underwater mortgages", and may decide to default and move to an apartment.

Other topics briefly addressed:

- Mike was named the chair of the New Products committee, replacing Bob Steinberg who is semi-retiring but will continue to consult Mike.
- Bear signed up to the ACA forbearance plan, agreeing not to make collateral calls. If ACA does not have to post collateral it should be 2 or 3 years before protection payouts deplete the firm's equity, and there is some hope amongst counterparties that there could be some additional capital infusion (but why would anyone put in equity to cover pre-existing losses?). However, this plan also requires counterparties to keep making premium payments. Mike said when they did the analysis it was determined that these additional payments are de minimis.

The \$175 million super senior ABS CDO that Bear purchased protection on from ACA is now marked at \$30 million, resulting in a \$145 million claim against ACA that is fully reserved (there are also a couple other small trades with ACA). Bear is also taking significant reserves against its other monocline counterparties; Mike said they are doing this by basically discounting the swap cash flows at a rate reflecting the monocline spreads (is this surprising at all, or similar elsewhere? It sounded like Merrill is simply taking some % of MTM).

- The Commercial desk priced and distributed a \$500 million unsecured (i.e., super subordinated) tranche of the Hilton commitment. The tranche priced at Libor plus 450 basis points, which seemed aggressive. Interestingly, this was the result of a

reverse inquiry by existing credit protection buyers. Because the company is going away, this unsecured debt is the only debt that will be available/eligible for delivery under existing CDS. (As an aside, the rating agencies did allow the loan to be securitized as one deal, as opposed to having a separate bank loan deal for the slug that was intended to be securitized by the franchise royalties). Thus this "technical issue" was quite fortuitous because it significantly reduced market risk in a time when market sentiment was not great. The desk's current (as of our meeting) Hilton position net of circles is \$4.8 billion, which had been marked down by \$70 million (not sure over what time frame). The desk was expecting to distribute a couple more \$600 million mez slugs over the next two weeks and be substantially out of the position by the end of January.

Mike confirmed earlier accounts from other firms that European mortgage markets were closed. Bear did a Rooftop securitization but held the securities on balance sheet so that they would be ready to distribute when the market re-opens.

- Leveraged Finance is no longer an issue for the firm, as Chrysler is mostly all that remains.

### Mortgages (Dan)

Mortgage losses for November were around (\$1.3) billion. From the white book perspective (provided by Kan): ARMs - (\$525) million, Non-Agency - \$115 million, Commercial - (\$30) million, CDO - (\$480) million, EMC - (\$100) million, ABS/SS - (\$280 million). When asked for a bit more color on the losses, Dan said it basically boiled down to 1) \$550 million in write downs on near prime products and ARMs, \$730 million in mark downs on the ABS CDO book which is being dismantled (offset by \$150 million in gains on ABS CDO PAUG shorts), and 3) \$80 to \$100 million in commercial losses.

The Mortgage business's net market value of positions was down \$2.5 billion since October despite the Hilton closing, and down \$7.5 billion ignoring Hilton. However, the total book is still around \$43 billion. As of December 13<sup>th</sup> the desk was net short subprime loans and RMBS by about \$1 billion (\$500 million at the end of November), and had only a \$630 million position remaining in ABS CDOs (\$730 long by \$100 short). Meanwhile total Alt-A exposure is north of \$12 billion (Dan said \$8 billion US, \$2 billion Rooftop, \$1.8 billion of balance sheet via WANCO/PIMCO, and \$900 million GIC book). And as of the end of November the commercial net market value was around \$16 billion (I believe around \$14.5 of that is whole loans).

Thus Dan said the firm is still too long, most notably AAA risk (not to be confused with AAA CDO risk). He said the desk has only \$200 million in Alt-A PAUG swap shorts and that they don't trade the TAB X. He also said the \$1 billion subprime short they have built up was partially to hedge the Alt-A book, but he clearly was not happy with the current profile and said they are really pushing the desk to come up with additional shorts. It sounded like he was particularly concerned on the resi side, noting the lack of data for and negative view of Option and Market Value ARMs. While it is quite challenging to hedge right now, he said doing nothing doesn't seem right. Therefore, the desk has been given the mandate to reduce risk even if it means paying a very high cost for protection or taking a lot of basis risk along the way (he



talked about the possibility of putting on yield curve steepeners, which typically works well as a hedge to a recession, and Mike Alix mentioned more macro hedging).

On the commercial side, the desk currently has about \$4.5 billion in hedges on the CMBX as well as a Lehman index (mostly AAA in either case). The desk also had some recent success from the perspective of sales. In addition to the sale of the subordinated Hilton tranche discussed above, there was recently a \$700 million whole loan sale out of London and the desk printed a \$550 million U.S fixed rate deal, selling almost all of the securities. (Apparently fixed rate commercial deals are less leveraged than floating rate deals and thus more securitizable – something Lehman mentioned as well).

### Leveraged Finance and CLO (Marc and Helen)

- The unwind continues. The PAC has not approved any new LBOs and the pipeline is down to about \$500 million, consisting of two names (Harras and Cinaburst) which will close in January/February (the later is down to \$60 million I believe).
- \$1 billion of the \$2.05 billion remaining funded and non-syndicated exposure is Chrysler (I am guessing a piece of this might be Hilton as well, which shows up mostly in the IG numbers?). This loan was marked at 96 in October but there weren't any buyers at that price in November, so the position was marked back to 93. The bank group has agreed to not try to syndicate again for another 3 months.
  - Another name Marc mentioned was an east coast railroad bought by Fortress. I didn't get the numbers on this one but he mentioned that Fortress put 40% equity into the purchase and that the company also owned a lot of real estate, which could result in some CMBS issuance.
- Bear is doing some best efforts transactions. Other than that, they are waiting for the market to come back.
- CLOs (Helen) -
  - The loan market was "extremely negative" in November without the CLO machine (definitely felt better in September and October)
  - Bear is down to \$1.8 billion in CLO inventory not counting the desk's first loss protection, and half of that is expected to price in January.
  - There is no CLO bid. Buyers are opportunistic hedge funds, etc. Marc said he thought the private equity firms would also get into leveraged finance, noting a gym from Bear's business just went to Carlyle.

### Kan's Risk Summary by Desk

Kan's broad assessment of November was that there were "very tough markets". The Firmwide 1-day VaR was up by \$21 million to \$69 million. This not at all a function of increased exposures, but rather is due to time series volatility and the inclusion of some of the Energy book into the firmwide calculation. We asked Rupert if they had begun rolling the time series (they had not yet amassed for years of data for many books during the CSE review). He said that they were not rolling the data, but rather were extending, as the data window now goes back to 2002. Surprisingly, he appears to have no intentions of starting a roll, as he said he feels more data is better than less data (but that he thought they were using just 4 years for the regulatory VaR calculation). Follow-up?

**Leverage Finance** – had a loss of only a couple million dollars. While the Chrysler loan was marked back to \$93, part of the loan was repaid at par, resulting in a gain on that portion.

**Credit Trading** – had a very large loss of \$125 million. Most of the losses came from Flow products, as the Structured Credit customer business was down around \$5 million and the Structured Credit prop desk was basically flat. The prop desk was showing large cushions relative to Markit and the desk was recently mandated to conduct a number of trades to reduce risk and assist in price verification; consequently they “took” \$10 million of the cushions into P/L.

Flow losses were attributed to general spread widenings as well as losses on curve steepener positions in individual names. Most notably \$20 million in losses were on auto names. The desk has been and continues to cut its steepener positions (on a name-by-name basis). Losses were also incurred on some illiquid perpetual bonds and some off-the-run indices (taken at month-end).

\$20 to \$30 million in losses were incurred via counterparty reserves (CVA), driven both by counterparty spread widenings and exposure increases.

Kan mentioned there was some kick starting of the price dispute process with JPM on the CDO tranches discussed in several previous months. He said they are at least actually getting some analysis from JP now.

**Emerging Markets** – which “hasn’t hit the radar in ages”, lost \$24 million on Argentina spreads (which blew out), rates in Brazil, and \$/peso FX. We agreed to receive an Emerging Markets business update in either January or February. And Kan mentioned there was recently a firmwide announcement regarding this business, which is a rare occurrence at Bear.

**Fixed Income Derivatives** – was tipped over to a small loss due to the increase in CVA. A \$12 million reserve on the long skew position (disaster protection) was released, as the position disappears (I believe as positions expired or came closer to at-the-money). Kan mentioned some yield curve option trades (e.g, the option makes a digital payment if the 2 year rate exceeds the 30 year rate) of the Exotics desk that were on the “watch list”. This is typically a one-way market, but the position was recently remarked after Bear got some bid-offer quotes in the dealer market (marking implied vols for these positions requires correlation inputs). Kan also said they were still having some yield curve construction problems (discussed last month), as things were not yet back to normal. Finally, we asked about the PRDC book, and he said that the FX scenarios were pretty well hedged with long dated options.

**Municipal Derivates** – had a loss of \$14 million (missed the details).

**Governments** – had a loss of \$7 million. While this is not a large loss, it is rare for this desk to lose money.

**Equity Derivatives** – had a large loss of \$48 million. \$12 million in losses were due to the final close out of the Hong Kong warrants positions (bringing the total loss on that position to \$142 million). \$23 million in losses were due to tax credits that had to

be reversed out of BSIL (something pertaining to dual taxation treaties the UK has with a number of countries?). There were also some month end correlation remarks on the exotics book.

**Risk Arbitrage** – had a large loss of \$26 million due to two deal breaks (\$17 million) and general deal spread widenings. About \$200 million of the remaining \$1 billion book is in LBO related positions (“rumortrage”), for which the firm faces a \$40 million down scenario.

**International Equity** – made \$29 million.

**Principal Strategies** – made \$12 million and had a good year, exhibiting good P/L on a relatively small VaR. The three main strategies in PS are a converts related strategy, a credit relative value desk, and the math arb book.

#### Model Control Update (Jonathan)

See Jim’s write-up (file “model\_review update\_12\_19\_2007”)

#### Counterparty Credit (Judy)

- A column was added to the net exposure reports for Bear Energy exposures, which currently stand at \$610 million.
- A few margin loan exposures were added to the capital calculation for non-netting related issues. Namely, there is a haircut treatment being applied to certain fixed income instruments in the PE modelling for clearance accounts (where the RiskMetrics equity VaR model is used for PE I believe), which results in non-zero PE for some concentrated accounts. Thus they did not feel they should operate under the assumption that the risk was fully covered. Judy said they want to migrate the PB positions over to the same PE models used for OTC derivatives (CreditLab).

We also gave the heads up that will we want to have a session in one of our monthly meetings in 2008 to discuss and demo RACS II, once the new system has been in production for several months.

- The Williams Company shows up as #23 on the top exposure list. The original derivatives portfolio from the acquisition was initially booked as a TRS to Williams, and Bear is in the process of assigning these trades to the individual counterparties. One of these counterparties (I missed the name) has posted collateral in the form of a letter of credit. Credit will include the exposure for the amount covered by the letter in the banks exposure profile.

#### For Monthly Memo

- November was a “historically disappointing” month for Bear. The Mortgage business alone had losses of approximately \$1.3 billion, and other desks incurring non-trivial losses included Credit Trading, Equity Derivatives, Risk Arbitrage, Emerging Markets, and Municipal Derivatives.
- Mortgage losses were attributed to continued erosion in asset values across subprime, Alt-A, ARM, and commercial collateral, as well as to the

underperformance of hedges. Bear continues to actively reduce its mortgage exposures; however, the firm remains quite long Alt-A, ARM and commercial assets. Thus, as the desk is now net short subprime mortgages and securities through derivative hedges, and has a relatively small net long position remaining in ABS CDOs, the primary concern of risk managers is the long AAA exposure in higher credit quality loans and securities. Senior management has mandated the desk to further reduce risk. However, hedging is challenging given market liquidity and the lack of any indices for directly shorting Alt-A collateral. Risk management is therefore pushing the business to somehow devise shorts, even if it means paying a high price for purchasing protection or incurring significant basis risks, as “doing nothing doesn’t seem right”.

- A \$17 million loss incurred by the Emerging Markets business brought the desk onto the radar screen for the first time during our monthly risk reviews. We agreed with the market risk manager to schedule a briefing on this desk in the upcoming months to discuss recent developments in the business and plans going forward.
- The new Model Control head briefed us on his plans for rebuilding the group in 2008. This included staffing plans and anticipated workload, changes to model review processes and focus, and plans for enhancing the regression testing used to control changes made to existing models. We will continue to track progress along these fronts and will reestablish our periodic reviews of current developments with model control personnel.

## **Bear Stearns Packet Dated October 31, Meeting held on November 19th**

### General Market Conditions (Mike Alix):

Mike kicked off the meeting by stating that Bear had significant difficulties generating revenues in core products (mortgages, credit trading, and leveraged finance). He noted that volumes were weak, liquidity poor, and hedges only erratically effective. (This sentiment is something that the rating agencies commented on after the \$1.2 billion write-down Sam Molinaro announced at the ML conference on November 14<sup>th</sup>. On Nov. 15<sup>th</sup>, S&P downgraded Bear's long-term credit rating to A from A+, but affirmed its A-1 short-term rating stated that "The expected net loss brings to light the extent to which the company is concentrated in fixed income business, which we believe is an underlying structural weakness in revenue generation."

During the month they moved reasonably aggressively to get shorter in the mortgage area. In the commercial space, they bought protection on more junior tranches of CMBS. In ABS, they shorted the ABX in the higher tranches as their shorts in the BBB tranches have "played themselves out" now. They also added some macro plays such as curve steepener (2/10 trades) and short CDS on baskets of industries correlated with real estate.

#### On the mortgage front, Mike also noted a few additional points:

(1). There is an inflection point with respect to further declines in HPA, where the hedges (referencing early vintages 04, 05, and early 06) will start to outperform the net long exposure Bear has in the later vintages. The firm is currently working on stresses in this area to put numbers to the various changes in HPA assumptions. (See notes on mortgage discussion with Dan Chen below for more details.)

(2). With respect to the mortgage "factory", they are re-tooling to originate Prime Agency but recognize that this is a very competitive, lower margin area of the mortgage business.

In addition to Kan's comments on the various whitebooks, Dan Chen came in to discuss the mortgage desks in detail and Marc came in to discuss Leverage Lending. Finally, Rupert, Wayne, and Samuel Gilman gave us a presentation on "Financial Guarantors"- covering both direct and indirect exposures to monolines and CDPCs. That followed with our brief discussion with Judy on the counterparty credit risk reports.

### Kan's comments on Risk Summary by Trading Desk:

The Trading division lost \$208 million for the month of October (subject to final month-end adjustments from Controllers) with the biggest losses coming from Mortgages (down \$327 million on the month) and from Equity Derivatives (down \$80 million on the month- due to the loss on the Hong Kong warrants discussed in detail last month).

Distressed Desk- was one of the bright spots as it made \$37 million on the month primarily from gains in airlines (\$10 million) and \$12 million from the LDN book (which

is only net \$300 million in long inventory). In addition, the desk made \$6 million in profit on the sale of 2 airplanes (it still effectively owns 10 airplanes through positions in debt and/or equity). Kan noted that the gains on the airline positions (Delta and Northwest) have reversed somewhat in November.

Leverage Finance- the desk was up \$48 million. The largest chunk of this was writing up the \$1.5 billion Chrysler loans from 94 to 96 which generated a \$30 million gain. However, post month-end the 96 mark is in serious question given the blow out in spreads on the LCDS in November. The trading desk also recorded \$15 million of its total \$18 million in profit from a rebate (i.e. internal transfer) from the LDN mortgages desk against CLO accumulations. (We didn't get any specifics regarding this point).

VaR for the desk increased from \$40 to \$47 million (weekly 95%). Part of this increase relates to two events: (1) the booking of a \$2 billion bridge financing commitment to Schering Plough (investment grade) and (2) spreads blowing out on monolines to which Bear has participated in liquidity facilities (i.e. relationship loans) to the tune of \$140 million (gross of hedges).

*(See further details on the leverage lending business and exposures in Marc's comments below.)*

Credit Trading- lost \$30 million on the month. The losses were split between flow and structured.

Kan noted that as has been the pattern over the past couple of months, the credit curves marked at month-end have generated significant mark-downs, \$15 million this month. The issue at hand is that there are several less liquid curves, including "off-the-run" indexes, that are 1-2 basis points off of when they mark to Markit consensus data at month-end. This has generated discussions between risk management and the business regarding two issues.

