The Impact of Audit Quality, Analysts' Forecasts and New Accounting Pronouncements on Bond Pricing and Investment: An Empirical Analysis

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A thesis submitted to the University of London for the degree of

Doctor of Philosophy

2007

Abstract

This thesis, which consists of five chapters, examines the impact of pension accounting standard, auditor independence, and analysts' forecasts on the allocation of corporate pension assets to bonds and the pricing of corporate bonds.

Chapter 1 outlines the research motivation and briefly summarizes the major findings. Chapter 2 investigates whether the introduction of the new pension accounting standard FRS 17 in the UK affects corporate pension assets allocated to bonds. The results show that UK companies shifted pension assets from equities to bonds during the transitional period of FRS 17, although in the same period US companies exhibited a slightly decreasing allocation to bonds. Moreover, firms that are more vulnerable to FRS 17 volatility have shifted more pension assets from equities to bonds. Finally, the above findings apply to both those UK firms that only disclosed in accordance with FRS 17 and those UK firms that fully adopted FRS 17 during the transitional period.

Chapter 3 examines the effect of auditor independence on the rating and pricing of corporate bonds. The results show that higher external auditor independence is associated with better bond ratings and lower yield premium. The findings suggest that independent auditors lead to greater accounting conservatism and thus reduced cost of borrowing.

The fourth chapter investigates the effects of analysts' forecasts on the pricing of corporate bonds. I find that earnings forecast and cash flow forecast are significantly and negatively associated with the bond yield premium after controlling for categorical bond ratings and fundamental financial ratios. Moreover, such association is stronger when the perceived default risk or information asymmetry is higher. I conclude that bond investors extract relevant information from analysts' forecasts to assess default risk over and above the categorical bond ratings in pricing corporate bonds. The last chapter concludes.

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Acknowledgement

The support of many individuals has made my four-year journey at London Business School possible.

First and foremost, I owe a great debt of gratitude to my supervisor Eli Amir, for the numerous inspiring discussions, insightful suggestions and his unbounded support. I would also like to thank Arthur Kraft, Dennis Oswald, Henri Servaes, Richard Taffler, Eli Talmor, Ane Tamayo, and Bruce Weber who have been generous with their time, encouragements and comments. In particular, I thank Greg Clinch, Elroy Dimson, Peter Joos, Wayne Landsman, Christian Leuz, Gilad Livne, Peter Pope, and Lakshmanan Shivakumar. It has been my lifetime fortune to attend those PhD-level accounting seminars taught by them.

My heartfelt thanks also go to all the fellow students in the department of accounting, especially Daphne Lui and Maria Simatova, for many helpful discussions and continuous encouragements. I also thank my friend, Chew Swee Cheng, for her warmhearted help and encouragements throughout my PhD study.

Finally, I would like to thank my parents for their unbounded love. I am also grateful to my parents-in-law for their unwavering support. I specially thank my husband, Lun Zhao, whose unlimited support and love have made my life colorful and full of happiness even in the difficult situations.

Chapter 1

Introduction

The bond market provides a significant source of capital for the ongoing operation of the public and private sector. With respect to market capitalization, the bond market is larger than the stock market. According to the statistics released by the International Monetary Fund (IMF), the global stock market capitalization totaled approximately $23 trillion in 2002. In contrast, the value of outstanding debt securities (including both public debt and private debt) on the global bond market amounted to $44 trillion. In particular, the value of outstanding corporate bonds totaled $29 trillion.[1] Moreover, the volume of the new corporate bond issuance each year is substantially larger than that of the new equity issuance (Mishkin, 1998). Anderson et al. (1994) also indicate that, among the three primary external financing channels for corporations – the issuance of bonds, common stocks, and preferred stocks, the bond market remains the most significant external financing channel.

Despite the vital role and the large size of the bond market, the bond-market-based studies in the accounting area are quite limited relative to the studies that focus on the stock market. One reason for this phenomenon is that, relative to the stock market, the bond market is less liquid and bond prices on the secondary market are not always readily available. First and foremost, most bonds are not listed on an exchange. Second, even for the corporate bonds that are listed, the vast majority of trading volume in corporate bonds in most developed markets takes place in the decentralized and dealer-based over-the-counter markets.

[1] Data is taken from the IMF website.

Therefore, a majority of the extant bond-market-based studies rely on the primary bond market data. Among the limited empirical studies on bond pricing, one stream of the literature has examined the impact of financial information and reporting quality on the pricing of corporate bonds. The results indicate that key financial ratios, earning-related fundamental score, and R&D investments are associated with the cost of borrowing, measured as bond ratings and/or bond yield premium (Ziebart and Reiter, 1992; Khurana and Raman, 2003; Shi, 2003). Moreover, prior studies suggest that high disclosure quality rankings and conservative financial reporting reduce the cost of borrowing (Sengupta, 1998; Ahmed et al., 2002).

Another stream of the literature has investigated the impact of capital market functions, such as rating agencies, banks and auditors, on the pricing of corporate bonds. It is well established in the literature that bond ratings released by rating agencies are good indicators of default risk and thus bond rating is an important determinant of firms' debt costs (Fabozzi, 2000). Furthermore, Datta et al. (1999) find that the existence of bank debt lowers the at-issue yield spreads for first public straight bond offers, highlighting the importance of the monitoring role played by banks in the bond market. Pittman and Fortin (2004) indicate that retaining a Big-Six auditor, which can reduce debt-monitoring costs by enhancing the credibility of financial statements, enables young firms to lower their borrowing costs. Mansi et al. (2004) find that auditor size and tenure are negatively and significantly related to the cost of debt financing using secondary bond market data. They conclude that, since auditors provide both an insurance role and an information role, auditor size and tenure matter to capital market participants.

Overall, given the vital role and the large size of the bond market, the extant bond-market-based studies are limited. Especially, researchers have limited knowledge about the impact of many important market functions, such as financial analysts, auditors, accounting policy makers, and institutional investors, on the pricing of corporate bonds. It also remains largely unknown whether and how these market functions influence the aspects of the bond market other than the pricing of bonds.

This thesis contributes to the literature by addressing three research questions. First, I examine the impact of accounting policy makers on the capital flow to the bond market. Specifically, I study whether the introduction of the new pension accounting standard in the UK affects the allocation of pension funds to debt securities. Due to the large size of the investment portfolios of corporate sponsored pension funds, their pension asset allocation has a great impact on the capital flow to the bond market. Second, I examine the effect of auditor independence on the cost of borrowing. As previously noted, auditors provide both an insurance role and an information role to the capital market participants. Auditor size and tenure have been found to reduce the cost of borrowing. I focus on another important aspect of auditor quality attached to external audit - auditor independence. Finally, I investigate whether analysts' forecasts are incorporated by bond investors into default risk assessment and bond pricing. I argue that due to the categorical nature of the published bond ratings, analysts' forecasts may enable bond investors to discern quality difference between bonds with identical or similar ratings.

The research motivation, institutional background and major findings for each study are briefly described below.

The first study investigates whether the introduction of the new pension accounting standard FRS 17 in the UK has had any impact on corporate pension asset allocation to bonds. Corporate sponsored pension funds are important institutional investors and the investment portfolio selection of corporate pension funds has a significant impact on the capital flow to the bond (stock) market. In this study, I examine the effect of accounting recognition and disclosure requirements under FRS 17 on the allocation of pension assets to debt securities.

In November 2000, the Accounting Standards Board (ASB) in the UK issued the new pension accounting standard FRS 17. FRS 17 requires pension asset and liabilities to be valued by reference to the market conditions and the total surplus/deficit in the pension scheme to be recognized as an asset or a liability on the balance sheet. Additionally, actuarial gains/losses arising during the fiscal year are required to be recognized immediately. Therefore, FRS 17 has the potential to introduce a large element of volatility into company balance sheets. FRS 17 significantly differs from its predecessor SSAP 24 and its US counterpart SFAS 87 under which actuarial gains/losses are deferred and amortized to income over average remaining service lives of employees and the surplus/deficit in the pension scheme is mostly kept off-balance-sheet.

I hypothesize that there exists a shift away from equities to bonds in pension asset allocation by UK sponsoring companies after the introduction of FRS 17. I compare the pension asset allocation of those FTSE 350 firms that sponsor defined benefit plans during the transitional period of FRS 17 with that of US public companies covered by Pensions and Investments. The results show that UK firms reduced their pension fund exposure to equities and increased their allocation to bonds during the period 2001-2004, even though in the same period US firms maintained a stable allocation to equities and exhibited a declining trend in the allocation to bonds. I also find that firms that are more vulnerable to FRS 17 volatility shifted more pension asset from equities to bonds. Finally, the above findings apply to both those

UK firms that only disclosed in accordance with FRS 17 and those UK firms that fully adopted FRS 17 during the transitional period.

The second study, coauthored with Eli Amir and Gilad Livne, examines whether greater auditor independence reduces the cost of borrowing. In recent years, following well-known accounting scandals, the ability of auditors to stay independent was questioned. To ensure greater independence, the Sarbanes-Oxley Act of 2002 and various rulings by the Securities and Exchange Commission (SEC) now impose restrictions on the type of activities that can be performed by the external auditor. We argue that independent auditors prefer accounting conservatism to avoid litigation and enhance their reputation. Since accounting conservatism helps avoid excessive dividend payout to shareholders and therefore accounting conservatism is preferred by bondholders, higher auditor independence is expected to be associated with lower cost of debt capital.