First, are the daily p&l numbers providing the right signal to risk managers if the curves are not being marked (or marked accurately daily)? Kan said that the traders focus on the key names intra-month. Risk management is looking to make sure the daily prices are accurate so that the signals provided by the daily P&L explain are relevant. Secondly, is the quality of the Markit consensus data good? Kan said that recently, they have evidence to suggest that the curves submitted to Markit by some dealers may be suspect. The dilemma is whether they should mark to consensus data, particularly if doing so will artificially align them outside of marks being quoted on broker screens. Kan also noted that the dealers with the best trade information (i.e. the ones actually trading the names, etc) could be thrown out of the survey (i.e. be the high or low quotes) while firms that just submit last month's data can probably remain in the survey (i.e. keep within the upper and lower bound). Obviously, this is not the kind of marks that Bear wants to use; they want to get quotes from those actively trading the names.

Kan said that they are going to both: (1) engage Markit about the data quality and (2) look for alternatives- broker quotes.

Credit Trading VaR was up from \$22 million to \$39 million. A good chunk of the increase is under investigation. The conjecture is that the VaR for the structured credit is overstated. (Follow up on this at next month's meeting.)

Fixed Income Derivatives- lost \$15 million. \$10 million came from NY Options flow desk which saw losses from being long Vega. Kan also noted that the Tokyo rates flow business had been bleeding money from short Vega positions at the front of the curve. He said the loss was exacerbated by difficulty in constructing the yield curve. Apparently the issue was with not capturing the basis between the 3 month future and the 6 month forward contracts traded in the broker market. In the past the basis was around 1 basis point but has recently widened to 6 basis points.

Equity Derivatives- lost \$80 million. \$110 million of the loss came from the Honk Kong warrants discussed last month. This \$110 million reflects taking into P&L all the "spread to zero" on the positions, effectively, the loss if no trading were to occur and the positions (longs and shorts) were held to expiration.

Risk Arbitrage- was up \$16 million. However, in November so far they have realized big losses on a couple of names where the deals have broken or are now expected to break: (1) \$14 million loss on an \$80 million position in Sainsbury and (2) \$10 million loss on United Rentals. Kan noted that these losses were "somewhat" in line with risk management projections given a "break" (i.e. in the right order of magnitude although the losses did actual exceed risk management projections but no further details were given).

Principal Trading Strategies- \$55 million. ½ of the gain came from the math arb strategy (8-9 record days). When asked Kan did say that it had hit a plateau in the last week relative to October. The math arb strategy was reduced to \$750 million X \$750 million before the GS infusion into its Geo funds. Previous to that time the book was \$1.1 billion by \$1.1 billion.

### Mortgage White books Discussion:

Dan Chen talked from a series of spreadsheets he provided. They covered, the change in positions from August 31<sup>st</sup> to November 9<sup>th</sup> (to provide details for the P&L/write down comments that CFO Sam Molinaro made in November at the ML conference); breakdown of long cash positions by underlying collateral and rating; details of protection purchased (and sold); and details of counterparty credit risk on credit protection purchased on mortgage related positions.

### Write-downs and Positions:

The big story of the month was the \$1.2 billion write down in the mortgage area. The write downs were primarily coming from two areas: (1) ABS CDOs and (2) Alt-A cash write-down.

### ABS CDOs:

The ABS CDO inventory consists of both inventory from the BSAM High Grade fund and the remaining from a CDO warehouse. I believe about \$500+ of the write down Sam discussed came from the repricing of the ABS CDO positions from High Grade and around \$250 million from the positions in the CDO warehouse. Dan said that some of the factors looked at in re-pricing the ABS CDO positions included new rating agency feedback- that subordination for AAA moved from 35% to 60-70% subordination.

With respect to the CDO warehouse, I believe that part of the collateral was kicked out of the warehouse subsequent to rating agency downgrades and then the remaining collateral in the warehouse was priced. The current warehouse position has been eliminated as BS printed a new CDO (CODA). (Follow up on where the exposure now resides- is it now just in the direct ABS CDO exposures?)

The Total ABS CDO related exposures decreased from \$2.073 billion at 8/31/07 to \$884 million on 11/9/07. \$704 million of the remaining exposure is Mezz Super Senior AAA rated tranches (both cash and synthetic). It was these Mezz positions that took the most substantial mark-downs during the 4<sup>th</sup> qtr. I believe Dan said the Mezz Super Seniors are now marked in the 50s.

### Alt-A exposures:

At 11/9/07, BS has \$9.9 billion MV of Alt-A inventory, by far the largest long cash inventory position in the mortgage space, compared to \$1.84 billion MV of subprime RMBS (cash only) and \$2.6 billion (scratch and dent) and \$739 ABS CDO (cash only). Dan said there are no real direct credit hedging options for this inventory.

During the month, BS revised up the cum loss assumptions substantially on the Alt-A collateral from 2-4% to 8%. This resulted in approximately \$550 million write down in Alt-A positions.

Dan said that the revised cum losses are not currently implied by market prices- basically stating that BS is ahead of the curve in marking the Alt-A inventory (market is implying 5-6% cum losses). Dan said that the big worry in this space is that a lot of the Option Arms (approx ½ of the Alt-A inventory) are going to reset over the next year.

### Subprime:

The net subprime exposure (based on MV) is short (\$52) million, down from a long of \$1.1 billion at 8/31/07. Most of the decrease was in the decrease in subprime whole loans (follow up on how this occurred) down from \$1.272 billion to \$530 million at 11/9/07.

The subprime position overall is made up of \$1.839 billion of long cash positions offset by (\$1.891) billion of ABS CDS protection, \$1.4 billion against IG securities and \$486 million against Non-IG securities.



The most interesting point made, which Mike Alix discussed at the beginning of the meeting was that while BS is net short subprime, their protection is more skewed to the lower rated tranches and to early vintages. The lower rated tranches BBB and BBB-, for example, have “played themselves out” (i.e. there isn’t much more unrecognized benefit in these positions). Regarding the vintage of the protection vs. vintage of the exposure, they are skewed to having their protection in early 06, 05, and 04 vs. having most of their exposure in the late 06 and early 07 vintages. In fact they have \$500 million of BBB protection referencing 2004-2005 vintages.

Dan stated that as a result, while they are net short, if markets deteriorate further, up to a point, their hedges will under perform and they will have more mark downs. However, at some point, the inflection point with respect to HPA assumptions, the early vintage hedges will start to pay off more. *(This is very similar to thinking of the super senior vs. mezz positions at MS in that the mezz short positions outperformed the super senior up until the inflection point in cum losses (implied) caused the position to actually be net short protection.)* Dan said risk management is currently working on HPA scenarios to get more insight into the “inflection point” around their subprime hedges. We will follow up on this at the next monthly meeting.

#### Other hedges:

In addition to the PAUG (CDS on ABS) and ABX hedges, risk management highlighted additional “macro” hedges that are used to hedge the mortgage exposure (although with substantial basis risk). These hedges include:

- (1). (\$252) million CMBX Index
- (2). (\$81) million HY index
- (3). (\$213) million Itraxx
- (4). (\$39) million Equity Shorts
- (5). (\$150) million TRS (CMBS Indices)

In addition, they have net 2/10 curve steepeners on.

#### Counterparty Credit Risk on CDS on ABS/ABX hedges:

They provided a list of counterparty credit exposure for CDS protection. As was highlighted in previous monthly meetings, the largest amount of protection sourced in this area, has been sourced from SPVs (e.g. GICs), which are largely wrapped by monolines. The CE at 11/9/07 to these SPVs was \$1.998 billion. The only other material CE in this space is to commercial banks (\$488 million) and broker/dealers (\$353 million).

Mike Alix stated that these figures were pre-month end mark changes and that the CE will increase and he thought the CE in this space to SPVs will likely be closer to \$3 billion. (See monoline discussion for more on GICs).

#### Leverage Finance:

Marc went over the leveraged lending pipeline. The big changes during the month were that the commitment pipeline decreased substantially from two actions. First, as expected the Cablevision commitment went away as the Dolan's bid was rejected by shareholders, decreasing the leverage loan pipeline from \$6 billion down to just \$567 million. The \$567 million represents just one transaction (Fl East Coast ???).

The CMBS/ABS pipeline (within the leveraged finance acquisition space) exposure was completely eliminated as the Hilton transaction was closed and funded early in October. Marc said that they are still working with the rating agencies on the expected securitizations. He said that they are definitely planning on exiting this loan through the securitization market and don't expect to have to exit partially through the leverage loan market. He also said that they know expect to have ½ of the securitization to be IG and ½ to be Mezz and they are currently out selling the Mezz. They know don't expect the securitization to hit the market until the January time frame.

As discussed above, the desk took a big write up on the \$1.5 billion Chrysler position coming from both increasing the mark from 94 to 96 and from Chrysler repaying (at Par) \$300 million of the \$1.5 billion subsequently. The 96 mark on the remaining \$1.2 billion will be under pressure as the leverage loan and HY bond market have taken big moves down in November.

At October month-end (pre the Chrysler \$300 million repayment) the non-IG funded positions stood at \$2.5 billion (recent syndications-excluding Hilton as it is a CMBS transaction) and \$3.8 billion (Non-IG retained tranches- i.e. the leftover hold positions of many previous commitments) respectively, virtually unchanged from the prior month.

Marc said that the PAC had very few meetings during October and only approved one commitment. That commitment required company MACs for both the acquirer and target, flex up to 14%, and real covenants. Not surprisingly, the private equity buyer has not acted on the commitment.

On the hedging front, the desk decreased their CDX HY Index short from (\$725) million to (\$140)million short.

### Monoline Insurers and CDPC (“FinancialGuarantors”) Presentation:

Rupert Cox, Wayne Buchan, and Samuel Gilman gave us a presentation on their exposure to Financial Guarantors. On a macro view, they said that this was the most complicated area to view all of your exposures as there are many direct and indirect exposures to the monolines.

In the presentation, they highlighted (1) their exposures to the monolines and CDPCs; (2) where they have hedged monoline exposures; (3) exposure to ACA and reserves taken; (4) GIC exposures; and (5) TOB program. (See presentation for details of exposures.)

Overall, outside of ACA, they are not predicting failure but downgrades are within scope and that if that were to occur it would have a roiling effect on the market. However, they view the most likely scenario that the monolines will get more capital to preserve their ratings.

The most illuminating part of the discussion at BS was the detailed discussion on the ACA exposures (and reserves taken) and the discussion of the GICs.

ACA exposures:

The biggest issue for BS is its direct counterparty credit exposure to ACA. They have 3 trades with ACA: (1) two corporate credit basket trades (\$439 million in notional and \$30 million in CE) taken out by the Credit Trading desk and (2) \$175 million tranche (of a 50-100% CDS of Mezz RMBS and CDO tranches with a \$143.7 million CE) taken out by the Mortgages desk.

Rupert said that they put “foolish faith in the BBB+ MTM trigger”. He also said that they didn’t believe the rating agencies would have allowed ACA to “load up” as much as they did in the ABS space. (Interesting that they would rely on rating agencies to reign in these institutions at the same time they were allowing CDPCs to be formed??)

They also said that they had expectations that they would be able to hedge better. This proved to be wrong as they were only able to buy \$8 million in default protection on ACA. Also, they underestimated the correlation of a significant gap in the MV of super senior ABS CDO tranches and the viability of ACA. “Buying such correlated protection didn’t make much sense.”

**As of the meeting, Bear had taken a \$140 million reserve (mostly in October I believe) against the ACA exposure, basically writing down the CE to zero. This is “the largest counterparty credit loss ever taken by BS by a huge factor.”**

**As bad as the news is for BS, they said that out of around 40 counterparties, they were well into the 20’s in exposure to ACA. BS had a grand total of less than \$600 million notional vs. the total \$60 billion in protection written by ACA.**

FSA exposures:

The largest gross counterparty credit exposure is to FSA. The direct exposure to FSA (all corporate credit trades) is \$229 million CE. BS has an additional \$57.9 million CE from other swap trades done with FSA-wrapped or related entities for interest rate, cross-currency, mortgage swaps. Unlike ACA, BS was able to hedge its FSA exposure and actually has taken a bearish trading view and has over-hedged the names, currently have \$453 million of protection on FSA.

In addition to the direct exposure, BS has indirect counterparty credit exposure to FSA through GICs it wraps. FSA is the largest GIC provider to BS deals. FSA has wrapped \$19 billion worth of GICs. BS has \$1.8 billion of GIC wrapped protection from FSA with a current exposure of \$641 million.

## GICs:

As previously stated a significant portion of protection purchased in the corporate credit and ABS space is from SPVs. Much of these SPVs purchase GICs which are managed by monolines such as FSA and the monoline wraps the GIC. The GIC manager takes the GIC proceeds and invests in eligible investments (follow up on what the limitations are). The trustee is required to value the collateral on a weekly basis. If the market value of the collateral is insufficient then the monoline (e.g., FSA) must deposit additional collateral with a MV equal to the shortfall by the end of the business day. Bear currently is verifying trustee marks and eligibility of collateral.

They also said that in addition to providing a “MV top up” on an ongoing basis, if the monoline is downgraded, the GIC is required to be over-collateralized by 8%, a potential additional liquidity risk for the monolines involved in this business. I believe they threw out AA or A- as the ratings trigger for this over-collateralization.)

Rupert basically said that this was the one area where the monolines have opened themselves up to some liquidity risk (given the any MTM or ratings based triggers for interest rate swaps, etc, are done outside of the insurance company operating sub). However, Rupert (and Mike) view the wrap provided by the monoline as a distant second line of defense. They are primarily looking to the assets of the GIC to support the protection they have purchased. They noted that in order for them to suffer counterparty credit losses with these collateralized GICs there would have to be a far more extreme scenario than just with a trade with the monoline to be in trouble.

The CE to GICs wrapped by monolines appears to be around \$1 billion (in the presentation) with FSA the largest followed by MBIA and Ambac wrapped GICs.

## TOB program:

We discussed both the size of BS TOB program as well as their concerns about this area.

First, Bear has both its own TOB program, on which it has the first and second loss position on \$3.151 billion of TOB program. BS is the remarketing agent for these deals and bears the liquidity risk. Bear also is exposed to liquidity risk on an additional \$275 million of TOBs as remarketing agent for third party programs where a customer has the first loss risk.

The underlying bonds are mostly wrapped across 4 names (MBIA, FSA, FGIC, and Ambac).

They said that they are reducing risk in this space and expect to be down to \$2 billion or so next month. They are somewhat concerned about the “mega players” deciding to get out of this space. The said that they are exploring other ways to reduce credit and funding risk in this space but didn’t provide any details. *Follow up on this at the next meeting or on the liquidity call.*

## Counterparty Credit

There wasn't much material info from our discussion with Judy on overall counterparty credit risk. The PB exposure continues to go down and the CE from placements increased as they continue to increase the liquidity pool.

We briefly discussed with Mike the fact that their counterparty credit exposures from derivatives were much lower than other firms and that we attributed that largely to the fact that they don't have significant non-collateralized exposure in that space.

He said that they are totally absent from the corp market- for interest rate and cross currency swaps and their sovereign exposure is low as well. The space of course where they will start to grow CE is at Bear Energy where the non-financial counterparties will have "high thresholds" which will result in more net exposure and the counterparties will be of lower ratings than their general counterparty to date.

### For Memo

- Bear Stearns experienced its largest counterparty credit loss ever as it fully reserved its current exposure to ACA, the distressed monoline insurer. ACA has publicly stated that if it is downgraded (by S&P) it will have to post collateral on the CDS protection it has written and it will not be able to do so. The reserve currently stands at around \$140 million but could increase further depending on changes in marks on the protection purchased. The current exposure to ACA comes from direct trades with ACA, where Bear has purchased protection on both senior corporate and asset backed tranches.
- During our recent meeting with Risk Management regarding the market risk exposures in the mortgage area, they discussed an interesting analysis they were conducting regarding the effectiveness of the hedges they had on in the subprime area. As of the middle of November, on a net basis, the firm was net short subprime RMBS exposure as they had over-hedged slightly. However, much of their protection referenced RMBS with early vintages (e.g. 2004 and 2005) which to-date have performed much better than the latter vintages (e.g., late 2006 and early 2007). As a result, the effectiveness of their hedges had been suboptimal. The risk manager noted that with this "vintage mismatch" there was an "inflection point" with respect to further declines in home price appreciation ("HPA") assumptions, where the hedges referencing early vintages would start to outperform the net long exposure Bear had in the latter vintages. The firm is currently working on scenarios to stress the HPA assumption with the objective of gaining more insight into where the inflection point might be and the potential impact on the effectiveness of the subprime hedges under the various HPA assumptions. We will follow up on this topic at our next monthly risk meeting.