We develop measures of auditor independence based on the disclosed audit fees and non-audit fees at both the client level and the auditor level. First, we employ the Basu (1997) regression model to investigate whether auditor independence is associated with greater conditional conservatism (timely loss recognition). Using the primary corporate bond market data, we then investigate whether these measures are associated with the cost of borrowing, measured as bond ratings and bond yield premium. We find that higher external auditor independence is associated with better bond ratings and lower bond yield premium in this market, after controlling for other factors identified in prior literature to affect ratings and yield. We also find that the effect of auditor independence on the bond yield premium is economically significant.

Finally, I investigate whether analysts' forecasts are incorporated by bond investors into the pricing of corporate bonds. Due to the categorical nature of the bond ratings published by the rating agencies, these ratings provide only incomplete indication of default risk. Therefore, bond investors may extract relevant information from analysts' forecasts to complement the categorical ratings in assessing default risk and establishing yield differentials between higher-quality and lower-quality bonds within each single rating category. Accordingly, I expect analysts' forecasts to provide incremental explanatory power for the bond yield premium after controlling for categorical bond ratings and fundamental financial ratios.

I obtain data on new bond issuances from the Security Database Corporation Platinum (SDC) and the final sample comprises a pooled sample of 763 new bond issuances. I find that analysts' earnings forecast and cash flow forecast provide significant incremental explanatory power for the bond yield premium after controlling for categorical bond ratings and fundamental financial ratios. Such association is stronger when the perceived default risk or information asymmetry is higher. The results also show that the incremental explanatory power of analysts' forecasts for the bond yield premium does not depend on the use of the proceeds from debt financing. Moreover, I find that the continuous measures of default risk derived from a simple ordered logit model outperform the categorical bond ratings in explaining the bond yield premium.

In summary, the results in this thesis corroborate the claim that pension accounting standards have a significant impact on corporate pension asset allocation to bonds. The results provide interesting implications for the ongoing changes in the pension accounting standard in the US. The Financial Accounting Standard Board (FASB) launched a two-phase project to reconsider its pension accounting standard SFAS 87 in November 2005. At the first phase US companies are required to recognize the pension funded status on the balance sheet. Some practitioners and researchers have expressed the concern that the changes are likely to prompt a shift of investment away from the equity market to the bond market. This study provides timely empirical evidence on this issue in the UK context. Moreover, the empirical evidence highlights the importance of independent auditors in ensuring accounting conservatism and thus reducing the cost of borrowing. The findings add to the extant literature by suggesting that, apart from auditor size and tenure, auditor independence also matters to bond investors. Finally, the findings suggest that primary bond market investors extract relevant information from analysts' forecasts to assess default risk over and above the categorical bond ratings in order to establish bond yield differentials, especially when the perceived default risk or information asymmetry is high.

The remainder of the thesis is organized as follows. The next chapter explores whether the accounting recognition and disclosure requirements under the new pension accounting standard FRS 17 in the UK have any impact on the allocation of pension assets to debt securities. Chapter 3 details the study that examines the effect of auditor independence on the cost of borrowing, measured as bond ratings and the bond yield premium. The fourth chapter investigates whether the primary bond market investors incorporate analysts' forecasts into default risk assessment and thus bond prices. The last chapter concludes.

Chapter 2

The Effect of Pension Accounting on Corporate Pension Asset Allocation: A Comparative Study of UK and US

2.1. Introduction

The purpose of this study is to investigate the effect of accounting recognition and disclosure on the allocation of pension funds to equity and debt securities. Corporate sponsored pension funds play a significant role in capital markets due to the large size of their investment portfolios. Research by the International Financial Services London shows that corporate pension fund assets in the UK amounted to £896 billion as of December 1, 2005, representing more than one quarter of the £3,450 billion assets managed by all types of UK funds.[2] Hence, asset allocation of corporate-sponsored pension funds has received considerable attention in both the academic literature and the popular business press due to the potentially large economic transactions that are involved.[3] In addition, pension asset allocation has a significant impact on the financial statements of sponsoring corporations because of the key assumptions (e.g., discount rate, expected return on pension assets, etc.) that must be made by corporate managers in the financial reporting process (Amir and Benartzi, 1998; Blake, 2001).

Prior research relates pension asset allocation of US corporations to pension

[2] Seib, C. 2006. London Leads Europe in Hedge Fund Investment. *Times Online*, August 1.

[3] For example, in 2001 Boots plc. liquidated all of its equity holdings in its £2.3 billion pension fund and moved the proceeds into long-dated sterling bonds. The sterling bond market received a boost in the week when this news was announced.

McLeish, N. 2001. Boots Pension Fund Switch Boosts Sterling Capital Markets. *EuroWeek*, November 2.

funding levels through tax and other institutional and regulatory settings, such as minimum funding requirements, the tax-deductibility of pension contributions and the existence of the US Pension Benefit Guaranty Corporation (PBGC).[4] Pension asset allocation is also related to employee demographics and to firm risk (Friedman, 1983; Bodie et al., 1984). In addition to funding levels, demographics and firm risk, Amir and Benartzi (1999) argue that US corporations that sponsor defined benefit pension funds modify their pension asset allocation to avoid recognition of minimum pension liability under Statement of Financial Accounting Standards (SFAS) No. 87, *Employers' Accounting for Pensions*. Specifically, they argue that sponsoring companies that are closer to minimum liability recognition requirements would invest more in bonds to allow better matching between pension assets and liabilities, thus reducing the likelihood of liability recognition. They provide empirical evidence in support of this argument.

In November 2000, the ASB in the UK issued Financial Reporting Standard (FRS) No. 17, *Retirement Benefits*, which had to be adopted for accounting periods beginning on or after January 1, 2005. During fiscal years 2001-2004 companies were required to provide detailed disclosure in accordance with FRS 17 (however, early adoption was encouraged). Unlike its predecessor, Statement of Standard Accounting Practice (SSAP) No. 24, FRS 17 requires that pension assets be measured at market value and pension liabilities be discounted using the prevailing market yield on AA-rated corporate bonds. In contrast, under SSAP 24 the valuation of both pension assets and liabilities rely primarily on actuarial assumptions. Furthermore, FRS 17 requires any actuarial gains or losses (particularly differences between expected and actual returns on pension assets) arising during the year to be recognized immediately in the

[4] See Black (1980), Tepper (1981), Harrison and Sharpe (1983) and Bader (1991).

statement of total recognized gains and losses, while under SSAP 24, actuarial gains/losses are deferred and amortized to income over the average remaining service lives of employees. Finally, FRS 17 requires the total pension surplus/deficit to be recognized on the balance sheet as an asset or a liability (net of deferred tax).[5] Under SSAP 24 such surplus/deficit is kept off balance sheet and disclosure in the notes is required.

FRS 17 is also different from its US counterpart in three major respects. First, under SFAS 87, although pension assets are measured at market value, the discount rate in estimating pension liabilities is determined on an actuarial basis. Second, under SFAS 87 actuarial gains/losses are deferred and amortized to income over the average remaining service lives of employees subject to the 10% corridor method. Finally, SFAS 87 requires recognition of the pension surplus/deficit on the balance sheet only if a threshold is exceeded (e.g., additional minimum liability). FRS 17, on the other hand, requires that pension liabilities be discounted using the prevailing market yield on AA-rated corporate bonds. It also requires full recognition of the pension surplus/deficit on the balance sheet and immediate recognition of any actuarial gains/losses arising during the year in the statement of total recognized gains and losses (which parallels comprehensive income in the US).

By requiring recognition of net pension asset/liability on the balance sheet and the immediate recognition of actuarial gains/losses in comprehensive income, FRS 17 introduces material volatility to UK companies' balance sheets, especially if pension assets are mostly invested in equity securities. Firstly, reporting actual rather than smoothed pension returns injects volatility into pension reserves in the shareholders' equity. Furthermore, the recognized net pension asset/liability could be a significant

[5] The pension surplus/deficit refers to the difference between the market value of pension assets and the present value of the projected pension liabilities.

portion of a company's book value and market capitalization. For example, in 2002 Rolls Royce disclosed a FRS 17 deficit of £580 million in its pension fund, more than 25% of the assets of the company. The volatility that can therefore be introduced into corporate balance sheets is evidenced by the fact that at the end of 2001 the combined surplus for the FTSE 100 was £5 billion, but by mid July 2002 with the collapse in world stock markets this fell to a deficit of £25 billion.[6]

In the presence of information cost and contracting cost, UK firms have motives to mitigate the volatility introduced by the new pension accounting standard in the transitional period. One way for corporate managers to better match pension assets with pension liabilities and thus reduce the FRS 17 volatility is to exercise a greater degree of investment conservatism with respect to pension asset allocation. This could be accomplished by shifting from investments in equity securities to (presumably) less volatile debt securities. Ceteris paribus, shifting investment from equity to debt is likely to reduce the magnitude of actuarial gains/losses and thus its effect on shareholders' equity. Also, FRS 17 requires pension liabilities to be discounted using the prevailing market yield on AA-rated corporate bonds. Consequently, firms can reduce mark-to-market volatility by selecting a portfolio of pension assets whose fair value is positively correlated with the fair value of pension liability.[7]

This study investigates the impact of FRS 17 on pension asset allocation of sponsoring companies in the UK. Specifically, I examine changes in UK companies'

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[6] Reynolds, B. 2002. FTSE 100 Pension Funds Are £25 Billion in Deficit, Leading Actuary Condemns Continued Confusion from FRS 17 Volatility. *Accountancy*, August 5.

[7] That is, an increase (decrease) in the yield on AA-rated corporate bonds will decrease (increase) the value of the pension liability. If the pension assets are primarily invested in bonds, the value of the pension assets will similarly decrease (increase) with an increase (decrease) in the yield on AA-rated corporate bonds.