## **Bear Stearns Packet Dated September 28, Meeting held on October 17th**

General Market Conditions (Mike Alix): While leveraged finance has gotten much better, the observed relief in the market following earnings releases was inconsistent with the persisting conditions in the asset backed and subprime areas, which continue to struggle. The mortgage factory has not yet started (the credit related residential business is still in a “deep freeze”). Mike said that the best thing about September was that it wasn’t August (we didn’t get the Trading Division net revenues for the month).

The one-week Firmwide VaR was up \$12 million to \$90 million, which is due more to increases in risk factor volatility than to positioning. In terms of attribution, there was a shift away from corporate credit spreads as a large driver to commercial spreads (numbers not provided). While positions appear down in both areas, the reduction in net CS01s for corporates is seemingly greater, and the tightening in spreads causes VaR to decrease as well (but again, that should also be true for commercials this month).

### **Hong Kong Warrants**

We discussed in more detail the Hong Kong warrants issue that Mike Alix notified us about in the first week of October.

Hong Kong listed warrants are mostly purchased by retail investors. These instruments typically trade at a premium (i.e., higher implied vol) to OTC options on the same underlier. The actual size of this implied vol spread depends on the supply and demand of the warrants (so I guess it is not impossible for the warrants to trade at a discount?). Bear had a trader in Hong Kong that was entering into “upside down” positions by buying these warrants and selling OTC vol against them. Because the trader was buying the more expensive vol, these trades were guaranteed to lose money should the positions be held to maturity. Thus it appears the trader’s strategy was to trade around the positions prior to expiry – i.e., he had a view that the vol spread between the two instrument types would widen temporarily before inevitably narrowing to zero at maturity. That is, the rationale would be to buy warrants when the vol spread is less rich than usual, and then trade out of the positions once the spreads widened. The trader entered into this position on around 15 underlyers (large caps) across 8 maturities.

The trading manager was apparently on board with this strategy. However, Kan and Mike said that the trader actually ended up doing very little trading in and out of these positions (he was just sitting on them). In addition, he was buying very large quantities of some issuances, which makes it very unlikely (or even impossible it would seem) that the vol spreads will widen, as the trader had basically removed all liquidity from the market (once the trader becomes most of the volume, the retail demand disappears). Even allowing for the possibility of trading around positions, Mike Alix described the strategy as being doomed from the beginning. He said the idea was basically to pay \$1.10 for a \$1.00 in hopes that someone else will come along and pay more.

This issue was identified during the quarterly price verification process. While there were no actual pricing issues, the risk managers observed the lack of logic around the

strategy. In terms of exposure to implied vol spreads tightening to zero, the trader had built a position of \$125 million. As a result he was told to liquidate 75% of his holdings (why not 100%?). The cumulative loss on the strategy as of our meeting was around \$100 million.

This event obviously does not represent the classical rogue trader problem. While the motivation behind the strategy still seems quite strange, Bear has yet to identify any fraud (the investigation is still ongoing). Kan described the problem as being one of uneconomic pricing. Given that the spread to zero exposure grew from \$40 million in July to \$80 million in August, and then to \$125 million by the time liquidation was finally forced (with about \$6 million in vega on each side), the obvious question RMD is asking is what they have done identify the issue earlier. (The position was actually initially identified in August, but action was not taken until weeks later). Independent risk metrics were not sending signals that this was a growing strategy, as this basis/spread had not been contemplated as a material risk factor that needed to be modeled. Thus one takeaway is that risk managers needed to have more regular discussions with desk heads and traders on strategies to make sure they are on the right page with respect to risk measures. Although, in terms of identifying uneconomic activity, Kan felt that more vigorous price verification is the channel by which this sort of thing should be caught.

### **Specific Business Updates from Risk Managers**

#### **Mortgages:**

The monthly P/L for the Mortgage business as a whole was around -\$34 million.

Dan said there was continued theme in the mortgage markets of liquid product (AAA jumbo prime and commercials, as well as Agencies ) trading and other products not trading. He said AAA Alt-A securities have come back about half as much as these most liquid products, with buyers being very selective of underlying collateral and cumloss results. Also, the resi ABX got hit pretty hard during the month, particularly the A and AA pieces, after a flurry of Moodys downgrades of 2006 subprime deals (I believe Dan said the A sold of 8 bps on Friday alone). Dan noted the possibility that a lot of the performance troubles had already been priced into the BBBs, while the higher pieces may have still been catching up. Separately, only two ABS CDO deals have been done in the market since August, with the vast majority of completed deals being on corporate collateral.

The downward trend in positions continued in September (e.g., ARMs net inventory down \$2.9 billion, Non Agency down \$800 million, and Commercial down by \$884 million). Recently Bear contributed 1/3 of the collateral to a \$1.8 billion commercial deal that was completely sold, with at least some of the pieces being oversubscribed (believe Bear was the lead on this deal). We asked about the ABS CDO deals that were being evaluated by the rating agencies last month (on BBB collateral). Apparently these were not received well by the agencies, and the business was unable to proceed. Thus there are still challenges to moving any product that involves multiple "layers of risk". In addition, while the ARMs balance sheet has continued to be reduced (net market value), Bear is

still retaining much of the risk position it had in August, as its sales have been more for funding than risk reduction (selling just the AAAs, as discussed last month).

The Mortgage business was able to get somewhat shorter synthetics, but Dan didn't specify which desk. We asked who they sellers of protection were, and he said that in at least one instance it was a hedge fund looking to monetize gains from short positioning.

Initially Dan said that he thought the Super-conduit (M-LEC) has probably had some positive impact on market confidence (making a massive selling of AAAs less likely), but then later backed away, saying that the market had not reacted and people were waiting to see. Mike Alix expressed skepticism of the idea, saying it just seemed like an attempt to delay the problem.

We asked about the infrastructure initiative that Mike and Dan had discussed a couple months ago. They have a trade management/flow update with Bearing Point next week. Eventually they will want to "re-architect the entire data structure", which will result in consolidated and improved risk views. But even in the short run the consultants have identified some areas where lack of discipline by the businesses (front end) can be improved to help reduce the manual burden on Risk Management. Separately, we asked Dan about any ideas he may have developed in terms of improving risk measurement. The only thing he mentioned was the need to better understand the large differences that can arise between trader and model risk sensitivities, which can lead to a lack of business buy-in of independent risk measures.

#### PAUG Swap Mark Disputes with other Dealers

Dan and Mike initiated a conversation about PAUG swap mark disputes, asking what we were seeing at other places. While this has been an issue at Bear for the last couple months, it seems there had been a noteworthy spike in disputes in the two days prior to our meeting, particularly with respect to super senior underliers. (We have heard in the past that Bear tends to buy protection from structures and sell protection to the Street, so I would guess this means that Bear is marking spreads tight relative to its CPs?). Bear currently has a few hundred million dollars under dispute with dealers; we told them we have seen numbers that big (actually bigger) elsewhere, which Dan seemed relieved to hear (Mike's response: Isn't that disturbing?).

We talked again briefly about RMD's price verification of PAUGs. Dan says they "switched" approaches in August-September, moving from a model that relied mostly on Fitch data to doing more fundamental analyses. (John S had previously said they would also do fundamental analysis on PAUGs when using the FITCH data, but Dan did not seem to see it that way). Dan described their process as 1) using internal models calibrated to the ABX and then 2) adjusting for differences in vintages, loans sizes, location, etc. (based on cash flows/performance). He emphasized the need in this market to rely upon internal analysts and their knowledge of what forces are driving prices, using internal prepayment and loss models. He discussed numerous problems with the Fitch and Markit data, most of which we have heard before (for instance, in one month they saw something like 59% of spreads not change). Not only are there so many tranches out



there (with different performances), but many of them are quite thin. He also said that Markit's inclusion of the duration did not represent an improvement over Fitch, because the products can be so convex (he would rather just see a price posted).

### **Leveraged Finance:**

The market reopened in September and October, with bank loan and high yield bond deals getting done "with the right price". For instance, Allison Transmission issued piktoggle notes as a follow on to a high yield bond issuance that had standard covenants, and the pik notes priced a percentage point higher. Secondary loan bids were higher over the period, and originators were "regrouping and getting loans off their books". Both Credit Suisse and Deutsche did "static pool" deals, which were described as a variation on a traditional CLO (the collateral had been ramped for traditional CLOs). Also, Bear's CLO group did a \$1 billion traditional CLO deal. Between this deal, another anticipated one, and the desk's first loss protection, the bulk of Bear's CLO pipeline is covered.

Bear's loan pipeline is still dominated by Hilton (CMBS) and Cablevision. For Hilton the business has the bottom part "circled up", and there is optimism that the debt will clear the market within the wide flex levels in place, and may do even better. The loan is scheduled to fund next week (the week of the 22<sup>nd</sup>), with distribution taking place a couple of months later (we know from our conversations with Bob Upton that they have secured funding lines in place for the bulk of the loan amount). Still, Mike Alix noted that the distribution strategy is highly dependent upon the rating agencies. Bear is placing an even lower probability of the Cablevision deal closing than last month, with the feeling being that the transaction would likely not be approved by shareholder on 10/24 (and in fact it was rejected).

Some high grade relationship commitments were presented to the PAC in September ("tack on" commitments), but still no sponsor-driven (LBO) activity. Once the existing overhang clears there may be interest in new transactions, but there are probably fewer opportunities from the sponsors' perspective.

Bear's hedging program is not working any better (the hedges are basically flat life-to-date), but there are some prospects for gains to be made during syndication of the loans.

### **Structured Funds:**

Risk Management provided an update on the Structured Fund business (see hand-out, it is pretty self contained). In short, the types of trades the business has been doing have not changed a lot (diversification, leverage, etc.). The LEA has grown by 35% this year versus a 41% increase in add-on capital, with this somewhat disproportionate increase in capital resulting from conservative structures unwinding (as opposed to entering into riskier trades). While a LEA limit increase to \$10 billion was approved in April, Mike said that number was being revisited and that the LEA would not reach that. Currently an evaluation is being made as to whether the economics of this business are changing with the increase in term funding costs. Not surprisingly, the business is pursuing secured funding options, as there is currently a hedge fund share facility on the secured funding pipeline report supplied by Treasury/Finance.

As we have previously discussed, two trades hit de-leveraging triggers due to the inclusion of the BSAM funds as underliers. The trades were brought back within guidelines and no gap risk losses were incurred.

### **Other Desk Results:**

Credit Trading – made \$78 million, \$30 million of which came from auto spreads bouncing back (tightening). As mentioned above, the desk has been cutting its net CS01 positions (aggregate spread risk pops is down by \$7.5 million to \$11.5 million). Credit Trading's VaR was down \$7.5 million to \$22.2 million, which is attributed to spread tightening in addition to the decreased exposure. Separately, \$11 million in pricing reserves for the Vox desk was released due to large cushions exhibited relative to the Markit results - although, extrapolating from Markit to bespokes requires some interpretation, as the ability to monetize these cushions is not straightforward. Separately, during our price verification meeting the next day, several references were made to Risk Management's (Oliver's) "high definition measure" for price verifying structured credit. We asked since this term was adopted if it meant there had been considerable changes to the price verification framework since we met with Oliver several quarters ago, which they didn't seem to know the answer (ask Oliver next time we see him).

FX – made \$18 million.

Fixed Income Derivatives – made \$30 million. Swaps made \$25 million and exotics made \$15 million on origination, but flow options (nyc) was bleeding money (lost \$16 million). Also, the trader who has been maintaining the bearish view through his vega position (discussed in previous months) was instructed to decrease his position, as he lost his prior profits when markets stabilized. However, Kan said that one does this with a "heavy heart", because it is always good to have traders who think they can make money on the short side, as the resulting disaster protection is more desirable than management putting on overlay hedges.

Muni Derivatives – made \$14 million as the BMA-Libor spread tightened (although they had halved their position since the widening).

Risk Arb – made \$18 million, as the ABN position did well and there was a tightening in Risk Arb spreads in general.

International Equity – made \$20 million on very good customer flow.

Principal Strategies – made \$29 million. About half of this came from the Math Arb book, which has done extremely well. Before August the desk was running a \$1.6 billion by \$1.6 billion book, and then cut its position size in half. Since then it has grown back to around \$1 billion, and Mike said they were probably grow it further (the desk recently had a record streak of 8 consecutive profitable days).

Bear Energy – VaR was up \$1.6 million to \$8.5 million. Kan noted that as they have migrating/integrating the business's risk systems, risk management has been finding areas of simplification made by the business that can be improved upon (one was for heat rate options, which will result in an enhancement that will reduce VaR). The Williams transaction is expected to close November 1. We will likely schedule a trip to Houston for January.

### **Model Review:**

We briefly met the new head of the Model Review group. His name is Jonathan Kinlay. He is an econ PHD who most recently was running a quant arb (equity volatility it appears) fund that he founded. He has also taught finance at the Stern School and worked at Chase years ago (looking him up online it appears he also use to run a risk analytics consulting firm). Our impression was that Jonathon was being asked to carry out the model control framework as it currently exists (as opposed to coming in with a lot of his own ideas about what a model control function should look like). That is, Kan said he felt the framework is pretty well established, but where more evolution is needed is in making model issues more tangible to senior management and desk heads. He felt Jon should be a good for that, given that he use to use models to try to make money.

### **Counterparty Credit Risk**

#### **Trilateral Feedback**

Jim and Lori went through the Tri-lateral feedback with Mike and Barbara. Some noteworthy reactions:

- Mike didn't seem comfortable with the idea of operating traditional prime brokerage according to a model of credit extension.
- In describing some of the stress testing that Goldman was doing, he said that at one point they looked into creating stress tools that attempt to find the shocks the portfolios are most exposed to, but he said they concluded they weren't really sure how they would use it.
- Mike wanted to know if the conclusion was that that margining practices were or were not sufficient (a conclusion which of course we did not render). In talking about our surprise surrounding the number of arrangements were initial, and potentially variation margin were not obtained, he said he did not buy the argument of managing just off of PE (he didn't think it was ok to do relatively few risky trades without margin, nor was it ok to do infinite low risk trades with margin that covers the PE). .

### **For Memo**

- Bear has experienced a recent spike in mark disputes with dealer counterparties to swaps referencing RMBS and ABS CDOs - products which have been very illiquid the last several months. We will continue to discuss with risk managers the firm's progress in resolving these disputes.
- An equities trader in Hong Kong incurred approximately \$100 million in losses as a result of a trading strategy that was "doomed from the beginning". The strategy

involved the purchase of warrants on large cap equities, hedged with short positions in OTC options referencing the same underliers. Because the warrants trade at a premium to the OTC options, these positions were ensured to lose money if held to maturity. It appears the trader's view was that the implied volatility spreads between the warrants and options would temporarily widen (before eventually collapsing to zero), allowing him to trade out profitably. However, because this individual had purchased the majority of outstanding warrants for some of the underliers, such a spread widening was virtually impossible. Thus far Bear's investigation into this matter has not uncovered any fraud. Given that this loss is not the result of a classical "rogue trader" problem, risk management has been assessing what steps it could have taken to identify and address this "uneconomic activity" sooner (the positioning commenced in July but it was not until September that the trader was forced to liquidate the book). Because this particular implied volatility spread was never conceived by risk managers to be a material risk factor to the business, there was no risk reporting around the exposure. Therefore, one lesson learned from the incident is that risk managers must have more frequent and detailed dialogue with traders and desk heads regarding trading strategies, in order to ensure the risk managers are "on the right page" with respect to risk measurement and reporting.

**Bear Stearns Packet Dated January 31<sup>st</sup>, Meeting held on February 20<sup>th</sup>**

The big picture for January from a market risk and P/L perspective is two fold: 1) Credit Trading had \$200 million in losses that were offset by \$280 million in gains from Fixed Income Derivatives - \$250 million of which came from yield curve steepeners, and 2) Mortgages had significant inventory write-downs that were offset by its own yield curve steepeners, CMBS protection, and other miscellaneous trades (like resi protection).

The aggregate yield curve steepener position, which has been established in several forms (e.g. 2-10s) and in several currencies (USD, Euro, and Sterling), reached \$12.5 million per basis point at its peak and was \$9.5 mm/b.p. as of our meeting. 3 to 4 mm/b.p. resides in Mortgages with the rest in FI Derivatives. Mike Alix described this as a large position that is being managed at the Risk Committee level, with daily reporting. The prevailing view appears to be that the “recession sensitive” position has “more room to run” (apparently the firm’s economists have been brought in to opine). We asked about who owns the P/L and Mike said the desks do. Apparently everyone came to the agreement that some sort of macro/recession hedging program needed to be established, and several desks thought the steepeners were the way to go (along with some other miscellaneous positions). The success of these rate hedges along with separate gains made on the Leveraged Finance hedges meant that hedging has worked better in Jan (and Feb for the Lev Finance) than at any point since the credit crunch began. Whereas the 2007 P/L for the Global Rates business was \$300 million, it was over \$400 million for this year by the end of January.

As of our meeting the Mortgage desk as a whole was slightly up for the month net of hedges. However, during our 2/25 call with Dan Chen (focussed on price verification) he said that was going to change, suggesting the \$215 million in net write-downs for the ARMs desk was getting bigger.

Kan’s P/L and Risk Summary by Desk

**Distressed** – lost \$15 million. Generally speaking the downward pressure on IG and leveraged credit was spilling over into distressed assets. More specifically, the desk had \$30 million in losses on monocline positions (MBIA shares and Radian shares & CDS) offset by \$12 million in gains on airline shorts.

**Leverage Finance** - Loan Trading/CLO Inventory lost \$12 million while Loan Origination lost \$3 million. Loan Origination NMV stands at \$8 billion while CLO is \$800 million. The business doubled the total size of its LCDX and HY hedges from \$2 billion to \$4 billion in the last couple of weeks; and, from the end of January until our meeting secondary leveraged loan prices had fallen from the \$91 range to the \$86 range (thus I believe some of the success on the hedging program with respect to Leveraged Finance mentioned above is actually February P/L). There has been active discussion about how much the firm should be trading in and out of this hedge position, with varying opinions. Corporate index liquidity is still pretty good (and even improving some for mortgages).

There was no real liquidating activity, but Pipeline Commitments have now fallen completely to \$0. [Bear's Harrah's exposure was also down as the deal took out a \$75 million revolver to pay off part of the commitment – but I don't know if that deal was in the Pipeline or Origination (closed) line].

We asked about the Chrysler mark. Kan said it is still at \$95 but said that everyone knows it needs to come down (Jan month end is not a critical time for reporting). We will monitor where this ends for February.

**Credit Trading** - lost \$200 million, \$175 of which came from Structured Credit. Within SC, the loss split between flow and prop (Vox) was \$100 and \$75 million respectively. Across the two, \$95 million of the losses were due to reserve increases - \$65 million in counterparty credit (\$30 on ACA) and \$30 million on bid-offer.

Both desks suffered on the basis between indices/tranches and single name curves, and there is currently a lot of attention on these books. In response to the market moves/losses, the customer book has been aggressively buying single name protection. I believe Kan said in January the desk was long \$20 million in CS01 single names versus short \$15 million CS01 on the bespoke book (net long \$5 million), while being net short \$5 million on the single names versus the index book (CDS and index tranches). Since then they bought \$9 billion in notional single name protection and sold some equity protection, in order to increase their convexity profile [does this really improve your convexity profile and decrease your SN versus index/tranche basis????]

Meanwhile, the prop desk has taken no such action, so the bulk of the focus is on that desk currently (hot topic for the RPC apparently). The gross CS01 of the book has increased quite a bit (\$8 million to \$20 million I believe), raising questions about the stability of the desk's risk profile. While the net risk profile of the desk is relatively stable, this "whipsawing" of the gross profile in various market conditions makes the book start to look like a lot of longs and shorts. There are a number of proposals about how this should be best addressed, one of which is making the desk transact on exactly offsetting bespokes. In any event, Kan said the traders understand they are in risk reduction mode. Since we were set to meet with James to talk about Structured Credit next month, we asked that he talk about this issue as well (didn't follow exactly what was going on – had to do with some cross partial effects and idiosyncratic moves I think).

Separately, the cash credit trading desk lost \$25 million on a \$250 million book of perpetual bonds issued by banks, as liquidity for this highly rated paper vanished (names like HSBC).

**Emerging Markets** – made \$22 million on FX in LatAm and Europe and corporates in Europe.

**FX** – made \$22 million, \$11 million of which came from metals. The desk also hired a new London trader, who was brought in to expand.

**Fixed Income Derivatives** – made \$280 million, as discussed above. They then lost \$80 million on the curve steepener the week before our meeting. Another trade the desk made money on was shorting Fed Fund futures at the front end. They had a \$1 million PV01 position and made \$70 million.

**Mortgages** – As mentioned above, the desk as a whole was slightly positive for the month, but it seems likely there will be more significant mark-downs for Q-end. We mentioned we had heard in recent weeks that Alt-A and Option ARMs in particular were getting hit pretty hard. Mike said they had already taken up their CumLoss estimate due to the higher than expected delinquencies but said it was just very difficult to predict what the losses will end up being. Dan was not present at the meeting so we discussed Alt-A PV with him on the phone the following week (see separate notes). He confirmed that they are now looking at CumLoss estimates in the 7-8% range, up from the 5% range (much of this is driven by the assumptions about how a high % of the delinquencies subsequently default). \$115 million of the \$215 million in markdowns for the ARMs desk came on residuals (that's all Alt-A I believe).

The Agency CMO desk made a fairly eye-catching \$90 million. Kan said \$40 was from financing, \$15 on curve steepening, \$15 trading MBS versus Treasuries, etc.

The Commercial desk made \$33 million despite \$270 million in write downs on inventory due to spread widening [This seems a little surprising as they have about \$15 billion in cash longs and \$7 billion in synthetic shorts. While the indices do move faster than the cash positions, we heard some language that wasn't coming off well – e.g, they are able to use the gains on the hedges to mark down the inventory. Follow up with Dan on exactly why there was net a gain].

The international book had the last CDO deal in the pipeline (from a November commitment), which failed to get rated. They marked this \$200 million position down by \$20 million and are still long the remaining risk (don't know if this was more resi or commercial collateral). The Global ABS desk also took markdowns on a \$1.3 billion Fuso Mitsubishi loan; while the leases are performing fine the desk has been unable to sell the position (don't know if this is commercial or auto).

**Equity Derivatives** – made \$32 million as there was good P/L on the US, Europe, and Asia volatility books.

**Risk Arbitrage** – lost \$10 million on a general spread widening (two deals in particular they got hit on were Alliance Data Systems and Tom-Tom). However, the desk applied for a limits increase. They asked for their single name break limit to be doubled to \$30 million and to grow the overall book limit from \$1.5 billion to \$2 billion. Kan said the traders are not itching to grow the book in the current market, but that the request pertained more to general risk appetite in this space and the desire for head room to be able to take advantage of opportunities as they come along. Kan said for the strategic positions (not rumortrage or LBO), the desk and RPC have confidence in their ability to

analyze risk. Apparently the desk also made the argument that they were operating in much smaller sizes than the risk arb hedge fund players.

**International Equity** – made \$36 million on very strong customer flows in London (increase in cash trading along with volatility in the markets). Interestingly, the Reliance Power IPO discussed last month did not go well. Bear, which had 2 desks put in the full subscription amount, got a \$63 million allocation, and soon after the Indian market started to fall (ended up falling like 17%). But the desk did hedge with some puts and future along the way and ended up getting out of the position flat. This was the first one of these subscriptions they lost money on and the India IPO market may very well cool off after this.

**Principal Strategies** – made \$15 million, driven entirely by the MathArb book. The limit for this book was increased from \$1.6 billion (long by short) to \$3 billion, and thus the position size is going to grow. Separately, there were losses on the credit strategies, one of which was \$8 million on some distressed RMBS that were converted to equities.

#### Monoline Update and Auction Rate Securities

Credit gave us updated numbers to the November briefing. The format was generally the same but with additional information. For instance some stressed exposure metrics have been added as has more detail on the less direct exposure. Bear also responded to our requests for: 1) info on the ARS programs and 2) the CVA methodology details.

Before the discussion began, Mike explained that he got a call from Eric Dinallo (New York Insurance Regulator) asking if Bear was interested in participating in the industry monoline efforts. Mike told him that since Bear has limited exposure the firm has little incentive to participate in an uneconomic industry led transaction. Apparently Dinallo is asking people to sign a confidentially agreement before being told the details of whatever is being discussed/proposed (I don't think Mike did). Mike later referred to Dinallo as a wild card and said he felt he was trying to put the genie back in the bottle.

Regarding the exposure report, there is not a lot to highlight that is not presented on the page. Now that ACA is totally reserved for and been removed from the market risk systems (any change in that position is automatically added to the reserve, which is offset by the gain on the replacement protection purchased), the only big CE number for direct counterparty exposure is to FSA. The FSA CE is \$400 million and the stressed exposure (spread doubling) is \$690 million. FGIC is the most distressed name on the list, but the one direct trade with them (\$55 million notional), which is out-of-the-money (no CE), rolls off in a week. We did confirm that for the Collateralized GICs Bear has had some success in getting collateral touch-ups (Amback in particular they mentioned); although this appears to require some significant work Bear part in terms of reaching consensus on the remark.

We also talked some about the counterparty issues surrounding potentially monoline restructurings. In summation, Mike said that obviously in any situation you don't want a regulator to manipulate the system to benefit one group of creditors at the cost of another



(asset backed people versus muni people). If that were to occur in these instances, the worst outcome (horror story) would be for someone who bought a wrapped ABS or CDS protection on ABS CDO tranching, and then hedged the monoline name. They could end up losing on both sides.

#### *ARS*

Bear is a dealer for \$11.33 billion in ARS for all manner of tax exempt issuer. The firm has no student loan programs. Interestingly, the week before our meeting only about 20% - 30% of Bear's auctions failed, although that number was up the week of our meeting (Mike said they see about 40 auctions a day, which must mean these are small issuances). Bear decided it wanted to limit the paper it took if auctions failed, and that it had no interest in low max rate paper. This position was then made easy when all of the other more significant players decided to allow the fails (thus decreasing the franchise risk to Bear). The firm's ARS inventory was only \$760k (\$5.5 billion in inventory across ARS, TOB and VRDNS). Since the fails there has been demand from new investors like hedge funds. Still, there are some very strange dynamics in the market, like wrapped paper paying a higher return than the unwrapped paper on the same issuer. Mike noted how this is a market no one ever thought of as a big risk issue, and which has become very unsettled. And one thing Bear does have to question/consider is the appropriate way to mark this paper in the secondary market.

Kristen said that alternative re-financing options for a lot of the munis will take months to explore (most of them can't just pull the trigger and issue long term debt). And Mike noted how the entire market structure that was created to feed the 2a7 fund demand was going away.

#### *CVA/Credit Reserves*

See slides. The highlights are:

- For monolines, in addition to the standard simulated CVA result, Bear adds a "write off component" on tranche trades. I did not follow the exact mechanics of how this works (it appears to occur outside of the main CVA calc). But they identify instances where the monolines have written too much protection (based on its capital versus total protection written), and identify the attachment point past which no protection payments would be received. They then price that portion of the protection as being worthless. Apparently this was one of the things that kept Bear's direct monoline exposure small.
- For tranches they use a Copula approach, treating the CP as like one additional asset, correlating it with the names in the tranche at 25%. In each simulation the value of cash flows that occur after that CPs default is calculated.
- We confirmed that the CVA is computed on EPE (setting negative exposures to zero before averaging). They also call this the "gross reserve". The net reserve is equal to the gross reserve minus the funding benefit, which is calculated looking just at the negative exposures in the simulation (this finally makes sense – they would have to do the gross calculation in order to charge the trader at initiation).

- The CVA and the credit reserve are synonymous at Bear. When the situation becomes dire, like with ACA, the CVA methodology is replaced with 100% of CE. This incentivizes the business to replace the protection purchased from ACA.
- Total Monoline reserves excluding ACA were \$67 million.

### Counterparty Credit Risk

#### *Risk Rating System*

Judy provided some work they have around monitoring the risk rating system. It sounds like the genesis of much of this was the FSA (as well as Deloitte) but the CPC found it interesting nonetheless. The packet includes things like ratings distributions and changes, exposure and number of counterparties by industry/scorecard type, ratings migration statistics, benchmarking to external ratings, reporting/tracing of scorecard rating overrides, etc. They also produced Risk Rating System Monitoring Guidelines.

#### *Hedge funds*

There has been some hedge fund suffering (losses and redemptions), and there are some funds out there that are not viable ongoing enterprises. Thus there is a fair amount of voluntary de-levering occurring. Bear has been making a lot of margin calls, especially on its commercial mezzanine portfolio. While they remained concerned about hedge fund exposures, there are relatively comfortable with their exposures to even the most concerning counterparties (from an LTV or collateral perspective).

#### *SPV Trades*

Not surprisingly Bear's current exposure to "other financial institutions" is up (by \$2.1 billion to) to \$10.5 billion. These are the trades with SPV and thus this is not surprising given market moves (the collateralized GICs would fall into this category).

### Emerging Markets Business (David Schoenthal and Martin Pierre)

David and Martin, the EM business co-heads, brought a presentation they gave at an offsite three weeks prior. In 2006, as part of the decision to diversify Bear's credit business outside of the states, the firm formed a global EM group. The group was formed by re-organizing existing emerging market trading efforts from Rates, FX, and Credit desks into one business. Of the approximate 65 trading and sales personnel, only 10 or 11 are outside/new hires. David previously ran Bear's FX business and Martin comes from Structured Credit. The centralization of EM efforts brings synergies from the perspective of sharing knowledge (before the credit and FX guys didn't talk to one another) as well as for the exploration of new customer transactions, such as hybrids. In addition, however, there is a mandate to grow total EM business activities (revenues and risk).

Internally some folks actually call the group the local markets group, as the decision was made early on that they didn't want to be just a hard currency shop. That is, they wanted to concentrate on local instruments. Along these lines, many of the countries dubbed emerging markets are now running current account surpluses and more capital market

transactions are occurring in their local debt markets (i.e., the countries don't have to borrow as many U.S. dollars). David mentioned Brazil and Mexico as examples of markets that are looking more like the U.S. every day.

Bear made between \$70 and \$80 million in Latin America last year (an off year). The desk's goal for this year is \$150 million (and the tentative thinking is \$225 for 2009). To put this in context, however, other dealers are currently making over \$1 billion in LatAm. In 2006, all of EM represented about 12.3 percent of the total \$306.3 billion capital markets and IB fee pool available to banks and dealers. Martin would like to grow Bear's activities accordingly ("pie in the sky", it will likely never get that big). While risk is up "markedly" (not sure from when), it is still quite small on an absolute basis and relative to other firms. [Assuming the "Local Markets" VaR line represents Global EM, the 1-Week VaR is \$9.5 million – **will confirm next month**]

Currently 80% of Bear's EM revenues come from LatAm, whereas LatAm only represents about 50% of revenues for the market as a whole. Furthermore, this portion is expected to shrink as countries like China and India become more important. David said his plan for the near future is to prove that they can make more money in LatAm before asking the firm for the resources to expand into new areas (it sounded like his thinking was to grow Europe after LatAm and then move onto Asia last).

Trading local markets obviously requires establishing local entities (local market licenses). Currently the only country Bear has established a Rep Office in is Argentina. The firm also has established a fund in Brazil (Ursa fund?) that can do about 70% of the trade types that Bear wants to do. The business is currently in the process of getting internal approvals to establish a Brazilian bank. (The also have an "other" entity in India, which I assume is also a fund). The last page of the presentation shows the firms plans for establishing entities in 2008 through 2010 (Mexico Saudi Arabia, Arabia, etc.). Bear provided a table showing the numerous entities the other CSE and banks have in the various countries (including lots of banks and broker-dealers), which really illustrates how much of an outlier the firm is.

Various market and credit risk limits are currently in place and are being discussed (LatAm VaR and greeks, market value and delta across currencies and product areas - see handout). Martin said traders coming over to the do want to know beforehand what their limits are going to be. Bear is currently also envisioning country limits based on EM Stress Tests for both market and credit risk. We asked about the systems challenges associated with the reorganization. They said they did have to "rationalize" the systems and that all trades are now in Lynx and Callypso (including cash bonds).

We asked about the EM prospects for other areas such as corporate lending and mortgages. They said everything is on the table, but they haven't done anything along those lines yet (and will move slowly).