Ralfe, J. 2001. Making the Switch to Bonds. *The Treasurer*, December 2001, 20-23.

pension asset allocation over the period 2001-2004, a transitional period of FRS 17. I hypothesize that UK companies that sponsor defined benefit pension plans will shift pension assets from equity securities to debt securities. I expect this shift to be more significant in companies that are more vulnerable to the financial effects of FRS 17 on comprehensive income and the balance sheet.

In addition, I classify the UK firms into two groups: the UK companies that decided to adopt FRS 17 earlier than the mandatory adoption date (early adopters) and the UK companies that only disclosed pension information in accordance with FRS 17 during the transitional period (mandatory disclosers). I then compare the pension asset allocation between these two groups. Finally, as a shift to debt securities could occur independently of pension accounting, I compare the pension asset allocation of UK companies with that of US companies (who were not exposed to pension accounting changes), and predict that the shift to debt securities will be more pronounced in UK companies than in US companies.

To test my hypotheses, I use pension asset allocation data for large UK companies (FTSE 350) over the period 2001-2004. I also collect similar data for US firms covered by Pensions and Investments. The final sample consists of 927 firm-year observations for the UK sample and 1,016 firm-year observations for the US sample.

I find that during the FRS 17 transitional period, UK companies changed their pension portfolio by shifting away from equity securities to debt securities. At the same time, US companies exhibited a stable allocation to equities and a declining allocation to bonds. The significant difference between UK and US companies supports the argument that accounting factors affect pension asset allocation. I also find that UK companies that are more sensitive to the effects of FRS 17 shifted relatively more funds from equities to bonds. Moreover, there is no significant difference between the shift of FRS 17 early adopters and the shift of FRS 17 mandatory disclosers. Collectively, the results corroborate the claim that, due to information asymmetry and contracting cost, pension accounting standards have a significant impact on corporate pension asset allocation.

This study contributes to the literature in several ways. It examines the determinants of pension asset allocation within an institutional setting outside the US. In addition, it is conducted during a period of a pension accounting change in the UK, which is a powerful setting for testing the main hypotheses in this study. Furthermore, the FASB in the US has launched a two-phase project to reform the current US pension accounting. The project aims to bring the funded status of pension schemes onto balance sheet, replace the use of expected return on pension assets with actual returns in the measurement of pension expense and mandate mark-to-market of pension assets and liabilities.[8] The empirical evidence in this study is important in understanding the possible effects of such accounting changes on capital markets.

The remainder of this chapter is organized as follows. Section 2.2 provides institutional background. Section 2.3 develops the hypotheses to be tested. Section 2.4 describes the research design. Sample selection and descriptive statistics are included in Section 2.5. Section 2.6 provides the empirical results, while Section 2.7 describes the sensitivity tests. Section 2.8 provides concluding remarks.

2.2. Institutional Background

Since 1988, companies in the UK have used SSAP 24 for accounting for

[8] Burr, B.B. 2005. FASB Pension Accounting Reform Expected to Have a Big Impact. *Pensions & Investments Daily*, November 14.

defined benefit pension schemes. This standard came under pressure in the late 1990s for its use of actuarial values, poor disclosure requirements, the lack of transparency in the figures it produces, and its inconsistency with the US and international standards on pension accounting (ASB, 2000). As a result, in November 1999 the ASB issued an exposure draft of a new accounting standard on pensions, which resulted in the issuance of FRS 17, *Retirement Benefits*, in November 2000.[9]

Originally, FRS 17 was meant to be adopted by companies with accounting periods ending on or after June 22, 2003. During the transitional period UK companies were required to disclose information in the notes in accordance with FRS 17. In November 2002 the ASB issued an amendment to FRS 17 in response to the International Accounting Standard Board's (IASB) plan to reconsider the provisions of the International Accounting Standards (IAS) No. 19, *Employee Benefits*. The amendment states that the requirements of FRS 17 would become mandatory for accounting periods beginning on or after January 1, 2005. The purpose of that extension was to allow an orderly transition to revised standards aligned with those of the IASB without mandating two changes in accounting for retirement benefits within a period of two years. Consequently, the FRS 17 transitional period spanned fiscal years 2001-2004. However, the ASB fully encouraged early adoption (i.e., both recognition in the balance sheet and note disclosure).

FRS 17 differs from SSAP 24 in three major aspects.[10] First, FRS 17 requires both pension assets and pension liabilities to be valued by reference to current market conditions. Specifically, pension assets should be measured at market value at the balance sheet date and pension liabilities are measured using a discount rate based on the return available on AA corporate bonds at the balance sheet date. Under SSAP 24

[9] See Appendix 2.1 for a list of events pertinent to the introduction of FRS 17.
[10] See Appendix 2.2 for a comparison of SSAP 24, FRS 17, SFAS 87 and IAS 19.

the valuation of both pension assets and liabilities rely primarily on actuarial assumptions. Second, FRS 17 requires any actuarial gains or losses arising during the year to be recognized immediately in the statement of total recognized gains and losses. This implies that under FRS 17 actual rather than expected return on pension assets is reflected in shareholders' equity. Finally, FRS 17 requires the total surplus/deficit in the pension scheme to be recognized as an asset or a liability (net of deferred tax) on the balance sheet. Under SSAP 24 any surplus/deficit was kept off balance sheet and disclosure in the notes was required.

FRS 17 also differs from its US counterpart SFAS 87 in three respects. Under SFAS 87, although pension assets are measured at market value, the discount rate in estimating pension liabilities is determined on an actuarial basis. In addition, under SFAS 87 actuarial gains/losses are deferred and sometimes amortized to the income statement over the average remaining service lives of employees (subject to the 10% corridor method).[11] Finally, Under SFAS 87, the surplus/deficit is recognized only if the minimum liability threshold is exceeded.[12]

Overall, FRS 17 makes the effect of defined benefit pension schemes on companies' financial statements more transparent. It aims at improving the reporting quality of pension accounting by recognizing the off-balance-sheet economic status of pension plans and by moving from an actuarial basis to a market-based approach in valuation.[13] However, the use of market values at the balance sheet date, the

[11] The purpose of the 10% corridor method is to prevent accumulation of actuarial gains/losses above a certain threshold (10% of the larger between the market value of pension assets and the projected benefit obligation). Amortization of actuarial gains/losses is limited only to the portion that exceeds the corridor. The presumption in SFAS 87 is that over the long run actuarial gains/losses will revert back to a mean of zero.

[12] Minimum liability threshold is the difference between the Accumulated Benefit Obligation (ABO) and the market value of pension assets. An additional liability under this requirement is recognized against an intangible pension asset or other comprehensive income.

[13] When first revealing FRS 17, the ASB Chairman, Sir David Tweedie, was quoted as saying "Pension cost accounting has for a long time been an impenetrable black box to users of account. This

recognition of a pension surplus/deficit, combined with the immediate recognition of actuarial gains/losses, introduce material volatility into the measurement of pension assets and liabilities and therefore volatility in the sponsoring company's balance sheet.

The purpose of this study is to identify and quantify the effect of FRS 17 on pension asset allocation. Note that during 2001-2004, the FRS 17 transitional period, pension accounting in the US was stable and thus asset allocations of US companies are used as a benchmark in my analysis.[14]

2.3. Research Hypotheses

There are rich findings in the accounting literature suggesting that information disclosed in the notes to the financial statements, like fair value of debt and equity securities, fair value of bank loans and derivatives, and non-financial intangible assets, are value relevant to capital market investors (Barth et al., 2001). With respect to pension-related disclosure, empirical evidence indicates that pension fund assets and pension fund liabilities, which are kept off-balance-sheet, are valued by the marketplace as corporate assets and liabilities (Landsman, 1986; Barth, 1991; Davis-Friday et al., 2004).

As aforementioned, UK firms are required to disclose in accordance with FRS 17 in the transitional period. The disclosure under the new standard, relative to that under SSAP 24, has made the pension-related reporting more transparent and the implications for a company of running defined benefit pension schemes clearer and

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new standard will help all interested parties to understand the implications for a company running a defined benefit pension scheme" (ASB, 2000).

[14] There are many other institutional differences between the UK and the US. For example, asset allocation in the US is affected by the existence of the Pension Benefit Guaranty Corporation (Amir and Benartzi, 1999). Such a government regulatory body did not exist in the UK during my sample period since the Pension Protection Fund in the UK became operational on 6 April 2005.

more understandable. Nevertheless, as discussed above, the market-based approach under FRS 17 also injects volatility to the measurement of both pension assets and pension liabilities. Given that pension-related disclosure is found to be value relevant to the marketplace (Landsman, 1986; Barth, 1991), UK firms have motives to mitigate the volatility introduced by the new pension accounting standard in the transitional period.

One way to reduce the exposure to the volatility introduced by FRS 17 is to improve the matching of pension assets and liabilities by following a policy of allocating more pension assets to bonds instead of stocks. As the market value of bonds is generally less volatile than that of stocks (SEC, 2005), and since pension liabilities under FRS 17 are measured using the prevailing market yield on AA-rated corporate bonds, such a policy would result in less mark-to-market volatility since the fair value of pension asset is positively correlated with the fair value of pension liability. To the extent that managers of UK companies care about volatility of net pension assets/liabilities and the market valuation implications for such disclosure under the new standard, I expect companies that sponsor defined benefit pension schemes to shift pension assets from stocks to bonds during the transitional period.

Pension asset allocation may change during the FRS 17 transitional period due to economic factors that are unrelated to accounting recognition and disclosure. To control for other economic effects on pension asset allocation, I use a sample of US companies that sponsor defined benefit pension plans and that are subject to the recognition and disclosure requirements of SFAS 87. I argue that since US companies did not experience any accounting changes for pensions in my sample period, any asset allocation changes of US companies (if any) will be due to economic factors, not changes in accounting rules. My first hypothesis is (in alternative form):

Hypothesis 1: UK companies that sponsor defined benefit pension plans will shift pension assets from stocks to bonds during the FRS 17 transitional period. During the same period, any shift by UK companies will exceed any shift by US companies that sponsor defined benefit pension plans.

The next hypothesis considers the cross-sectional variation in the effects of FRS 17 on financial disclosure and recognition of sponsoring companies. I expect UK companies that are more vulnerable to FRS 17 to allocate more assets to bonds than those companies that are less vulnerable to FRS 17. I proxy for vulnerability to FRS17 in two main ways: the relative size of the pension scheme and the magnitude of actuarial gains/losses, giving rise to two sub-hypotheses I will describe shortly.

My first proxy of vulnerability to FRS 17 depends primarily on the relative size of the pension scheme. In particular, for a sponsoring company with a large pension scheme, the effect of a change in the market value of pension assets could be significant. For example, in its annual report for fiscal 2003, Charter plc., a UK-based engineering company, reported pension assets with a market value of £462.2 million, while its shareholders' equity amounted to £24.9 million. This means that a decline of 5.4% in the market value of pension assets could eliminate the company's entire distributable reserves on the balance sheet and consequently restrict its dividend payout ability. Similarly, a decline in the yield on the AA-rated corporate bonds could eliminate shareholders' equity, as the pension obligation increases when the discount rate declines. Consequently, I hypothesize that the shift from stocks to bonds will be more significant for UK companies with a larger ratio of pension assets/liabilities to shareholders' equity. I have no a priori reason to expect such a relation for US companies; however, to the extent that a relation may exist for US companies, I expect that the relation will be stronger for UK companies than for US companies. Therefore, I hypothesize the following:

Hypothesis 2a: The shift of pension assets from stocks to bonds in UK companies is positively correlated with the relative size of the pension scheme. This relation is stronger for UK companies than for US companies.

Companies with larger pension schemes also experience larger actuarial gains/losses, especially if a majority of pension assets are invested in equities. These companies are more vulnerable to the volatility effects of FRS 17 and would therefore have stronger motivation to shift pension assets to bonds. In contrast, companies with smaller actuarial gains/losses would have a weaker motivation to switch pension funds to bonds, since shifting to less risky bonds also implies a lower expected return on pension assets on the income statement.[15] Therefore, I expect the shift to bonds to be more significant for UK companies with a larger ratio of actuarial gains/losses to shareholders' equity. As above, I have no a priori reason to expect such a relation for US companies. Therefore, I hypothesize the following:

Hypothesis 2b: The shift of pension assets from stocks to bonds in UK companies is positively correlated with the relative magnitude of actuarial gains/losses. This relation is stronger for UK companies than for US companies.

While adoption of FRS 17 became mandatory at the end of 2005, many UK

[15] Fernandes, F. 2002. There is no Escape from FRS 17. *The Treasurer*, March 2002, 29-30.

companies voluntarily adopted FRS 17 during the transitional period (early adopters), as opposed to merely providing note disclosures (mandatory disclosers). In a rational and efficient market with little information processing costs and contracting costs, accounting choice without cash flow implications should not affect market valuation and thus has no economic consequences (Healy and Palepu, 2001; Balsam et al., 2006). However, in the real world, contracting is incomplete and costly. For early adopters, the recognition of any pension deficit would be set off against the company's distribution reserves and consequently affect the company's ability to pay dividends.[16] Meanwhile, recognizing the net pension asset/liability on the balance sheet, combined with immediate recognition of the actuarial gains/losses, will affect key bottom-line figures and financial ratios. Given that those key figures and ratios are commonly used in debt covenants and managerial compensation contracts, early adopters are more vulnerable to the FRS 17 volatility relative to mandatory disclosers.

Although voluntary adoption of FRS 17 in the transitional period may give rise to additional contracting cost, the signaling hypothesis proposed by Akerlof (1970) could explain this phenomenon. Specifically, UK firms can signal to the market about their overall financial health and their commitment to high quality reporting through such accounting choice. Since SSAP 24 has been criticized for poor measurement and the lack of transparency, the new pension accounting standard FRS 17 aims to provide more transparent, relevant, and reliable information to investors. The extant literature has shown that market participants view the recognized and disclosed information differently presumably due to the high verification standard from auditors for recognition (Aboody, 1996; Espahbodi et al., 2002; Davis-Friday et al., 2004). Therefore, by voluntarily adopting the new pension accounting standard those UK

[16] Wood, A. and J. Tyerman. 2005. Further Pensions Headache for Business. Corporate Finance Supplement of *The Birmingham Post*.

firms can signal to the market participants about their ability to absorb the pension-related volatility and their commitment to quality reporting.

Given that full adoption leads to potentially increased contracting cost, early adopters need to mitigate the volatility induced by the new standard in order to reduce the costs of violating bond covenants written in terms of accounting numbers and increase the value of management compensation package. As aforementioned, choosing a more conservative portfolio in pension fund investment can reduce the FRS 17 volatility. Nevertheless, a more conservative investment portfolio also results in a decrease in expected returns on pension assets. Such decrease directly affects bottom-line figures in the income statement. Therefore, it is possible that early adopters presumably combine the shift in pension asset allocation with alternative measures to deal with the volatility introduced by the new pension accounting standards. For example, they can have the defined benefit plans closed to new entrants and switch to defined contribution plans. [17]

Given the additional contracting cost and the decreased return associated with conservative portfolio, early adopters may have a stronger motive to combine the switch in pension asset allocation with other mechanisms to mitigate their exposure to the FRS 17 volatility, relative to mandatory disclosers. Hence, I make no prediction about the difference between early adopters and mandatory disclosers with respect to pension asset allocation. Therefore, my third hypothesis is:

Hypothesis 3: The positive correlation between the shift to bonds and the relative size of the pension scheme and/or actuarial gains/losses will be similar between UK early adopters and UK mandatory disclosers.

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[17] For example, in 2002 British Airways announced that its two principle defined benefit plans are closed to new members and a new defined contribution pension fund is introduced to new employees.

2.4. Empirical Design

Although pension assets could be invested in a variety of asset categories, disclosures in financial statements usually classify pension assets into three main categories: 'stocks', 'bonds', and 'others'. Stocks and bonds together account for about 90% of total pension funds in my UK and US samples.[18] 'Others' often includes such assets as mortgage-backed securities, venture capital, private placement, properties, etc.

To test the first hypothesis I examine the pension asset composition over the period 2001-2004 for a sample of UK companies and compare this composition to a sample of US companies. Specifically, I am interested in whether UK sponsoring companies have switched pension funds from equities to bonds during 2001-2004, and whether this switch has occurred in US sponsoring companies as well.

To test the second and third hypotheses I use the following model:

$$rBONDS_{it} = \beta_0 + \beta_1 SenVol_{it} + \beta_2 FUND_{it} + \beta_3 FUND_{it}^2 + \beta_4 HOR_{it} + \beta_5 LEV_{it} + \beta_6 DIVP_{it} + \beta_7 TAXR_{it} + \beta_8 SDCF_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (1)$$

The dependent variable in Equation (1), *rBONDS*, is the market value of pension assets allocated to bonds divided by the market value of total pension assets for firm *i* in year *t*.

I include *SenVol* to proxy for company *i*'s vulnerability to the effects of FRS 17 in year *t*. I expect *SenVol* to be positively correlated with *rBONDS* for UK companies, but not for US companies. As previously discussed, a company's vulnerability to FRS17 may manifest in different ways. Therefore, I measure *SenVol* in four ways (the first two to test hypothesis 2a, and the last two to test hypothesis 2b):

(i) *EXPOS1*: The fair value of pension assets deflated by the book value of

[18] Amir and Bernatzi (1999) report similar allocation percentages for US companies during the 1990s.

shareholders' equity for firm i in year t. A change in the market value of pension assets affects shareholders' equity directly, ceteris paribus. Therefore, *EXPOS1* captures the company's exposure to the volatility in the market value of pension assets and net pension surplus/deficit.

(ii) *EXPOS2*: The projected benefit obligation (PBO) deflated by the book value of shareholders' equity for firm i in year t. A change in the discount rate will directly affect the projected pension obligation, and depending on the pension asset mix may affect shareholders' equity. Therefore, *EXPOS2* captures the company's exposure to the volatility in discount rates.

(iii) *ACTGL1*: The absolute value of realized actuarial gains/losses deflated by the book value of shareholders' equity for firm i in year t. A higher magnitude of actuarial gains/losses is primarily the result of a larger difference between expected and realized pension asset returns; ceteris paribus, this should lead to a more volatile shareholders' equity. Therefore, *ACTGL1* captures the firms' exposure to changes in pension asset values.

(iv) *ACTGL2*: *ACTGL1* divided by the percentage of pension funds allocated to equity for firm i in year t. A higher percentage of pension funds invested in bonds would result in a lower magnitude of actuarial gains/losses. Hence, there might be a mechanical negative relation between *ACTGL1* and *rBONDS*. The scaling of *ACTGL1* by the percentage of pension funds allocated to equity should mitigate this mechanical relation. Therefore, *ACTGL2* proxies for the expected volatility reflected in actuarial gains/losses assuming all pension funds are invested in equities.