For Memo

- Bear incurred losses on adjustable rate mortgage and structured credit inventory positions in the (preliminary) range of \$400 million. However, gains elsewhere, including from the firm's recently established systemic and recessionary-based hedging program, offset these losses. Given the size of the more unconventional hedges (which are largely views on the shapes of yield curves in several currencies) and the significant basis risk that arises between these positions and the firm's long inventory assets, the hedging program is being actively monitored and discussed at the senior most levels of the firm.
- Under current market conditions the gross risk profile of the Structured Credit desk has become somewhat unstable and the desk is in risk reduction mode. Given the complexities involved in trading a book of bespoke credit tranches, there are varying internal opinions regarding the optimum strategy for executing risk reducing transactions. We intend to discuss in more detail with product line risk management next month the particular issues involved in understanding and articulating the book's risk profile, the latest work performed in verifying front office bespoke valuations, and action taken to reduce basis risk exposures.
- RMBS backed by Alt-A collateral, much of which is adjustable rate, is under considerable price pressure and liquidity is quite limited. Risk management's price verification of subordinate Alt-A bonds has become a pure exercise in fundamental cash flow analysis, which requires the econometric forecasting of default losses. This is obviously a challenging task given the limited amount of historical data available for these products, coupled with the current interest rate and credit environment. Given higher than expected delinquency rates exhibited in the most recent Alt-A remittance reports, Bear's cumulative loss estimates are rising rapidly, which could result in additional (and sizable) mark downs. We continue to discuss mortgage price verification with risk managers, as well as the potential (and push) for selling inventory, which has been absent in recent months.

## Lehman Brothers (Package Dated June 30; Discussion on July 15)

### Measured Risk

#### Market Risk Profile

- The firm's overall VaR increased by \$2 Million to \$31.1million. There was a modest increase of \$1.8 million in Fixed Income and a larger \$2.6 million increase in Equities.
- There was a large decrease of \$6.0 Million in the VaR for the Interest Rate Products business line in June. This was the result of Lehman taking off its large Vega exposure that it had acquired in the previous month when the firm loaded up on Vega in anticipation of an increase in volatility. The increase did not materialize and consequently Lehman reduced this exposure in June.
- Although there were substantial decreases in VaR for individual fixed income business lines, the reason for the slight increase in Fixed Income VaR was the large decrease in diversification benefits. The risk manager stated that the long Vega position that the firm had in the IRP business the prior month had a positive portfolio effect on Fixed Income as a group. When the Vega position was lifted, there was less diversification benefit between the Fixed Income businesses. Most of the Fixed Income businesses became short at the same time at month-end. The diversification benefit between the Fixed Income businesses in May was \$38.8 million or 58.26% and it dropped to \$29.9 million or 50.34% in June.
- Although the IRP business was net short rates at the end of June, the U.S. IRP stress matrix showed that for large basis point moves in rates, the business would make money in large decreases in rates and lose money in large increases in rates which is contrary to what one would expect from a net short position in rates. This was the exact opposite of what the Stress Matrix showed in May. The risk manager stated that this was the result of both rates going down (except for shortest maturities) from the prior month as well as the positive gamma in the U.S. derivatives desk kicking in as rates go lower. He stated that the U.S. derivatives desk gets long quickly when rates go down quickly. So it appears that they will make money in a substantial rate-decreasing environment but will lose money if there are substantial increases in rates, although at a much lower amount. **(Since this is an about face from the earlier month, I have an unanswered question. Was this change caused merely by a decrease in rates or was there change in positions: I would think there would have had to be a change in positions for there to be a flip on both up and down movements in rates????)**
- The Municipal bond business remained above its VaR limit for the second consecutive month. It's VaR increased from \$7.4 to \$8.2 Million versus a limit of \$7.0 Million. **This seemed a little odd since we were told at the last monthly risk meeting that Lehman had reduced its positions after the end of May. Mike is supposed to email me back concerning this issue. Didn't seem to remember any conversations around this limit increase this month.**

#### Mike's response:

After a reduction in muni risk in early/mid June, the muni desk bought more short-term debt TRANs (tax rev anticipation notes) in June, which is the muni refunding season. Total assets bought in June and July exceeded \$1.5Bn in TRANs issued by various states. Although these positions are hedged using Euro\$ futures (and all

have one year duration), the overall basis risk has increased leading to a higher VaR.

- **Mike is to get back to me on the spike up and back down in Fixed Income risk from 06/16- 06/18/04.**
  - Mike's response  
The mid-month increase in Fixed Income VaR was predominantly due to a temporary increase in mortgage basis (short agency vs. long non-agency; increase approx 500k/bp). The subsequent decrease in VaR was largely driven by a reduction in non-agency bonds (from the current month securitization).
  -
- In the equity space, the major increases in VaR came from the Proprietary and Portfolio Trading units and related to building of positions in anticipation of the Russell 2000 rebalancing. Although the rebalancing event itself turned out to be a non-event from a revenue perspective, the large increases in positions caused a spike in the Equities VaR. In the Proprietary space, Lehman added an approximate \$250 Million of positions over roughly a week's time in anticipation of the rebalancing. In addition, within the Portfolio Trading group, they purchased through a blind bid auction process, a \$1 Billion diversified risk basket of long and short equity positions from Goldman Sachs Asset Management. The risk manager stated that this was an unusually large transaction in this space, but that with the combination of margin compression and low trading volumes, he believes there is a growing appetite for transactions of this size in the equities area. This risk manager went on to say that it took longer than the firm expected to unwind this trade. They unwound this trade through their distribution network in approximately 1 ½ - 2 weeks. They saw their customers and others stay on the sidelines and hypothesized that this was the result of the equities remaining in a range-trading and low volatility environment.
- The firm continued its dispersion trade strategy in the U.S., which resulted in continued negative gamma. However, the negative gamma was significantly reduced from the prior month due to a macro hedge (purchased calls on U.S. S&P) put on by the head of trading in Equities (see discussion in Risk management section). In addition to reducing the negative gamma the U.S. equities, the macro hedge was a significant part of the large increase in the Long directional position in U.S. equities the firm has taken as reflected in its dramatically larger delta. The U.S. Equities delta increased from \$180.5 million to \$618.8 million by the end of June. This increase was mainly from the management position taken in the Volatility book but the convertible desk also added somewhat to their long positions. The firm also increased their long exposure in Japan from \$203 million to \$233.8 million (two-thirds of which is Japan convertibles) by the end of June. These events highlight the fact that in the Equities Volatility and Convertibles desk, the firm is making directional bets.
- The U.S. convertible bond business continued to be in excess of its limit for the second straight month. The VaR increased from \$4.7 million to \$5.2 million by the end of June versus its \$4.0 million limit. In June, the firm selectively increased positions in U.S. convertible bonds. The risk manager stated that the volatilities remain extremely low and the desk believes that there will be a pop in volatility.

#### Credit Risk Profile

- Current credit exposure decreased \$2.8 billion to \$15.8 billion. Most of the decrease related to the rolling off of equity financings. \$600 million of this decrease related to the rolling off of an equity financing related to a particular large AA-rated European bank (which had increased the CCE the month before).

- Global high yield loan exposure changed only slightly in the aggregate. There was a decrease in Consumer Cyclical offset by increases in Consumer Noncyclical and Other Industrial.

### Risk Management

- There was a discussion at the meeting concerning the approval process for the unusually large equities basket trade with Goldman Sachs. The risk manager stated that although there was relatively little time to make a bid, the deal did go up the channels for approval.
- There was a continued discussion with the risk manager concerning the hedge/view macro manager accounts used at Lehman. In the prior month the conversation at the monthly risk meeting focused on the "18E" account which was a macro hedge account for mortgage backed securities where the head of the desk went outright short agency pass-through to hedge the convexity risk of the firm's MBS inventory and to take a view. There was little change to this position in June. However, there was a discussion at the current risk meeting about the use of a similar manager account in the U.S. Equity Volatility book where the head of trading took a long position in call options on the S&P. The positive gamma from these positions greatly offset the negative gamma that has continued to result from the dispersion trade discussed in the past few months risk reports, but also resulted in a much larger U.S. long delta position. The risk manager stated that the philosophy surrounding the use of this separate management accounts was to allow management to express a proprietary view on a more macro level and keep the results of this distinct from the traders' day-to-day activities. The risk manager stated that he keeps a close eye on what the business heads are doing and that the new infrastructure (discussed below), helps him in this regards. He also stated that as long as the business stays within the risk appetite, as reflected in limits, for the business, he doesn't have any concerns.
- The risk manager gave a demonstration of Lehman's Equity Risk platform. The system went live one week ago. The system was developed through a collaborative effort between the front office and the risk management team. Traders as well as the risk management team use the system. The traders are given access to specific information. Only a small number of people have access to the entire system (e.g. for example aggregated results across business units). The desks use the tool to help them in explaining their P&L, especially for hard to explain businesses or strategies (e.g. the dispersion trade strategy within Equity volatility). The risk manager stated that this tool has been extremely useful for him. The risk department would generally spend 4-5 hours a day putting the daily risk package together, and he believes that they will soon be able to produce the daily risk reports for submission by around 9:30 AM (T + 1). He also believes that this system allows the risk managers to do much more analytical review of the risks and allows them to dig deeper into the positions in a efficient manner. He went on to discuss the future enhancements of the system including: application to the credit risk and interest rate risk areas, ad-hoc analytical capabilities, and legal entity reporting of risk metrics. They are targeting to have their to-do-list completed in the next 6 months.
- There was a discussion concerning the potential effects concerning the preliminary accounting rule change regarding accounting for contingently convertible bonds for purposes of inclusion in the EPS calculations. The controller stated that if the rule becomes final, although the future issuance of the "Co-cos" would almost certainly dry up causing a reduction in revenues from underwriting these products, there would be a need for companies to unwind those bonds that they currently have on their books and would create new opportunities. Thus, from a revenue perspective, this might actually prove desirable for them. However, there was no discussion about Lehman's own use of this type product in their capital structure.

JTG 08/05/04





## Lehman Brothers (Package Dated July 30; Discussion on August 19)

### Measured Risk

#### Market Risk Profile

- The firm's overall VaR increased by \$2.9 million to \$34.0 million. There was an increase of \$3.5 million in Fixed Income and a decrease of \$2.7 million in Equities. The various increases and decreases in measured risk were spread out among the various business lines, with the exception of a large percentage decrease in measured risk in the Equity prop business.
- The driver of the small increase in measured risk in the IRP business was the firm's short Treasury position in the long end of the curve. This resulted in a \$2.2M DV01 up from \$1.1M the month before. Subsequent to this report, the firm is back to relatively flat rates in the IRP business.
- The risk manager noted that the risk in the securitization business has come down in the past few weeks due to the securitization of a large amount of sub prime product. She stated that they are net short rates in the securitization business. However, since they were net short rates in both IRP and Securitization, diversification benefits were reduced this month.
- The Municipal bond business remained above its VaR limits. However, there was a decrease in the measured risk from \$8.2 million to \$7.4 million.
- Although global high yield loan exposure did not change from the previous month, the risk manager noted that they see a large amount of demand for high-yield loans. The risk manager noted that the demand for Term loans in this area is growing especially among hedge funds. These type loans provide for much higher yield than the miniscule fee associated with unfunded revolvers. She sees some deals getting flexed where they are reducing the size of the high-yield bond and increasing the size of the Term loan. She noted that hedge funds are getting aggressive on these deals. Finally, she noted that the deals in this area are getting done as planned and that there would be a large amount of syndication during the September/October timeframe.
- The majority of the reduction in Lehman's VaR in July was related to Equities and specifically to the reduction in measured risk for the U.S. convertible bond business and the Equity Prop business. At the end of June, Lehman had increased its long directional position in U.S and Asian equities. Based on the recent sluggish economic news and the near-term geopolitical events, the firm saw a reason to decrease the Equity deltas. Lehman reduced the U.S. equities Delta from \$618.8 million to \$415.5 million, of which most of the decrease was in the Convertible bond and proprietary desks. Lehman also reduced its Asian equities delta from \$247.4 million to \$5.6 million, of which most of the decrease was in the Asian volatility book (although this book also contains a large Asian Convertible bond business as well). The majority of the long equity delta position that remained at the end of July was in the U.S. volatility book, where the desk obtains directional exposure through buying options (i.e. only risk is the premium so not as costly to obtain directional exposure through derivatives). Whereas in June, the risk exposures highlighted the fact that in the Equities Volatility and Convertibles desk, the firm was expressing a directional view, it appears that by the end of July this in much less the case with regards to the Convertibles desk.

- The U.S. convertible bond business continued to be in excess of its \$4.0 million limit for the third straight month. However the measured risk decreased from \$5.2 million to \$4.7 million by the end of July. Lehman lightened up on these positions due to poor performance.

### Credit Risk Profile

- Current credit exposure increased \$1.0 billion to \$16.8 billion. Most of the increase came in the A and AA credit ratings and particular with equity financing/stock borrowing by commercial banks.

### Risk Management

- The risk manager walked us through the “Global Risk Management Update” presentation she gave to Lehman’s Management Committee, which includes the Executive Committee members as well as senior level managers in various operating areas. The purpose of the briefing was to make sure that senior management was fully informed about what the Global Risk Management department was doing. She stated she received great feedback and support for the initiatives the department was pursuing. This presentation was similar to the “Town Hall” presentations she had made earlier to all of her personnel, to make sure everyone in her group was well informed. The risk manager also stated she meets with Joe Gregory, Lehman’s President and COO on a monthly basis.
- The risk manager discussed some of the initiatives that the group has been or is currently working on including:
  - Realigning the credit risk from a geographical focus (i.e. country focus) to a sector focus (i.e. industry) with a country risk analysis overlay for countries of particular credit uniqueness (e.g. Germany, Italy, Emerging Markets, etc).
  - Also to provide a consistent approach, the Head of London credit is now also the Global Head of Sovereign Credit and the Head of NY credit is now also the Global Head of Hedge Funds.
  - Took the quantitative groups out of market and credit risk and put them in one group under Eduardo Canabarro.
  - Established formal global and regional credit risk committees (internal to credit) to help provide consistent framework, limits, and sector reviews. The goal is to establish within credit a consistent framework that is first based on a structured and analytical approach and then adds a qualitative/judgement overlay. She described this as a major cultural change for the credit risk personnel.
  - The risk manager has set up a mandatory quant training program to give the credit personnel (which mostly have a fundamental credit analysis background) more quantitative analytical skills.
- There was an article in the Wall Street journal that spoke about the large increase in the securitization of home equity loans this year. The article mentioned that Lehman had sold its largest home-equity securitization to date, \$3.6 billion. We asked if there was a shift in product mix within the MBS/ABS space for Lehman. The risk manager stated that there was no big story for Lehman regarding this area. He stated that this was just the normal building up of inventory and securitization transaction and that this product was not becoming “bigger than normal” for Lehman. The risk manager also stated that most of the inventory here was first liens not second liens.

For follow up

- Although the measured risk decreased for the U.S. convertible bond and the Municipal bond business during July, both these businesses have remained above their VaR limits for multiple months now. We will continue to have conversations regarding this area.
- The risk manager noted that there was a large demand for high-yield bank loans, especially by hedge funds seeking yield. At next month's meeting, we will follow up on this statement and see what if any impact this is having on Lehman and on the market in general.

JTG 08/24/04

## Lehman Brothers

(Package dated August 31; discussion on September 16)

For Lehman: Mike Schultz and Ed Grieb

For SEC: Mike Hsu, Bob Cleland, Bob Seabolt, Lori Bettinger, Steve Spurry, Michelle Danis and Matt Eichner

- Ed Grieb commented on the third quarter financial performance that will be discussed during next week's conference call. He noted that overall performance was off a bit compared to the second quarter, but still strong relative to the third quarter of 2003. He commented that high grade credit was off a bit but that structured credit, such as CLO and CDO deals, remained strong. Equity flows continued to be somewhat anemic, although the Lehman equity underwriting pipeline is relatively full. He noted that a number of deals involve i-securities, a hybrid product with high-yield and equity pieces that are issued together but can trade separately after ninety days.
- Ed also noted that, in addition to the acquisition earlier in the year of Staten Island Mortgage, Lehman had acquired mortgage originators in the U.K. Like in the U.S., the firm hopes to improve sourcing of collateral with further acquisitions. When asked whether the business model surrounding mortgages differs in Europe, Ed and Mike cited the preference for floating rate products as characteristic of the U.K. market.
- Mike Schultz cited two significant changes in the risk profile. First, measured risk associated with mortgages fell. This was in part due to securitizations, but also reflective of a change in hedging strategy. By switching from swaps to passthroughs as the primary means of hedging the mortgage book rate risk, exposure to the mortgage/swaps basis was reduced. Mike said this was a comfort issue for managers battening down the hatches in advance of leaving town for vacation and the arrival of the conventioners. Overall, measured risk associated with mortgages fell from \$15 million at the end of July to \$10 million at the end of August.
- High yield exposure also fell sharply, from a measured risk of \$9.2 million at the end of July to \$5.8 million at the end of August. The sole driver was the transfer of a large position from the high-yield book after it was effectively sold forward to another institution. Mike noted that the overall business remains strong, with significant deal flow and continued appetite on the part of institutional customers.
- Risk fell in the equity volatility business as the desk purchased a substantial volume of S&P call options. Given the low cost of equity volatility, the desk found the position quite attractive. Rather than hedge the delta associated with the long calls, the desk is running a substantial long delta position in accordance with a generally positive view on the future path of equity prices. Mike was asked (once again) whether a volatility business running a substantial delta exposure is any grounds for concern with regard to risk governance issues. He replied (once again) that delta exposure within the applicable limits raised no issues, particularly when established

through long positions in options. He explained that the delta/gamma ratio was a measure that he (as the equity risk manager) was tracking.