In calculating *EXPOS1*, *EXPOS2*, and *ACTGL1* I adjust shareholders' equity by undoing the immediate recognition of actuarial gains/losses and the recognition of net pension surplus/deficit for early adopters. This ensures that tests which compare early adopters and mandatory disclosers are estimated on a like-for-like basis.

I include *FUND* and $FUND^2$ as a measure of the funding status of firm i's pension fund in year t. These variables are included to capture the tax and regulatory influences on pension fund asset allocation. In general, the tax-deductibility of pension contributions for tax purposes in the UK and the US should induce companies to pre-fund their pension plans; companies that are subject to higher tax rates should have even greater incentives to pre-fund their pension plans. However, the prior literature is mixed as to the influence of funding status on pension fund asset allocation. For example, Black (1980) and Tepper (1981) argue that since returns on pension assets are not taxed in the US, pension assets should be invested in the most heavily taxed securities, which are presumably bonds. Their argument suggests no association between funding levels and asset allocation as all companies invest in bonds regardless of their funding level.

Bader (1991) argues that firms attempt to minimize the volatility of their pension contributions. These contributions are fairly predictable for moderate funding levels, but less predictable as funding levels become more extreme. To reduce the volatility of pension contributions, Bader (1991) argues that extremely over-funded and under-funded plans should invest in bonds, while only moderately funded plans should increase allocation to equities. His argument suggests a U-shape relation between funding levels and the percentage invested in bonds.

In contrast, Harrison and Sharpe (1983) argue that the existence of PBGC in the US provides a US company with a put option on its extremely under-funded pension obligation. Together with limited tax deduction in the case of extremely over-funded plans, they argue that funding and asset-allocation decisions are joint and extreme. To maximize tax benefits on one hand and the value of the PBGC option on the other hand, companies should either over-fund the pension plan and allocate all the assets to bonds, or under-fund and allocate all the assets to equities. Although in practice funding/asset-allocation decisions are rarely extreme, this argument supports a positive relation between funding levels and allocations to bonds. A serious caveat is that the value of the PBGC put option in the US has declined over time and in particular since the 1986 tax reform act. Also, an insurance company such as the PBGC did not exist during my sample period in the UK. Therefore, the incentive to allocate pension assets to equity securities in cases of extreme under-funding may be of a second order nature.

Following these arguments and the empirical findings in Amir and Benartzi (1999),[19] I include both *FUND* and $FUND^2$ to accommodate the possibility of a non-linear relation between funding levels and asset allocation. The funding status is measured as the fair value of pension assets over the ABO for firm *i* in year *t*.[20]

I include *HOR* to control for the horizon of the pension obligation. Specifically, pension fund managers who have an aim of reducing the volatility of recognized net pension liabilities must take into consideration the horizon of the pension obligation. While pension obligations to retirees are relatively short-term and are mainly affected by interest rates, pension obligations to active employees are relatively long-term and are mainly affected by salary increases. As bonds are most correlated with interest rate changes and stocks are more highly correlated with salary increases (Amir and Bernatzi, 1999), companies with a relatively young workforce

[19] Amir and Bernatzi (1999) documented an inverted-U relation between funding status and the percentage invested in equities.

[20] I define funding status in this way to be consistent with prior studies (e.g., Amir and Bernatzi, 1999). Since ABO is not available for UK companies, I calculate ABO based on the formula proposed in Amir and Bernatzi (1999): $ABO=PBO/(1+G)^N$, where PBO is projected benefit obligation, G is projected salary increase rate and N is pension fund's investment horizon.

should invest more in stocks and less in bonds. Consequently, I expect a positive (negative) correlation between investment horizon and allocation to equities (bonds). Amir and Benartzi (1999) find evidence in support of this argument. *HOR* is measured as the natural logarithm of the ratio of PBO to current service cost for firm *i* in year *t*. My measure differs from Amir and Benartzi (1999), who use ABO in their calculation, since ABO is not available for UK firms. However, I believe that my measure is a reasonable proxy for investment horizon since a workforce which is closer to retirement should generate a larger service cost relative to a young workforce. I also recognize the fact that an older workforce would likely lead to a larger PBO, ceteris paribus; however, I believe this impact is not as influential as the service cost impact. Overall, I believe that an older workforce should lead to a smaller ratio of PBO to service cost, indicating a shorter investment horizon. To summarize, I expect a negative relation between *HOR* and the percentage invested in bonds.

I include two variables to capture the influence of debt covenants and dividend payout policy. As defined benefit pension plans are reported on sponsoring companies' balance sheets, the pension liability and corresponding investment portfolio may be affected by certain contractual arrangements. In particular, companies that are closer to the violation of debt covenants have stronger motives to improve asset/liability matching in order to reduce pension deficits on the balance sheet. Better asset management would also reduce the volatility of shareholders' equity and future pension contributions, which in turn would reduce the volatility of dividends. I expect companies with tighter debt covenants and higher dividends payout ratios to be more concerned about pension asset/liability matching. Therefore, to capture the effect of leverage and dividend policy on pension asset management, I include financial leverage (*LEV*) and dividends payout ratio (*DIVP*); I expect the coefficients on these variables to be positively associated with the percentage invested in bonds. Financial leverage (*LEV*) is measured as long term debt divided by the sum of long term debt and market value of equity for firm *i* in year *t*. Dividend payout ratio (*DIVP*) is measured as dividends per share divided by retained earnings per share for firm *i* in year *t*. If current retained earnings are negative, then the variable is measured as the average dividends per share over the current and past two years divided by average retained earnings per share over the current and past two years.

As aforementioned, since returns on pension funds are not taxed in the US, prior literature has argued that pension assets should be invested in the most heavily taxed securities, which are presumably bonds. Therefore, companies subject to higher tax rates should have greater incentives to allocate more pension assets to bonds. In the UK, the tax exemption at the company level for pension asset return was abolished in the 1997 Budget. To control for the potential effect of different tax regimes on pension asset allocation, I include the company's effective tax rate (*TAXR*) as an additional control variable. *TAXR* is measured as total tax expense divided by pre-tax income for firm *i* in year *t*. If current pre-tax income is negative, I use the average tax expense over the current and past two years divided by the average pre-tax income over the current and past two years.

Finally, I include the volatility of operating cash flows and firm size to capture firm risk. It has been documented by Friedman (1983) and Bodie et al. (1984) that companies tend to offset high corporate risk by investing more of the pension assets in bonds. This policy of offsetting risk through the pension fund may reflect management preference to avoid making contributions to the pension fund when operating cash flows are low.[21] Thus, I expect a positive correlation between the variability of operating cash flows and bond allocation. Also, companies with more diversified operations would prefer to assume more risk in their pension fund. To the extent that larger firms are more diversified, I would expect a negative association between firm size and allocation to bonds. The volatility of operating cash flows (*SDCF*) is measured as the standard deviation of operating cash flows over the current and past four years, deflated by book value of common equity for i in year t. Firm size (*SIZE*) is measured as the natural logarithm of market value of equity for firm i in year t.

I estimate Equation (1) separately for UK and US companies by introducing an indicator variable (*UK*) which is included by itself and interacted with all explanatory variables in Equation (1); *UK* equals one if the firm-year observation is a UK company, and zero for a US company. I expect the coefficient on *SenVol* to be significant for UK companies but not for US companies.

To test hypothesis three, I estimate Equation (1) separately for UK early adopters and mandatory disclosers by introducing another indicator variable (*ADPT*) that interacts with all the explanatory variables in Equation (1). *ADPT* equals one for early adopters, and zero otherwise.[22] Table 2.1 provides definitions of all variables.

(Table 2.1 about here)

I use ordinary least squares (OLS) to estimate Equation (1). Petersen (2006) indicates that residuals may be correlated across firms or across time in panel data and therefore OLS standard errors can be biased. In this study, it is possible that the

[21] Specifically, if operating cash flows are volatile and the pension assets are invested in equities, the plan is likely to become under-funded when operating cash flows are low. As a result, the company would have to make large contributions to the pension fund in times of low operating cash flows.

[22] Specifically, if a firm became an early adopter in any year 2001 to 2004, I classify each firm-year observation for that firm as being an early adopter. I have performed sensitivity analysis with respect to this classification; see section 2.7.

unspecified determinants of pension funds allocated to bonds (*rBONDS*) are correlated both over time and across firms. For example, if the equity market as a whole is volatile, then all firms may shift away from volatile equities investment to less volatile bonds. On the other hand, the strategy of pension asset allocation could also be driven by some unspecified firm-specific factors, and this will give rise to a firm effect in the error terms. The presence of positive correlation among error terms results in underestimated standard errors and thus inflated t-statistics.

To address such econometric concern, I employ two-dimension clustering suggested by Petersen (2006) to accommodate the possibility of both time effect and firm effect in the panel data. Following Thompson (2006) and Cameron et al. (2006), Petersen (2006) employed the following estimate of the variance-covariance matrix.

$$V_{Firm\ \&\ Time} = V_{Firm} + V_{Time} - V_{White} \quad (2)$$

$V_{Firm\&Time}$ denotes the variance-covariance matrix by two-dimension clustering; V_{Firm} is the variance-covariance matrix by clustering on firm only; V_{Time} denotes the variance-covariance matrix by clustering on time only; V_{White} denotes the White variance-covariance matrix which is subtracted off to avoid double counting these terms. In essence, the Petersen's two-dimension procedure is slightly different from fixed-effects procedure, since it does not impose the assumption that firm (time) effect is fixed. Petersen (2006) argued that if the firm (time) effect is not fixed, then firm (time) dummies will not remove the dependence among the error terms. Since researchers do not always know the precise form of the dependence, Petersen suggested a less parametric approach as given in equation (2).

2.5. Sample Selection and Descriptive Statistics

To obtain my initial UK sample I select those firms from the FTSE 350 that sponsor defined benefit pension plans over the period 2001-2004. Approximately 250 of the FTSE 350 sponsor a defined benefit pension plan. Information on market value of pension assets, actuarial present value of pension liabilities, pension actuarial assumptions, actuarial gains/losses and details of pension asset allocation are collected from annual financial statements. All other financial data for UK companies is taken from Datastream. To facilitate a comparative study of UK and US companies, I collect data for US companies' pension asset allocation from Pensions and Investments, a periodical survey that covers the largest 1,000 pension funds in the US. Of this 1,000, approximately 300 pension funds relate to defined benefit plans for publicly traded firms (the remainder are sponsored by private firms, unions, or government entities, or are foreign companies listed in the US). Financial data for US companies is from Compustat. After removing observations with missing data requirements, I obtain a final sample that consists of 1,943 firm-year observations, including 927 observations for the UK sub-sample and 1,016 observations for the US sub-sample.[23]

Table 2.2 provides descriptive statistics for the UK (left) and the US (right) sub-sample respectively. On average, UK companies allocate 64% of their pension assets to equities and 28% to bonds, slightly different from the allocation of US companies, 60% to equities and 31% to bonds. The magnitude of actuarial gains/losses (*ACTGL1*, *ACTGL2*) is similar across the sub-samples. However, the relative size of pension plans is larger for UK firms relative to US firms, as reflected

[23] All continuous explanatory variables are winsorized at 1% and 99% to mitigate the effect of extreme observations, except *TAXR* and *DIV* which are winsorized at 5% and 95% to remove negative values.

by higher means and medians of *EXPOS1* and *EXPOS2* (statistical tests not reported). As for other variables, the UK and US sub-samples are similar to each other in terms of funding status (*FUND*), effective tax rate (*TAXR*), pension obligation horizon (*HOR*), and volatility of cash flow (*SDCF*). US companies have lower dividend payout ratios, are slightly larger and are more highly leveraged than UK companies.

(Table 2.2 about here)

2.6. Empirical Results

Figure 2.1 presents the mean percentage of pension assets allocated to equities and bonds for UK and US companies. The top two lines show that UK firms reduced their allocation to equities during the transitional period while US companies maintained a relatively stable allocation to equities. The bottom two lines show that UK firms increased the allocation to bonds while US firms displayed a gradual decline in bond allocation during the same period. Plotting based on the medians (not presented) exhibits very similar patterns. These results are consistent with the argument that the change in asset allocation of UK companies during the FRS 17 transitional period was driven by the accounting change rather than by general economic conditions.

(Figure 2.1 about here)

Figure 2.2 depicts the trend of pension asset allocation for the fifty-four UK companies that voluntarily adopted FRS 17 prior to the mandatory implementation date. For each early adopter, I identify the adoption year and denote it as AY(0). Then, I plot the mean (median) percentage of pension assets allocated to equities and bonds from year AY(-3) to AY(2). Both Figure 2.2a and Figure 2.2b exhibit a decline in pension funds invested in equities, and an upward trend in the percentage invested in bonds. Overall, Figure 2.2 exhibits a consistent shift away from equities to bonds throughout the sample period for early adopters.

To examine whether the documented shift is statistically significant, I first calculate the difference between percentage allocated to equity and the percentage allocated to bonds for year AY(-3) and AY(2). I then test whether the difference in AY(3) is greater than the difference in AY(2). A one-tailed t-test of the mean (median) for Figure 2.2a (Figure 2.2b) results in a p-value of 0.07 (0.04), corroborating the conclusion that there exists a significant adjustment towards bonds in pension asset allocation among the FRS 17 early adopters.

(Figure 2.2 about here)

Figure 2.3 compares the shift from equities to bonds for UK early adopters and mandatory disclosers. The figure shows that both early adopters and mandatory disclosers have decreased their allocation to equities while concurrently increasing their allocation to bonds. Overall, both groups exhibit very similar patterns in the pension asset allocation to equities and bonds during the period 2001-2004.

(Figure 2.3 about here)

Table 2.3 provides data on the composition of pension assets for the different sub-samples. Panel A compares the pension asset allocation of UK and US sub-samples. I also test whether the mean allocation to equities and bonds have changed from 2001 to 2004. The results suggest that from 2001 to 2004, UK sponsoring companies decreased their allocation to equities by 6.6% and increased their allocation to bonds by 6%. Both changes are significant at the 0.01 level. During the same period, US sponsoring companies had a relatively stable allocation to equities and a declining allocation to bonds (significant at the 0.01 level). These results support my first hypothesis.

Panel B of Table 2.3 compares the asset allocation of early adopters and mandatory disclosers. The results indicate that both groups exhibit an upward trend in the percentage of funds invested in bonds and a downward trend in the percentage invested in equities (significant at the 0.01 level or better). Moreover, the percentage allocated to 'others' by both groups remains relatively stable over time. The results suggest that early adopters and mandatory disclosers exhibit similar patterns in their pension asset allocation.

(Table 2.3 about here)

Table 2.4 presents the results from a nonparametric portfolio analysis of the association between *rBONDS* and the explanatory variables. Specifically, I report the mean *rBONDS* by quintile for each independent variable, for both UK and US sub-samples. My statistical test is based on a comparison of the mean *rBONDS* for quintile 1 (smallest values) and quintile 5 (largest values).

The results indicate that for the UK sub-sample, when I partition using the four proxies for company vulnerability to the effects of FRS 17 (*ACTGL1, ACTGL2, EXPOS1* and *EXPOS2*), firms with the largest vulnerability (quintile 5) have a significantly (at the 0.01 level or better) larger percentage allocated to bonds relative to firms with the smallest vulnerability (quintile 1). Firms that are most vulnerable allocate approximately 32%-34% to bonds, whereas firms that are least vulnerable allocate around 24%-27% to bonds. The results for the US sub-sample indicate that larger values on these variables do not lead to a greater percentage allocated to bonds (in fact, larger values of *EXPOS1* lead to a lower percentage allocated to bonds relative to smaller values of *EXPOS1*). Overall, these results support my second hypothesis.

With respect to the other variables, the results in Table 2.4 show that for UK companies, those with higher funding ratios (*FUND*), longer investment horizons (*HOR*), or larger firm size (*SIZE*) invest significantly (at the 0.01 level or better) less in bonds. Similarly, those firms with greater cash flow variability (*SDCF*), or higher financial leverage (*LEV*) invest significantly (at the 0.06 level or better) more in bonds. The results indicate that for the US sub-sample, those companies with shorter investment horizon (*HOR*), higher dividend payout ratio (*DIVP*), or smaller firm size (*SIZE*) invest significantly (at the 0.07 level or better) more in bonds.

I also form quintiles based on the change of explanatory variables and then examine the change in *rBONDS* for each quintile (not tabulated). Since some independent variables are stable over time for a specific firm, the changes of independent variables do not vary significantly across firms. As a result, I observe fewer significant statistics for the tests on the mean difference between the bottom quintile and the top quintile. However, for UK firms, *rBONDS* continues to be statistically (at the 0.10 level or better) larger for quintile 5 relative to quintile 1, where quintiles are formed by *ACTGL2*, *EXPOS1* and *EXPOS2*.

(Table 2.4 about here)

Table 2.5 provides the results of estimating Equation (1) with *ACTGL1* and *ACTGL2* as proxies for the expected impact of FRS 17 on balance sheet volatility (Hypothesis 2b). Models 1 and 3 use UK data, and Models 2 and 4 use UK and US data. The indicator variable, *UK*, in Models 2 and 4 is used to facilitate comparison between UK and US companies. To avoid overstatement of the t-statistics, each regression accounts for two dimensions of within cluster correlation using the Petersen (2006) procedure.

The results show that, for the UK sample, the coefficient on *ACTGL1* is significantly (at the 0.01 level) positive, as expected. However, this coefficient is not significantly different from zero for the US sample. The interaction term *ACTGL1*UK* is significantly (at the 0.01 level) positive. Similar results are obtained in Models 3 and 4 where *ACTGL2* replaces *ACTGL1* in order to take into account the simultaneity between pension asset allocation and realized actuarial gains/losses. The significant and positive coefficients on *ACTGL1*UK* and *ACTGL2*UK* highlight the impact of different accounting treatment on pension asset allocation. These findings are consistent with my hypothesis that UK companies avoid the volatility of disclosing or recognizing large actuarial gains/losses by selecting a more conservative pension portfolio; whereas, the magnitude of actuarial gains/losses does not have a statistically significant impact on pension asset allocation for US companies.