- The firm undertook a modest rebalancing trade in Europe as the composition of the Eurostoxx was adjusted. Mike, in response to a question, said that margin compression on these rebalancing trades in Europe was less of a problem from the dealer perspective than in the United States.
- The firm continues to run substantial positions in convertible debt in Asia. These positions were acquired opportunistically, but have since bled P/L.
- A noticeable spike in the fixed income VaR was caused by a European government debt trade.
- The firm maintains a substantial sized carry trade in Turkish government debt. Mike noted that the term of the long leg was sufficiently short (i.e. less than one year) that they believed that there would be sufficient liquidity if an exit were necessary.

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## Lehman Brothers

(Package dated September 30; discussion on October 22)

For Lehman: Madelyn Antoncic, Ed Grieb, and Jeff Goodman (for the mortgage discussion)

For SEC: Lori Bettinger, Bob Cleland, Michelle Danis, Matt Eichner, Jim Giles, and David Lynch

- Global VaR increased from \$24.9 to \$30.2 million. Overall, fixed income VaR increased by \$3 million to \$31.7, and equities VaR increased by \$2.1 million to \$6.3. Within fixed income, VaR for IR products increased by \$1.7 million to \$13.2 million. In equities, VaR for the volatility business increased from \$2.6 to \$4.3 million. The desk has a long gamma position of \$26.2 million due to a long short-dated S&P call option position. Madelyn remarked that the firm is structurally getting rid of Asian positions in this space, as the volatility is not there to support the business. [However, VaR in Volatility Business in Asia increased from \$2.9 to \$3.5 million. We will follow up on this next month.]
- Ed Grieb commented on the market environment over the past month. Increasing oil prices and continued low levels of volatility contributed to softer earnings. There was not a lot of activity in fixed income, while equities were up a bit over the convention- and vacation-depressed levels of August.
- In the banking sector, some leveraged finance deals were deferred until post-election. The sense is that the current market environment of tight spreads cannot get worse and may in fact get better after the election. During the past month, four IPOs were completed. There are several sponsor deals in the pipeline that are expected to be completed over the next few months.
- S&P recently raised its view on Lehman Brothers to positive from stable. While S&P has not yet changed Lehman's credit rating, Madelyn expects that to happen in the near future.
- Lehman currently has a macro hedge on IR and FX products where they are short 10 year Treasuries and short USD. This hedge is put on at the level of "liquid products," which is above the desk. The hedge is put on at this level because they do not want to micromanage the traders, and in fact the position the trader has could be the result of market making in customer flow.
- Madelyn discussed the issue of hedge fund redemptions. The market has seen a pull back in hedge funds, with the Marin Convert Fund a well-publicized example of a hedge fund limiting investor withdrawals. Lehman manages its exposure to hedge funds through its haircuts (i.e., extra collateral). Madelyn also mentioned that they are developing incentives such as lower haircuts on aggregate positions to get hedge funds to move all their positions to Lehman. This allows Lehman to monitor more fully what the hedge funds are doing.
- There was a question about Lehman's interest in NPLs in Europe. Madelyn responded that they were active in this area in Asia, and it was a very profitable line

of business. Asia generally has no loan servicing, and it took very little to get the NPLs to perform. Lehman looked at a couple of deals in Europe and searched for partners, but ultimately they were not comfortable with proceeding. An understanding of the foreclosure process is critical. They plan to continue to look for opportunities in this space.

- Madelyn was asked about the effect of the current situation with MarshMac, and more broadly about how Lehman handles idiosyncratic credit risk. She indicated that proper diligence is key, as well as mitigation and termination triggers up front. She is currently working on a report of possible insurance sector scenarios and their effects on Lehman. We will follow up on this report next time.
- Ed Grieb gave a presentation on “i-securities” that were mentioned during last month’s meeting. This is a hybrid finance vehicle used for IPOs of low-growth, high-cashflow companies. The i-security (also known as EIU (Equity Income Units), EIS (Enhanced Income Securities), or IDS (Income Deposit Securities)) consists of one unit of dividend-paying common stock and a specified dollar amount of high yield perpetual debt. The bundled units trade together for 90 days and then can trade separately.
  - I-securities are a way for companies without the growth potential required for a traditional IPO to raise capital. One drawback to the structure is that the company never de-levers, as the perpetual debt will always be outstanding.
  - The 15% dividend tax rate makes this an especially attractive instrument for investors. Investors in i-securities receive efficient and predictable cash flows, but these companies are non-investment grade with ratings in the B/CCC category.
  - Lehman participated in the issuance of i-securities for B&G Foods, the maker of pickles and other food products. They currently have three other offerings in the pipeline: Alliance Laundry Systems, Carrolls Corporation, and Cincinnati Yellow Pages. These issuances have nice fees for Lehman attached.
- Jeff Goodman gave a presentation on the European mortgage markets. As mentioned during last month’s meeting, Lehman recently acquired two mortgage originators in the U.K. Compared to the U.S. secondary mortgage market, the European market is much smaller (\$750 billion versus \$190 billion in securitizations). A critical difference between the two markets is that European mortgages are almost entirely LIBOR floaters with prepayment penalties, while a large segment of the U.S. mortgages are fixed rate prepayable without penalty. Securitizations have a bullet structure, where the cash flow from the underlying pool of mortgages is used to pay coupons. Essentially, these have a corporate debt flavor with mortgages being the underlying collateral.
  - Lehman’s is specifically becoming involved in the non-conforming sector (roughly between subprime and Alt-A in the U.S.) of the U.K. mortgage market. Non-conforming loans do not meet prime lenders’ underwriting guidelines, and this segment of the market has taken off since the mid to late ‘90s. Deals in this space have a senior subordinated structure, and they source collateral via

origination. To date, Lehman has \$8 billion in securitizations in 19 deals in the non-conforming sector.

- Risk management in this space is to map whole loans into the projected capital structure. Spread risk is the major driver of risk. Because of the floating nature of the collateral, there are no convexity issues.

Michelle Danis, Version: 10/26/04



## Lehman Brothers

(Package dated October 29; discussion on November 18)

For Lehman: Madelyn Antoncic and Ed Grieb

For SEC: Lori Bettinger, Bob Cleland, Michelle Danis, Matt Eichner, Michael Hsu, Bob Seabolt and Steve Spurry

- Global VaR decreased from \$30.2 to \$23.7 million. Overall, fixed income VaR decreased by \$4.4 million to \$27.3, and equities VaR decreased by \$2.3 million to \$4.0. Within fixed income, VaR for the securitized business increased by \$2.9 million to \$14.3 million. Lehman is short mortgages in this space, but have hedged out the volatility, resulting in a short mortgage option-adjusted spread (OAS) position. This position is a result of the continued tight spreads. In equities, VaR for the volatility business decreased from \$4.3 to \$2.7 million. The business continues its long delta and gamma position due to long short-dated S&P call options. Lehman is also long outright cash in this space, resulting from a bullish perspective on the market.
- VaR in the cash products space in equities increased slightly from \$2.0 to \$2.3 million. The potential pipeline for block trades is currently long. Unlike previous trades relating to the Russell rebalancing, this is not a blind basket. In the FX space, Lehman is short the dollar. Madelyn noted (with disbelief) that Russia was upgraded to investment grade by Fitch. Counterparty credit risk was up slightly due to increased exposure to a Luxembourg-based mutual fund counterparty.
- The hedge fund redemption story that was predominant last month has died down. Redemptions by funds of funds have slowed, but Madelyn continues to monitor the situation. As follow-up to another issue raised last month, Madelyn investigated the MarshMac situation further and did not find any fall-out for Lehman.
- Ed Grieb commented on Lehman's financial performance over the past month. October was a good month, with revenues in excess of \$1 billion and net income of \$212 million. Lehman is planning a \$700 million dividend payment (timing?) to mitigate the \$2 billion in excess capital they currently have. Volumes were higher in both equities and fixed income. One weak area was operations across the board in Europe. Banking had their best month since October 2000 as a result of deals with nice fees attached. Ed mentioned three deals in particular:
  - Cingular Wireless's acquisition of AT&T Wireless.
  - A General Mills convertible trade. Madelyn was very involved in this deal, which concerned issuing a convertible bond. General Mills did not want to issue the bond directly because of tax implications, thus Lehman's role was to facilitate the issuance. The bond has a reset feature, meaning that the conversion price resets at certain dates as a function of the stock price during the preceding period.
  - An IPO for U-Store-It, a self-storage REIT.

- Madelyn walked us through a presentation that she, Chris O'Meara and Ian ?? gave to Lehman's board on November 16. Dick Fuld, CEO, is very involved in every deal, and Madelyn meets regularly with the Board or Finance Committee to brief them on details of trades. The information contained in this presentation is highly confidential, especially concerning risk appetite usage numbers.
  - Madelyn stressed that risk management involves the whole firm, not simply Madelyn's group. Employees own 30% of the firm, and thus incentives are aligned for employees to reinforce internal control culture and discipline.
  - The most important aspect of risk management is to work proactively with the risk-taking areas of the firm before transactions occur. This helps ensure that the least risky deal structure is executed, and helps ensure that risk mitigants are in place, including getting appropriate levels of collateral and appropriate hedging strategies.
  - The risk control environment works proactively to minimize valuation model risk. Key to this is demonstrating good two-way flow. If a business is always on one side of a market, the assumption should be that something is wrong with their views and valuation models. This is something that Madelyn monitors constantly. There is always a risk that the whole market is wrong (i.e., the internet stock bubble), but if the book is balanced there will not be huge surprises.
    - As an example, the CDO business had a pattern of selling the senior and equity tranches of deals and keeping the mezzanine pieces. The business consistently had a view that the mezz pieces were cheap. Madelyn wanted them to prove it in the marketplace by selling the mezz pieces. The bottom line is that you do not want the business to keep the toxic waste.
    - An example of a business with good two-way flow is mortgages. Lehman's mortgage business is vertically integrated, and this allows them the flexibility to design structures that they know will sell, and to instruct originators to generate collateral consistent with that structure.
    - In contrast to Lehman, Fannie and Freddie are structurally long mortgages and in need of instruments to hedge their short convexity positions. Thus, they are always on one side of the market and do not see the two-way flow. This is not desirable from a risk management perspective.
  - An important component in the risk management framework is the Risk Appetite Limit. The Risk Appetite is the amount of money that the firm is prepared to lose on an annual basis from market and counterparty credit risk, as well as from stress events. The Risk Appetite is calculated by taking baseline revenue projections from exogenous sources (M&A activities and IPO, High Grade, and High Yield Originations) adjusted for downturns, subtracting compensation costs necessary to protect the firm for the long-term, and subtracting a minimally acceptable return on total equity (ROTE). The resulting number is the firm's Risk Appetite, and is approved by the Executive Committee on an annual basis and is reviewed quarterly for requisite changes.

- Risk Appetite Usage is measured on a global basis and reported daily against the Risk Appetite Limit. It is composed of three factors, the details of which are contained on page 7 in the presentation:
  - Market Risk, which measures the potential mark-to-market loss on all positions from adverse market moves
  - Stress Event Risk, which measures stress and “gap risks” which go beyond potential market losses.
  - Counterparty Credit Risk, which measures the potential loss the firm can suffer due to forward settlements, financing and derivative transactions with our customers.
- Stress tests and scenario analyses are performed to evaluate the potential P&L impact on a portfolio. Hypothetical scenarios driven by macro fundamental shifts are also run. Re-runs of historical episodes are also performed to evaluate the impact on the current portfolio of a repeat of stressed time periods, such as the Russian Default Contagion and LTCM episode, etc.
- *Highly confidential*: Lehman’s overall risk usage runs at about 80-85% of the limit, and has been relatively stable at \$1.64 billion (annualized number). The composition of the aggregate number has changed over the years from predominately event risk to predominately market risk. Madelyn views this as a positive development because market risk is diversifiable whereas event risk is not. Risk usage for fixed income products is down despite the fact that originations are up, as a result of hedging that has sold out the risk. In the equities space, current risk usage is unchanged from year-end 2003, but there are several spikes in the time series resulting from the ebbs-and-flows of institutional client business.
- Daily P/L averaged \$32 million from September 2003 through August 2004, with five negative days within predicted VaR. Lehman compares daily P/L to ex ante calculated VaR as a type of backtesting for the VaR model. There was a discussion about the inappropriateness of analysts’ comparisons of VaR across firms, and Madelyn has been tapped to write an op-ed for The Financial Times on the subject.

Michelle Danis, Version: 11/23/04

## Lehman Brothers

(Package dated November 30; discussion on December 16)

For Lehman: Madelyn Antoncic, Ed Grieb, and Eduardo Canabarro (for the model review discussion)

For SEC: Lori Bettinger, Bob Cleland, Michelle Danis, Jim Giles, Michael Hsu, Bob Seabolt, Steve Spurry and P.C. Venkatesh

- Global VaR increased from \$23.7 to \$32.1 million. Overall, fixed income VaR increased by \$7.5 million to \$34.8, and equities VaR increased by \$3.4 million to \$7.4. Within fixed income, VaR for the securitized business increased by \$3.9 million to \$18.2 million. Lehman continues to short mortgages in this space with swaptions hedging out the volatility, resulting in a short mortgage option-adjusted spread (OAS) position. This position is a result of the continued tight spreads. In equities, VaR for the syndicate business increased from \$1.7 to \$6.1 million as the result of a large block trade by an Employee Stock Ownership Plan (ESOP) selling shares acquired when a bank bought another bank and paid in shares.
- Madelyn commented on three main drivers on exposures during November:
  - A short US dollar position versus major currencies (Sterling, Euro, and Yen) driven both by customer demand and by Lehman expressing a view. The PV01 for the Euro increased from \$75 last month to \$268, while the PV01 for the dollar decreased from -\$100 to -\$370. As of mid-December, the aggregate short position had come down substantially to \$500 million.
  - A short interest rate position across the board. As mentioned previously, they continue with a short mortgage position because of the view that spread levels are extremely low.
  - A pickup in equity business, specifically an increase in IPOs and in block trades. The commitment calendar is still busy heading to the end of the year.
- High Yield loan exposure was up significantly in the consumer cyclical sector due to one outsized transaction, resulting in committed exposure rising from \$1,076 to \$2,387 million, and funded exposure rising from \$556 to \$981 million. The loan was to a European betting company to complete its second dividend recapitalization of the year. The company is a very profitable “cash cow” that retired its debt, leading to a large equity position. Its investors took out the equity as a dividend payment and replaced the capital structure with loans. Lehman syndicated the position down and also engaged in some hedging of the position.
  - The main risk of this type of deal is “syndication risk.” Will Lehman be able to syndicate out the deal in the market at the time the deal is funded? Madelyn stressed that she watches the timing of deals, and from a risk mitigation standpoint she prefers shorter dated deals, as there is more market visibility.
  - We had a brief discussion about the process a loan such as this would go through before Lehman would agree to extend the commitment. There is a

Commitment Committee that works with the deal team to study the specifics of the deal. The deal would then go through the High Yield Committee within the fixed income division, then to a firmwide committee, in which Madelyn participates. The purpose of these committees is to drill into the specifics of the deals. For example, they want to know how they are going to turn the company around, and what the exit strategy is. As Madelyn has stressed in the past, Dick Fuld gets involved in the specifics of most every deal. She gave the example of a small deal in the \$125 million range in which Dick became involved because of some thorny legal issues.