With respect to the control variables, I find a U-shape relation between funding status and the percentage allocated to bonds (i.e., I find a significantly negative (positive) coefficient on *FUND* ($FUND^2$)). I also find that companies with a longer pension liability horizon allocate less to bonds (the coefficients on *HOR* are all statistically negative), and the influence of the pension liability horizon on pension asset allocation is greater for UK firms relative to US firms (the coefficients on *HOR*UK* are statistically negative). Additionally, I find that companies with a higher dividend payout ratio allocate a larger percentage of pension assets to bonds (*DIVP* is significantly positive in all models), corroborating the argument that companies choose to invest more in less volatile bonds in order to decrease the volatility of dividends. The effective tax rate (*TAXR*) and firm size (*SIZE*) are also important determinants of pension asset allocation, but not in all model specifications. Specifically, for the UK sub-sample there is a significantly positive relation between the effective tax rate and the amount allocated to bonds. With respect to firm size, all models except Model 1 show that smaller firms tend to allocate more pension assets to bonds. There is also some weak evidence that firms with more volatile cash flows have, on average, a higher percentage allocated to bonds than firms with relatively stable cash flows (the coefficients on *SDCF* for both UK and US firms are significantly positive when I use *ACTGL1*).[24]

(Table 2.5 about here)

Table 2.6 provides the results of estimating Equation (1) with *EXPOS1* and *EXPOS2* as proxies for the expected impact of FRS 17 from recognizing pension scheme surplus/deficit on balance sheet volatility (Hypothesis 2a). The results are similar to those presented in Table 2.5. The relation between *EXPOS1* and *rBONDS* is significantly (at the 0.05 level) positive in Model 1, as expected. In Model 2, however, the coefficient on *EXPOS1* is significantly (at the 0.10 level) negative, suggesting that US firms with large pension schemes relative to their shareholders' equity may increase their pension portfolio exposure to equities rather than to bonds. The significantly positive coefficient on the interaction term (*EXPOS1*UK*) strengthens the claim that UK firms, primarily due to the different accounting treatment for pensions, have a much stronger motive to avoid pension-related volatility by investing more in bonds. The results from using *EXPOS2* also suggest that UK firms who are more vulnerable to the effects of FRS 17 allocate more pension fund assets to bonds.

With respect to the control variables, *FUND*, $FUND^2$, *HOR*, *DIVP*, and *SDCF* all have the expected signs and are significantly associated with *rBONDS* for UK companies. These results are similar to those in Table 2.5, with the exception that I no

[24] In general, my findings are consistent with those in Amir and Benartzi (1999), who examine the determinants of the percentage allocated to equities. Specifically, they find a significant positive (negative) relation between pension liability horizon and firm size (cash flow volatility) and the percentage allocated to equities. They also document a reverted U-shaped relation between funding status and the percentage allocated to equities.

longer find a significant relation between the effective tax rate or firm size and the percentage allocated to bonds. For the US sub-sample, only *HOR*, *DIVP*, and *SDCF* are significant. Once again these results are similar to those in Table 2.5, with the exception that I do not find a significant relation between funding status or firm size and the percentage allocated to bonds.

(Table 2.6 about here)

Overall the results in Tables 2.5 and 2.6 support my second hypothesis that the accounting implications of FRS 17 have influenced the pension asset allocation for UK firms. Specifically, UK firms with a larger relative size of pension scheme and UK firms with a larger relative magnitude of actuarial gains/losses invest more pension assets in bonds. Alternatively, the ratio of pension assets/liabilities to shareholders' equity and the ratio of actuarial gains/losses to shareholders' equity, does not influence the pension asset investment decision for US companies.

Tables 2.7 and 2.8 compare the pension asset allocation between early adopters and mandatory disclosers. Models 1 and 4 explain pension asset allocation for mandatory disclosers, whereas Models 2 and 5 explain pension asset allocation for early adopters. Models 3 and 6 are included to determine whether the influence of the factors which are hypothesized to explain pension asset allocation is different between the two sub-samples.

In Table 2.7 I use *ACTGL1* and *ACTGL2* to proxy for the vulnerability of firms to FRS 17. The results show that firms who are more vulnerable to the impact of FRS 17 invest more in bonds, for both early adopters and mandatory disclosers, and there is no difference between these two groups (*ACTGL1* and *ACTGL2* are significantly positive, whereas *ACTGL1*ADPT* and *ACTGL2*ADPT* are not significantly different from zero.) With respect to the control variables, only financial leverage shows a differing influence between the two sup-samples. Specifically, early adopters with greater financial leverage allocate more pension assets to bonds, whereas financial leverage does not influence the pension asset allocation for mandatory disclosers.

(Table 2.7 about here)

In Table 2.8, I use *EXPOS1* and *EXPOS2* to proxy for the vulnerability of firms to FRS 17. Similar to Table 2.7, the results show that firms who are more vulnerable to the impact of FRS 17 invest more in bonds, for both early adopters and mandatory disclosers, and there is no difference between these two groups (*EXPOS1* and *EXPOS2* are significantly positive, whereas *EXPOS1**ADPT* and *EXPOS2**ADPT* are not significantly different from zero.) Once again, early adopters with greater financial leverage invest more pension assets in bonds, whereas financial leverage does not influence the pension asset allocation for mandatory disclosers.

(Table 2.8 about here)

Overall, the results in Tables 2.7 and 2.8 confirm my earlier findings that the accounting implications of FRS 17 influence pension asset allocation. Specifically, UK firms who are more vulnerable to the volatility induced by FRS 17 tend to invest more of the pension assets in bonds, regardless of whether the firms adopted the recognition requirements of FRS 17 early or not. Consistent with my hypothesis, the relation between firm vulnerability to FRS 17 and pension asset allocation is similar between early adopters and mandatory disclosers. As previously mentioned, this is presumably because that early adopters have stronger motives to combine asset allocation shift with other mechanisms to deal with such volatility for both disclosure and contracting cost reasons.

2.7. Sensitivity Tests

I perform a number of sensitivity tests to examine the robustness of the main results. First, the dependent variable, *rBONDS*, is measured as the ratio of pension funds invested in bonds. However, *rBONDS* has not accounted for the portion of pension funds invested in the vague category 'others'. Although 'others' only accounts for a small portion of pension funds, overall the investment in 'others' has relatively lower risk than stocks and is similar to bonds in terms of volatility. To accommodate the possibility that UK firms may also shift away from equities to other less risky investments apart from bonds, I perform a robustness test by measuring the dependent variable as the ratio of pension funds invested in bonds and 'others'. The results remain similar to those in Tables 2.5, 2.6 and 2.7. For Table 2.8, the coefficients on *EXPOS1*ADPT* and *EXPOS2*ADPT* are positive and significant at the 0.10 level, suggesting that early adopters who are more vulnerable to the effect of recognizing net pension asset/liability allocate more pension assets to non-equities relative to mandatory disclosers.

Second, to examine the impact of different pension accounting treatments on the pension asset allocation in UK and US, I used a pooled sample of all UK and US firms that meet the data requirements. To further investigate whether the findings are sensitive to sample selection, I repeat the above analysis using a matched sample. I conduct a one-to-one match between the UK firms and the US firms by year, 4-digit Standard Industrial Classification (SIC) code and size. If a match is not found using 4-digit SIC code, I then use 3-digit SIC code and then 2-digit SIC code. This procedure results in 682 UK firm-year observations matched with 682 US firm-year observations. All results are qualitatively similar.

Moreover, in Tables 2.7 and 2.8, I construct an indicator variable equal to one for firms that fully adopted FRS 17 during the transitional regime, and zero otherwise. Specifically, I classify the sample into early adopters and mandatory disclosers by firm rather than by firm-year. As a sensitivity test, I re-classify early adopters by firm-year; that is, firm-year observations are classified as early adopters if and only if the firm was an early adopter in that specific year. The new classification results in a sub-sample of 125 firm-year early adopter observations (as opposed to 212 firm-year observations using the original early adopter classification). The results based on this alternative classification are qualitatively similar to those presented in Tables 2.7 and 2.8.

As aforementioned, the Petersen two-dimension clustering approach allows for both a firm effect and a time effect. This approach allows possibly non-fixed firm (time) effect and generates unbiased standard errors if there are a sufficient number of clusters, in my case both enough firms and enough time periods (Thompson, 2006). However, the sample period in this study only spans four years. As a robustness check, I also run the fixed firm effect regressions, another approach commonly used in dealing with panel data. The untabulated results show that the results based on the fixed effects are slightly different from those in Table 2.5. Specifically, the coefficient on ACTGL1 for the US sub-sample is negative and significant at the 0.10 level, while the coefficient on ACTGL2 for the US sub-sample is positive and significant at the 0.01 level. However, the coefficients on the two interactions terms ACTGL1*UK and ACTGL2*UK remain positive and significant at the 0.05 level or better. The results replicating Tables 2.6, 2.7, and 2.8 are similar.

Finally, it remains unexplored empirically why some UK firms voluntarily adopted the FRS 17 before it became mandatory. Simply partitioning the sample into two groups and estimating Equation (1) for the two groups separately in Tables 2.7 and 2.8 may suffer from self-selection problem. To address this econometric concern, I employ the Heckman (1979) model to correct the selection bias. I construct a binary model where the dependent variable equals one for early adopters and zero otherwise. The independent variables include an indicator variable which equals one if the principle defined benefit plan is closed to new entrants and zero otherwise, the net surplus/deficit of the pension scheme deflated by shareholders' equity, firm leverage, firm size, and firm age. The results indicate that it is more likely for a firm to become an early adopter when the firm is larger, has relatively less mature pension plans (captured by firm age) or lower leverage, or has the principle defined benefit plan closed to new members. The economic status of the pension plan is not significantly associated with this accounting choice. I calculate the inverse Mills ratio based on this binary model and then include this ratio as an additional control variable in Tables 2.7 and 2.8. The untabulated results show that the inverse Mills ratio is significant at the 0.10 level or better in all models. Nevertheless, the main conclusions that I drew earlier remain unchanged after I take into account such selection bias.

2.8. Conclusions

The shift from SSAP 24 to FRS 17 in the UK radically changed the accounting treatment for pension benefit plans. The new standard recognizes that the assets and liabilities of the pension scheme are essentially those of the sponsor and should therefore be reflected at fair value on the company's balance sheet. Furthermore, FRS 17 requires immediate recognition of actuarial gains/losses. Such accounting treatment has introduced a potentially large element of volatility into the balance sheet and note disclosure of the sponsoring corporations. Consequently, it is possible that UK pension scheme sponsors would seek to increase their exposure to corporate bonds in order to reduce the volatility of the pension fund on the sponsor's balance sheet and note disclosure.