- CSE preparations have started at Lehman. They hope to have a draft application to us sometime in February, and have made staffing arrangements. Laura Vecchio has been charged with managing the CSE process, with help from Matt Stadler and Tony Stucchio. We will possibly discuss some liquidity and funding issues at the next review meeting, depending on the timing of a treasury personnel reorganization.
- Lehman released their fiscal year end earnings on the day before our meeting. Ed Grieb walked us through the numbers. They had a very strong quarter, with record revenues and net income for fiscal 2004. The strong results were driven by banking, with record M&A activity and a strong pipeline. Equities were also up due to post-election volume. In the fixed income space, mortgages continued to be strong and FX trading was a record levels with demand to hedge dollar exposures. Capital increased to the \$2.3 billion range, in spite of a \$1.2 billion dividend payout at the end of November. Their target capital level is the \$1.5 billion range.
- Lehman continues to be bullish into the first quarter of '05. There were several questions during the earnings call about how Lehman plans to sustain such growth, especially if fixed income is off. Lehman does forecast that fixed income may drop but that they will continue to grow on the equity side. Banking continues to pick up. In one high profile deal, Lehman is an advisor to Sprint in their recently announced acquisition of Nextel.
- Eduardo Canabarro briefed us on the proposed model control guidelines being implemented for the equities division. A handout is available at <J:\ORA\OTCDD Application Amendments\LBOTC\Model Control Guidelines.doc> that explains the process in detail, but the salient features are highlighted below.
  - Models at Lehman for pricing and hedging, especially prevalent in the exotics space, are designed by quants. Quants report to the research group, who then report to the business divisional head. While quants do not report directly to a trading unit, they do report to the business. Thus, their position is quasi-independent. There are approximately 20-25 quants, who are dedicated to specific businesses.
  - Eduardo's group consists of 5 model reviewers. The idea is to give responsibility for and ownership of models to the business units, with oversight conducted by the model review staff. The model review staff philosophy is to "trust but verify." They have told the quant staff to tell them everything they think they should know, and they are clear that "violations will be felonies." Risk management is putting a lot of responsibility on the front office, and they want clearly defined responsibilities.

- The basic process will have quants developing, documenting, and testing models, which will then be implemented into the technology platform. Once the business unit signs off on the model, risk management must be notified. The model is under a temporary approval until it has been independently reviewed and approved by risk management and product controllers. Risk management will be concerned with global issues, such as whether or not all market elements are captured or the impact of changes in model parameters. Implementation accuracy will be picked up via evidence submitted to the group as part of the documentation process.
- Risk management envisions focusing their attention on exotics. This class of products is less than 5% of the volume, but is extremely model dependent because of the lack of a transparent market.
- As a major “carrot” to get the businesses to comply with these guidelines, no P&L will be released until the model has approved.
- This process is being implemented in equities now, with plans to roll out to the fixed income division soon. We will be updated throughout the year on how the implementation is proceeding. Eduardo sees this as an opportune time, because of CSE and SOX, to formalize the model review process. Lehman has devoted a considerable amount of resources to the process because of the regulatory impetus.

Michelle Danis, Version: 12/21/04

## Lehman Brothers

(Package dated December 31; discussion on January 20)

For Lehman: Madelyn Antoncic, Ed Grieb, Tony Stucchio, Mimi \_\_\_\_, and Robert Azerad and Nahill Younis (for the liquidity and funding discussion)

For SEC: Lori Bettinger, Bob Cleland, Michelle Danis, Jim Giles, and Bob Seabolt

- Global VaR increased from \$32.1 to \$48.3 million. Overall, fixed income VaR increased by \$10.3 million to \$45.1, and equities VaR increased by \$6.2 million to \$13.6. Within fixed income, VaR for the Credit Businesses increased by \$5.3 million to \$16.8 million (\$13.4 in America) as a result of a long Emerging Market spread exposure. Note that VaR Limits are subject to change consistent with new Risk Appetite Limit, which is undergoing its quarterly review and annual approval by the Executive Committee. Madelyn expects limits to be increased, as the firm's budget is being revised upward in light of the firm's success at the end of 2005 (after the budget was set in October). [See the monthly notes from October 2004 when the Risk Appetite Limit was discussed.]
- Madelyn commented on the main drivers of exposures during December. The market is strong in the High Yield space, but there has been a definite slowing of the pipeline. There is a good stock of commitments that are in the market now or will be soon, but there is uncertainty as to what is coming after this current batch. Among the other risk drivers:
  - A previous short US dollar position versus major currencies (Sterling, Euro, and Yen) has come down significantly. They continue to be short the US dollar versus the Mexican Peso, but they at times during the month were actually short the Euro. Delta for the Euro has decreased to -\$100 at month-end December from \$410 in November.
  - A previous short interest rate position across the board has changed to a short position in the U.S. curve only.
  - A trade in mortgage basis continues. This is a continuation of an ongoing strategy to short mortgages with swaptions hedging out the volatility, resulting in a short mortgage option-adjusted spread (OAS) position.
  - They are short credit spreads in the investment grade space. [inconsistent with numbers in package? is this only post-Dec 31? It looks like in the packet they are long credit. I have in my notes that Rick Grida is bullish on credit, and is short credit spreads (same as you). But they are very long credit (almost 3 billion on Dec. 31, so I don't see how they could be short by January 20. This would make more sense if they are "short protection," because then they would be long credit spreads. I think you would go short protection if you're bullish?]
  - They have a net long delta position in the equity space. This is partly the result of a long short-dated S&P call option position that has continued for several months now.

- They are continuing to work down several large block trades. Many block trades came to market in the past month, and the pipeline at one point reached greater than \$3 billion. The pipeline has now dwindled to \$60 million.
- They continue to like munis because of the overall level of the the curve. VaR, currently at \$12.8 million, continues to exceed its \$7 million limit.
- There was a change implemented in the calculation of High Yield VaR. They are now capturing commitments at an earlier stage, and this resulted in an increase in HY VaR from \$9.9 to \$11.7 million.
- The High Yield loan committed exposure was down significantly in the consumer cyclical sector as a result of the further completion of the outsized dividend recapitalization transaction discussed last month. Committed exposure was down to \$1,472 from \$2,387 million. Funded exposure rose slightly to \$1,078 from \$981 million last month.
- Last month Lehman became the first foreign firm to have a license to trade fixed-income and equity OTC derivatives in Korea. A question was asked whether this was an additional risk factor on Madelyn's radar screen, and she indicated that this office (which will function as a branch office) will be selling very vanilla products. The risk will be booked in Tokyo, and they have hired two Korea-based risk managers (market and credit) to oversee operations. They do not have big business plans for this operation. In the region, most of their business comes from real estate projects and from distressed debt. As Madelyn has indicated in previous conversations, there is tremendous upside from the servicing of distressed debt in Asia.
- Ed Grieb walked us through the numbers for December. It was yet another very strong month with record revenues. M&A revenues were strong with many deals pushed to completion before year-end. They received a large placement fee from managing the sale of \$5 billion of Fannie Mae preferred stock. Credit products were down slightly due to the holidays, while FX remained strong. Net income was \$323 million on \$1.36 billion revenue. Capital decreased over last month to \$1.9 billion.
- Robert Azerad and Nahill Younis from the Treasury gave us an introduction to the Funding Framework. A very detailed presentation is on at J:\ORA\Monthly Risk Memos\Lehman Notes\lehman\_funding. Some of the highlights of the presentation are below.
  - The Funding Framework provides a set of rules which seeks to mitigate all sources of liquidity risk wherever possible. As a result, Lehman as decreased its reliance on short term funding from 20% of total debt in 1998 to 4% in 3Q2004.
  - Some of the guiding principles they use include (1) not to rely on asset sales or increases in unsecured borrowings in a liquidity crisis, (2) not to overestimate the availability of secured financing in a liquidity crisis, and (3) that legal entity structure constrains liquidity flows.
  - The "Liquidity Pool" covers, in a stressed liquidity environment, all expected cash flows for one year. The pool is invested in cash and money market instruments and unencumbered liquid collateral that can be monetized in short notice.



Lehman has approximately \$15-18 billion liquidity in the form of cash or assets that are easily monetized.

- In addition to the liquidity pool, Lehman is expanding the use of innovative funding vehicles that provide additional liquidity protection at a lower cost such as committed credit facilities.
  - “Cash capital” represents funding with a maturity extending beyond one year.
  - Legal entity structure is of critical importance with regard to mobilizing and pooling cash at the holding company to meet maturing liabilities. Lehman tracks the liquidity of the Holding Company separately from the regulated entities, and maintains cash capital surpluses in their regulated entities as well as in the Holding Company.
- Additional topics to be discussed at the next meeting include:
    - Global VaR increased \$16.2 million, to \$48.3 million (a 50% increase). The risk manager explained that the firm is recalculating its 2005 budget in light of its profitability at the end of 2005, and the firm’s risk appetite will increase accordingly. We will discuss the finalized limits during the next meeting.
    - There will be a half-hour discussion on CSE preparations.
    - There will be a discussion on the models currently in the BD-lite inventory, and a brief discussion on how they are occasionally used on a one-off basis.

Michelle Danis, Version: 1/24/05

## Lehman Brothers

(Package dated January 31; discussion on February 16)

For Lehman: Ed Grieb, Tony Stucchio, Matt Stadler, Laura Stucchio, Eduardo Canabarro, Mike Schultz, and Spyros Papadakis

For SEC: Lori Bettinger, Michelle Danis, Matt Eichner, and Bob Seabolt

- Ed Grieb walked us through the numbers for January. It was yet another very strong month with revenues second only to December. Net income was \$250 million. Fixed income sales and origination was strong, but banking was off a bit. The Private Client Services business has been rebranded as Investment Management.
- Eduardo Canabarro gave a short presentation on the equity derivatives models currently approved for use in LOTC. This is a continuation of ongoing discussions around the Model Control Guidelines recently implemented by Lehman in the equities division. Eduardo requested guidance on the use of “unapproved” models that are slight variations of approved models on a limited and temporary basis. These unapproved models (i.e., models that have not gone through the formal Model Control Guidelines) must frequently be done quickly to respond to customer demand. Matt sent an email to Eduardo on 1/28/05 that such uses are acceptable on a limited basis, provided that written notice of the circumstances and details of the trades are provided as soon as is practical.
  - An example of a model that is a slight variation of an existing model is ConvertReset2FD. This model is a variation of ConvertResetFD, which computes the value and greeks of a convertible bond (or a preferred stock) with callable features and with re-settable strike prices using the finite difference method. ConvertReset2FD allows the reset strike to be capped and/or floored relative to the running conversion price. There is also a choice to use different combinations of absolute or relative caps or floors for each reset date.
- Spyros Papadakis gave an overview of ELITES, a new product in LOTC that is essentially a zero strike prepaid forward. Because of the structure of the product, it will be a registered security with a cusip number. B-D lite rules state that only securities used to hedge derivatives can be in LOTC, therefore, allowing ELITES to be booked in LOTC will require an exemption. We agreed to analyze this issue and get back to them. **Yes, and Matt seemed to feel that this is really a question for the lawyers as well (as it requires a rule exception, booking issues, etc.) [is this the gist of the conversation?]**
- We had a discussion about the upcoming CSE evaluation process. Lehman is on target to submit their draft application the last week in February, and the field work process will begin in May. We explained the procedure that Market Reg has followed in past reviews, with a kick off meeting followed by three teams (Liquidity and Funding, Market Risk, Credit Risk) holding targeted meetings over the subsequent six weeks. The exact form of the kick off meeting is up for discussion, but will most likely take place over one day only. Lehman is open to beginning the field work process as soon as we are willing, but they understand we are busy with Morgan’s application right now. We discussed getting short presentations on various

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topics at the regular monthly meetings along the lines of the recent Funding Framework discussion. We will follow up with a list of potential topics in the next few weeks.

- Mike Schultz walked us through the monthly risk package. Global VaR stands at \$48.9 million. The current month's package states that 12/31/04 global VaR was \$40.8; however, last month's package shows a 12/31/04 global VaR of \$48.3 million. Fixed income VaR is at \$46.6 million and equities VaR is at \$10.9 million. The risk limits changed as a result of the new Risk Appetite Limit, and Madelyn will walk us through this in a conference call this week as she was unable to attend the meeting.
- The main drivers of exposures included the following.
  - Within fixed income, there was an increase in the VaR for Interest Rate products to \$16.9. This was due to an increase in risk in Europe as well as a reallocation of VaR between a JV between IR products and mortgages.
  - There was a reduction in VaR in the High Grade Credit Business to 7.0 as a result of reductions in the Emerging Markets Business.
  - In the equities space, Lehman currently has an outright delta position of nearly \$900 million. A significant driver of this is a long delta position in the Asian volatility world. They have a negative gamma position in the Americas of over \$100 million, but this is a misleading number. Lehman has a dispersion trade in which they are short an index and long the components of the index. They overhedge the short index because the volatility of the index is lower than the volatility of the components. By adding the individual gammas, you don't see this and the aggregation is misleading. The delta for European Convertibles is \$131.5 million, but these are directional trades mostly in indices with no single name concentrations.
  - To follow up on a question from last month, we asked Mike about the long credit spread DV01 that appears in the risk package and the "short credit spread" story we got last month. He believes that Lehman has a credit curve play where they are short investment grade spreads and long non-investment grade spreads, with the net effect being a long DV01. We will follow up with Madelyn.
  - In the FX space, Lehman has gone from a negative gamma to a positive gamma position. This was driven by a change in the gamma position for the Euro from negative \$890 to positive \$294 million. The long yen position has been reduced significantly and the delta has fallen from \$166 to negative \$73.
  - There was a decrease in overall credit exposure, mainly due to equity finance positions in very liquid names.
- Additional topics to be discussed at the next meeting include:
  - We will discuss the revised Risk Appetite Limits during a conference call with Madelyn Antoncic during the week of 2/22 or at the next meet

ADDENDUM: Phone Conversation with Madeline Antoncic held on Monday, March 7 at 10:00AM, to follow-up on changes to risk appetite

- Risk management has been thinking about the appropriate time horizon for data
  - They want a time series long enough to capture volatility, but not so long that it dampens history or picks up nonexistent regimes.
  - For example, the 4 year volatility of equity is greater than 70%, and in reality today it is in the high teens.
- Madeline explained that she focuses on VaR as a measure of “what can I lose tomorrow,” which should reflect what happened yesterday and the day before.
  - This is the belief that for daily VaR, the best predictor of t+1 is t-1 and t-2.
- Currently, Lehman uses three measures of risk. The firm is managed on the Risk Appetite, not VaR.
  - Risk Appetite: 1 year estimate, 95% (incorporates credit, market, and event risk)
  - Daily VaR: 1 day, 95%
  - Economic capital: 1 year or greater (depends on life of trade), catastrophic 99.5%
- As a result of these discussions, Lehman has changed their VaR to incorporate a 10% per month decay factor, or a  $\frac{3}{4}$  year average life.
  - This introduces more volatility into VaR, as it is more reactive to inflection points.
  - For example, if volatility rises, it will be picked up sooner under this regime than with a four year time series. Madeline prefers to switch now (proactively.)
  - In order to make sure that there is not a “black box” phenomenon when VaR changes (i.e. the inability to determine whether positions changed, or the change in VaR was due to volatility in the historical data), Madeline will run two parallel VaRs, one using the new weights, and the other using a standard, unweighted four years of historical data. The weighted version will be reported to senior management, but Madeline will use both versions for the purpose of risk management VaR explain.
  - Madeline also stated that they had run tests to make sure that if the move to exponential weighting caused lower risk measurements, the limits were adjusted accordingly. This did not occur with any frequency.
- During a discussion of Lehman’s Risk Appetite, Madeline reiterated that the Market Risk portion of the overall limit is an annualized version of VaR.
  - The limits are allocated first by region and then by business (although at one point she said by business and then region – CLARIFY during review)
  - While the limits at a division level have been increased, they have not been fully allocated out. Divisions use limits to de-emphasize some areas (real estate) and ramp up others (FX) – note: Michelle pointed out that the FX limit had not changed despite this. Madeline confirmed this but stated that it was a business they wanted to grow.
- We discussed the change in the limits, and the fact that they seemed to point to a loss of diversification. Madeline explained that limits are set by region and then business, and there is no reason to keep the relationship across years. Dave

Goldfarb allocates across divisions, and within divisions the head allocates limits.

**NEED to discuss limit setting, diversification, etc. during review.**

- Madeline confirmed that in December, Lehman had been long CS01 briefly (breaking with their strategy of being short credit spreads). In January, they again reverted to being short spreads.
- She also mentioned a problem with an FX engine (?Murex) that caused problems with Monte Carlo simulation. She stated that Lehman is switching to FX Spirit, which should fix the problem. **(not sure what this was about)**

Lori Bettinger, Version: 3/10/05

## Lehman Monthly Risk Review

Package dated 2/28/05, Discussion held on 3/17/05

- Lehman had another record quarter. Equity strength was driven by the Fannie Mae deals in December. M & A remains strong, with Lehman involved in 4 of the 10 current deals. FICC recorded record revenues, and F/X and equities had record sales credits. Prime Brokerage balances increased – this is a business that they are growing strategically. They are further along in the equity space, and increasing fixed income PB. We will discuss this business during the CSE review (note: John Wicken appears to be the head of this area, as he is the head of overall financing). Revenue was down in investment management, as Q4 incentive gains are no longer there. AUM increased, as did fees on the core business. The WorldCom settlement was finalized (the 20M deductible has been fully reserved since settling with the insurers last week). Business in Europe and Asia is strong as well, with Europe continuing its turnaround and engaging in higher levels of F/X hedging.
- VaR was down by nearly 21M over the month, driven primarily by a 19.5M reduction in FICC VaR. Equity VaR was down 1.2M. As mentioned in prior reports, at the beginning of December Lehman was net short rates, IR products (government and derivatives) and mortgages, a position which drove up risk. The net short positions in core businesses drove up the correlation. This trend turned around in February, as the net short rates position was down almost 50%. Mortgage DV01 decreased overall (3.3M to 2.8M), although the short position in Agency MBS increased by 800M to 970M. According to Madeline, the rates and mortgage positions changed the diversification impact. The long spread position in high grade is down slightly (70M), driven by lower emerging market positions. We really can't see this in the tables – Madeline mentioned Brazil but it only shows up in the FX Market Risk Summary report (where there is a PV01). We will ask next month how to interpret this table in light of those remarks. The muni desk reduced its VaR usage by 3.7M. Equities were down in every category, including cash and derivatives (the directional index trade was taken off). Also, block trades were taken off the syndicate desk. Within F/X, Lehman had a large short \$ position that was taken off and then put back on. They are current short \$/Yen, \$/Pound, and \$/Peso (a basis trade). They will be opportunistically short the Euro as well.
- Numbers are down for high yield exposure, both in commitments (3.4B to 2.6B) and funded (2B to 1.2B). The pipeline slowed down during the first few months of 2005, but has picked up since (although not at the pace of Q4). Some recent deals missed their EBITDA and the loans were repriced. Lehman mentioned Hansel, Verizon Hawaii, and Telecordia. With Telecordia, JPM was the lead and LB only took on 15%. The senior part of the deal was distributed and the deal was priced. The EBITDA came in below

expectations, and the bond deal was repriced (from 8 7/8 to 10% coupon). The loan was repriced as well. However, the market remains strong. Madeline highlighted the need for flexibility in these deals and MAT clauses.

- Within the credit market, demand for high yield has remained strong, even with GM's widening. The low end of the high-yield market (CCC) had begun to widen prior to GM. There are some sign of softness in the market. Lehman is still long CS01 overall, although they are short in some areas. The head trader takes a fundamentals approach. The goal is to avoid pain during the time of irrational exuberance.
- Madeline spoke about the proliferation of club deals (where 2 or more acquirers work together, for instance with the recent purchase of Toys 'R Us by Bain Capital and KKR). There are two types of deals: refinancing/recapitalization and leveraged buyouts (usually led by private equity companies). The financial sponsors will jointly approach various financial advisors, and ask to see proposed financing structures. They will then pick and choose ideas, mix them together, and assign roles in the deal. Madeline noted that with LBOs, the financial sponsor decides when the business has been "turned around" and is ready to be sold. She is interested to see how this decision-making process will evolve when there are two or three financial sponsors involved in this process (particularly when they may have been used to making unilateral decisions in past deals).
- Lehman continues its talks with Starwood to buy Le Meridian. Lehman has exercised its option to buy Dresner's interest (the mezzanine piece). They are in the final stages of negotiation, but have back-up parties that remain interested if the deal with Starwood falls through. Their main goal is to find an operating company. What may happen is that Le Meridian would be split into two holding companies – one controlling the real estate, and the other the operating entity. The real estate holding company would be owned by Starwood (and possibly others), and Lehman would likely have a small equity share in the operating holding company. They have marked this position conservatively, and expect that they may to get to take some of that back when it sells.
- On the counterparty side, CE is up 162 MM this month, mostly through exposure with highly rated commercial banks. Madeline briefly discussed the credit risk methodology, and their search for better granularity around the recovery rates (rather than the rating). The recovery rate is a function of the instrument's location in the capital structure, and the sector (i.e. higher recovery rates in the energy sector as opposed to lower rates in technology). They differentiate for these factors in the event risk calculation, and now in MPE as well. The reworking of the MPE models is complete, but implementation has not occurred yet. Madeline commented that it is easier to make changes to market risk methodologies because every trade does not

need to be tagged to a counterparty. Lehman is in the process of hiring a new employee to run credit modeling.

- Madeline followed up on the phone conversation regarding the new weighting of time series for VaR (documentation on this change was received from Lehman on March 18). She again stated that the weighting shows inflection points, and is quicker to recognize volatility. For the risk equity calculations, there will still be no weighting (this measures catastrophic loss, and as such, needs longer time horizons).
- Lehman is also working on operational risk, having hired Marcello Cruz last summer. His work is useful in that it has uncovered some efficiency issues that can be addressed internally.

#### **For the memo**

As a precursor to the CSE review, Lehman will give overview presentation on market and credit risk management during the next monthly meeting. (this should be true!)



## Lehman Brothers

(Package dated March 31; discussion on April 21)

For Lehman: Madelyn Antoncic and Ed Grieb

For SEC: Lori Bettinger, Bob Cleland, Matt Comstock, Michelle Danis, Matt Eichner, Mike Hsu, David Lynch, Steve Spurry and PC Venkatesh

- Ed Grieb walked us through the numbers for March. Lehman had approximately \$1.2 billion in revenues, which was 7% off the first quarter run rate. Fixed income was strong as the result of a number of securitizations and the Republic of Italy deal (see below). In the equity space the volume was good but profits were down slightly as a result of market conditions. They are acting as an advisor on Chevron's purchase of Unocal which will show up in future numbers.
- Madelyn walked us through an outsized transaction that Lehman engaged in with the Republic of Italy during March. Italy has approximately 35 billion EUR worth of inflation-linked, fixed-coupon bonds that they wished to swap into floating. Lehman engaged in four swaps to pay a fixed coupon (varying in each swap) on notional linked to inflation and receive 6 month LIBOR minus a fixed spread (varying in each swap) floored at zero on notional linked to inflation. The notional of the swaps accrete according to the European CPI (a harmonized index). The large sizes of the swaps created substantial execution risks. Initially, due to liquidity concerns, they hedged with Bund futures. Over time, they diversified the hedges. Interest rate and inflation risks have since been absorbed into Lehman's books of risks and hedged according to the strategies of the desks. Volatility, correlation (between inflation and interest rates) and counterparty risks are being monitored on an ongoing basis. As Lehman legged into the hedges, fixed income VaR spiked on March 15<sup>th</sup> to nearly \$90 million from about \$35 million. The next day it fell to \$60 million, and then fell below the \$50 million limit for the remainder of the month. Lehman has created a hedging grid based on Italy spreads. As the spreads widen, they will hedge increasing amounts of the exposure. Lehman has a good existing relationship with Italy and has advised them on a number of deals in the past, including a property securitization. However, they believe this large swap was a one-off transaction and are not likely to do more of these large trades with Italy going forward.
  - The current exposure to Italy as of the end of March is \$625 million (second highest counterparty CE), and the MPE is \$1,659 million. The large CE, two weeks after inception of the swap, is based on the fact that this is an in-arrears swap, meaning that the payment is based on LIBOR measured at the end of the period. From mid-March to the end of March, 6 month LIBOR, which Lehman receives, rose.
- VaR increased over the previous month from \$28.1 to \$36.8 million. The largest driver of this change was a macro hedge position put on by FID Corporate that resulted in a \$10.6 million VaR charge. The macro hedge consisted of a short \$1 billion 10 year on the run treasury position and a short \$1 billion 5 year swap position. The trades generated a net DV01 of 1.25M. This is a hedge of business risk associated with rising interest rates, not an offsetting of specific positions. VaR also saw a large decrease in the diversification benefit (50 to 30% over the quarter), in

part due to a short treasury position held by the mortgage desk and an equity position. (not sure what equity position).

- Commitments fell slightly from \$2.6 to \$2.4 billion, and the amount funded also fell from \$1.2 to \$1.1 billion. The leveraged lending business slowed down in March. Some deals in the market worth a couple of billion dollars were pulled, but Lehman's own deals are plugging along. Business in Europe continues to do well, with financial sponsors maintaining a high level of activity. The main concern at Lehman is that market visibility has worsened (i.e., future market conditions are more uncertain), leading them to commit to shorter time horizons.
- Lehman discussed their recent 50M investment in Osperie, a commodities hedge fund. They have a earn-out provision in 06/07, where they could invest an additional 40M, depending on the fund's performance.
- Madelyn just hired a Global Head of Sovereign Risk Management, Jami Miscik, who is an ex deputy director of the CIA. Lehman does not have an Emerging Markets business (it was disbanded in '98), but will opportunistically invest in different countries. Positions in EM countries are managed and monitored within the relevant business unit. That is, interest rate positions are managed within the IR products group, credit products are managed within the Credit Business, etc. An Expected Potentail Loss (EPL) limit by country has been established that is monitored. As an example, Russia has a \$70 million EPL limit with very tight rules (i.e. only ST repos, offshore, under US or UK law) governing the types of positions that can be held. Within emerging markets, the limits used to be allocated on a "first come, first serve" basis. They are now allocated across businesses, by "liquid" and "less-liquid" instruments. Within the liquid category, if a business is below the limit, it may be reallocated to a another business within the liquid category.
- We also had overview presentation by Madelyn on risk management, a presentation by Jeff Glibert on Credit Risk Management, and a presentation by Paul Shotte on Market Risk Management. See separate write ups for these discussions.

#### For Follow Up

- Lehman engaged in a series of interest rate swaps with the Republic of Italy with a notional of nearly 35 billion EUR. In these swaps, Lehman pays a fixed coupon on a notional linked to inflation and receives 6 month LIBOR minus a fixed spread floored at zero on notional linked to inflation. The interest rate and inflation risks have been absorbed into Lehman's books of risks and hedged according to the strategies of the desks. Volatility, correlation (between inflation and interest rates) and counterparty risks are being monitored. We will continue to follow up on these exposures over the coming months.
- Lehman requested guidance as to the accounting treatment of the Italy trade (which caused a huge spike in VaR). They were referred to Corp Fin. Do we need to do any follow-up here?



## Revenue

- Net revenues were down slightly in March, reflecting in part a slowdown of the equity markets. Within capital markets, fixed income has remained strong (mortgage securitizations have remained strong in Europe, and PTG has sold out of some real estates and Asia NPL positions). Investment banking had a good month, as customers moved to lock in rates prior to expected rate increases. Risk arbitrage suffered some losses in the distressed trading space.
- The equity origination pipeline is very strong, but actual originations were slow in April, as customers waited for more optimal timing. M&A activity was also slower, as deals waited on regulatory approval and debt offerings prior to close.

## Market Risk

- VaR decreased by 12.6M to 36.8M. In general, risk-taking is down due to fewer opportunities. The VaR decrease was driven by fixed income (down 13.9M to 37.5M), and specifically by the removal of the macro business hedges and the further hedging of the interest rate swaps with Italy. The macro trades (shorts in 5Y and 10Y Treasuries), which were a business hedge for a gradual slowdown in securitizations, decreased fixed income VaR by 10.6M. With the Italy trades, all risk factors have been hedged completely except for the long vol position, which is being hedged down gradually.
- Equities VaR was unchanged at 17.1M.
- Other positions changes included a reduction in the US high grade spread exposure (decreased by 1M/bp), a reduction of the overall short mortgage exposure, and an increase of F/X exposure primarily due to a short USD/JPY position.
- Within the equity vol business, there is significant negative gamma in the US (from 2% moves through the 25% swings). Paul Shotton stated that there is a belief that implied vol is greater than actual vol, and the desk can pick up the time decay money by being short. We will follow up on this position, as well as the desk's success in micromanaging its delta position.
- Within high grade credit US, we were told that CS01 was reduced significantly, although this cannot be seen by comparing the prior month's packet with this packet. Despite this reduction, the VaR in high grade credit trading increased by 1.4 million. We will follow up to understand the reasons for this apparent discrepancy.

## Credit Risk

- The mark on Italy came down, and had the biggest change on a single-name basis. The only material change in CE was around highly rated names, with de minimus

unsecured hedge fund exposure due to the timing around margin calls (this will always be the case).

## Leveraged Finance

- Global high yield exposure remained relatively unchanged. Jeff Glibert discussed the current market dynamics. Financial sponsors have pulled “opportunistic” trades, where they were entering the market after a very short period of ownership to take advantage of the favorable conditions (sometimes trying to flip their investments within six months). He mentioned a very recent deal, Boise, where the IPO was pulled. The sponsor had only owned the company for six months. Investors have stopped accepting these sorts of deals. However, the market is more receptive to long-term investments. Lehman has been looking at one deal where the investor has had the company for 3 to 4 years, and is starting a new private equity fund and looking to show results from the prior investments. The market is looking upon this favorably, as the company has outperformed expectations and paid down its debt.
- At a more macro level, the tightening of the market allows sponsors which are long cash to come in and compete against IPOs. Lehman mentioned one deal where Merrill Lynch is seeking to do an IPO, and Lehman is backing sponsors who want to buy the company outright.
- The bank loan market remains robust, but the high-yield and PIK markets are struggling.
- The financing pipeline remains strong, including in Europe. LBO sponsors continue to raise money, although a couple of deals have struggled (Sunguard). Sponsors will draw on a bridge loan rather than access the bond market if necessary (happened with Masonite?), and banks should be addressing this possibility in determining the pricing of the bridge. Lehman discussed a recent recap that they did where the bank deal was oversubscribed, so they moved 500M from the bridge to the bank deal and laid off some of the bridge funding risk. For the right deal, the bank market is still a welcoming place.
- Hedge funds continue to be players in the LBO market, with sponsors occasionally working directly with hedge funds in the placement of subordinated debt. Lehman speculated that the hedge funds have in some cases called financial sponsors directly, particularly where they own part of the bank loan and are already familiar with the company and/or sponsor. One issue arising from this trend is marking that type of potentially very illiquid private placement to market, and how it would be financed if the hedge funds sought to do so.

## Hedge funds

- Credit is spending a fair amount of time on margin calls, and have had no issues so far. They feel that much of the last few weeks has been about rumors rather than actual systemic risks. There are two strategies with issues: convertibles, down about 5%, and credit trading. In both cases, some funds were well-positioned and made money during recent market moves.

- Lehman noted that spreads have not continued to blow out. They mentioned that this is very different from 1998, as there are no corporate defaults and no sovereign/emerging market concerns. They characterized the current environment as a “slow bleed” for certain hedge funds. Again, we heard that leverage is down and funds are more diversified. They also noted that with fund of funds, money redeemed from one fund does not leave the hedge fund arena. Rather, it migrates to new strategies or to best-in-class funds (i.e. the CB funds that have been making money – implied vols embedded in CBs are the lowest in 2-3Y, and \$ is still going into this area. Lack of issuances are more of a problem).
- Redemption notices should begin shortly, and Lehman is tracking this. Jeff Glibert referred to these redemptions as a free option, as redemption requests are non-binding and often not actually exercised. This free option makes liquidity management at hedge funds even more relevant.
- Lehman’s stakes in hedge funds are as follows: Marble Bar (10%), Osperie (20%), and GLG (20%). These are equity investments in the hedge fund management, so they earn a percentage of the management company’s net income. They are not necessarily direct investors in the hedge funds themselves.
- Lehman noted that new funds are looking to lock up money for 2 to 4 years, and the market seems to be accepting these demands. These longer lock-up periods may allow hedge funds to avoid registration (not sure about the all the legality behind this).

#### For follow-up

- Lehman is short gamma in the U.S. equity volatility business, and we will follow up on the decision to position themselves for losses with fairly small (+/- 2%) movements in the equity market.
- Lehman noted that while they have not seen much in the way of equity originations or mergers and acquisitions activity during April, their pipeline is very strong and they anticipate a significant pickup in activity. We will follow up on this situation next month.