To shed some light on the impact of the new pension accounting standard on pension asset allocation, this study empirically examines how UK companies respond to FRS 17 in respect of pension asset allocation during the FRS 17 transitional period. The empirical results confirm the prediction that the transitional period observes a shift away from equities to bonds, even though in the same period US firms exhibit a stable allocation to bonds and a declining allocation to bonds. The findings also suggest that the more vulnerable companies are to FRS 17 induced volatility, the more they allocate pension funds to bonds. Moreover, both early adopters and mandatory disclosers exhibit a similar positive relation between firms' vulnerability to FRS 17 volatility and the percentage allocated to bonds.

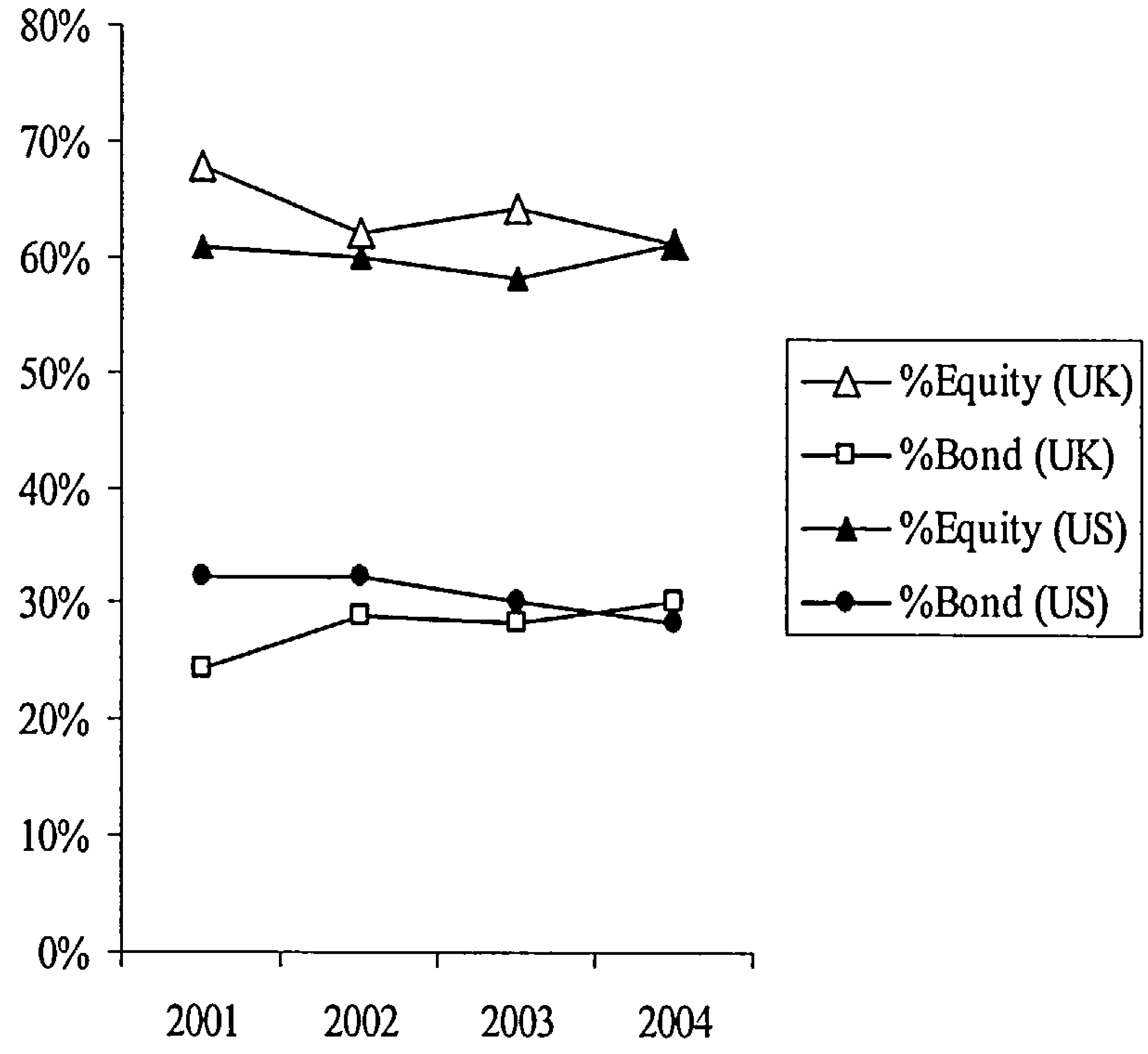
The results provide interesting implications for the ongoing changes in the pension accounting standard in the US. The FASB launched a two-phase project to reconsider its pension accounting standard SFAS 87 in November 2005. At the first phase US companies are required to recognize the pension funded status on the balance sheet. Some practitioners and researchers have expressed the concern that the changes are likely to prompt a shift of investment away from the equity market to the bond market. A report by the Committee on Investment of Employee Benefit Assets has estimated that switching to mark-to-market pension accounting would result in approximately $290 billion in funds being shifted from equities to bonds.[25] This study provides timely empirical evidence on this issue in the UK context.

[25] Brewsterin, D. 2005. US Pension Accounting Shift "would Hit Equities". *Financial Times*, November 21.

Figure 2.1

Pension Asset Allocation during the FRS 17 Transitional Period

UK vs. US Companies



The figure plots the mean percentage of pension assets allocated to equities and bonds for UK and US sponsoring companies during the sample period (2001-2004). More details can be found in Table 2.3.

Figure 2.2

Pension Asset Allocation for UK Early Adopters during the Transitional Period

Figure 2.2a: Mean Allocation

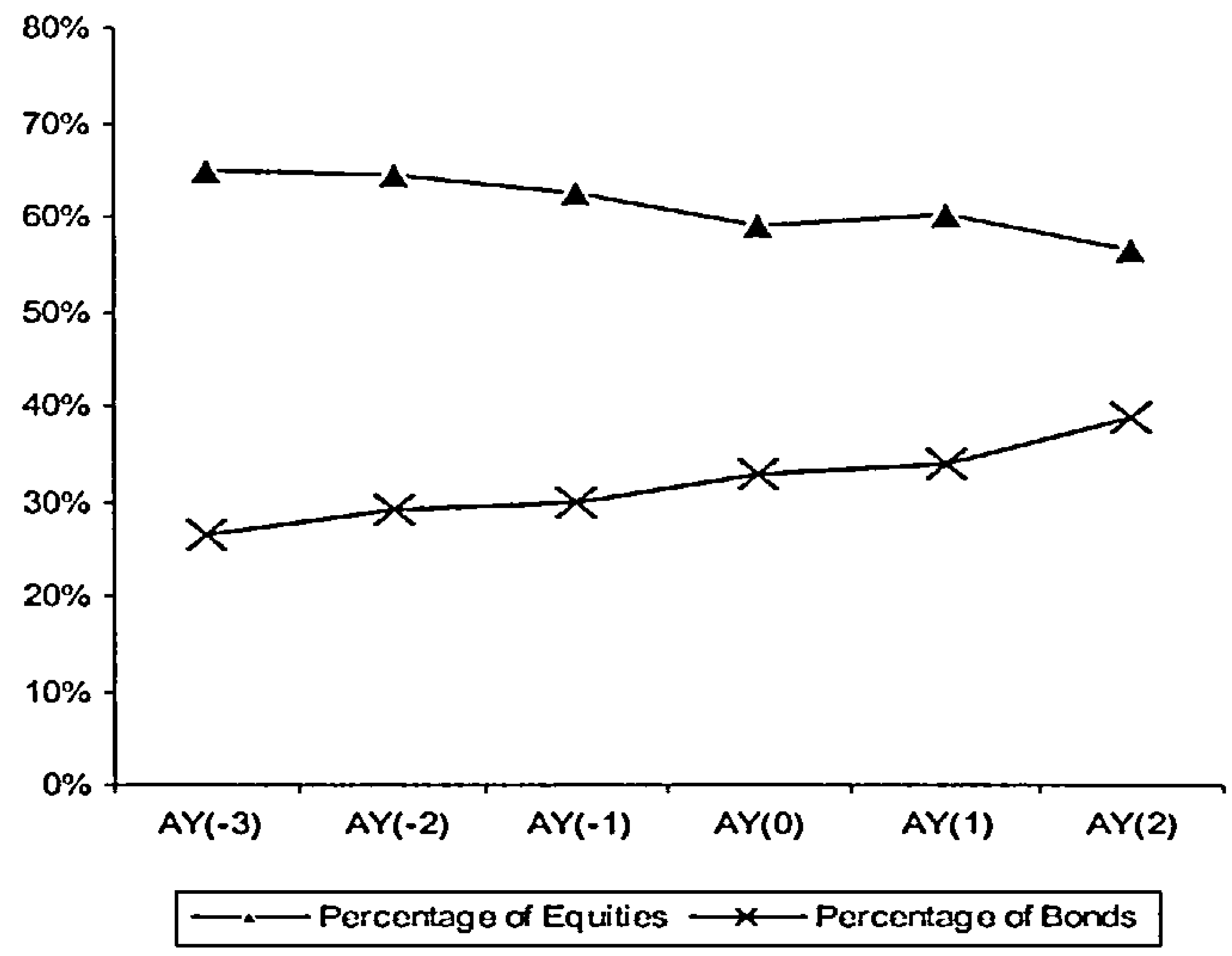
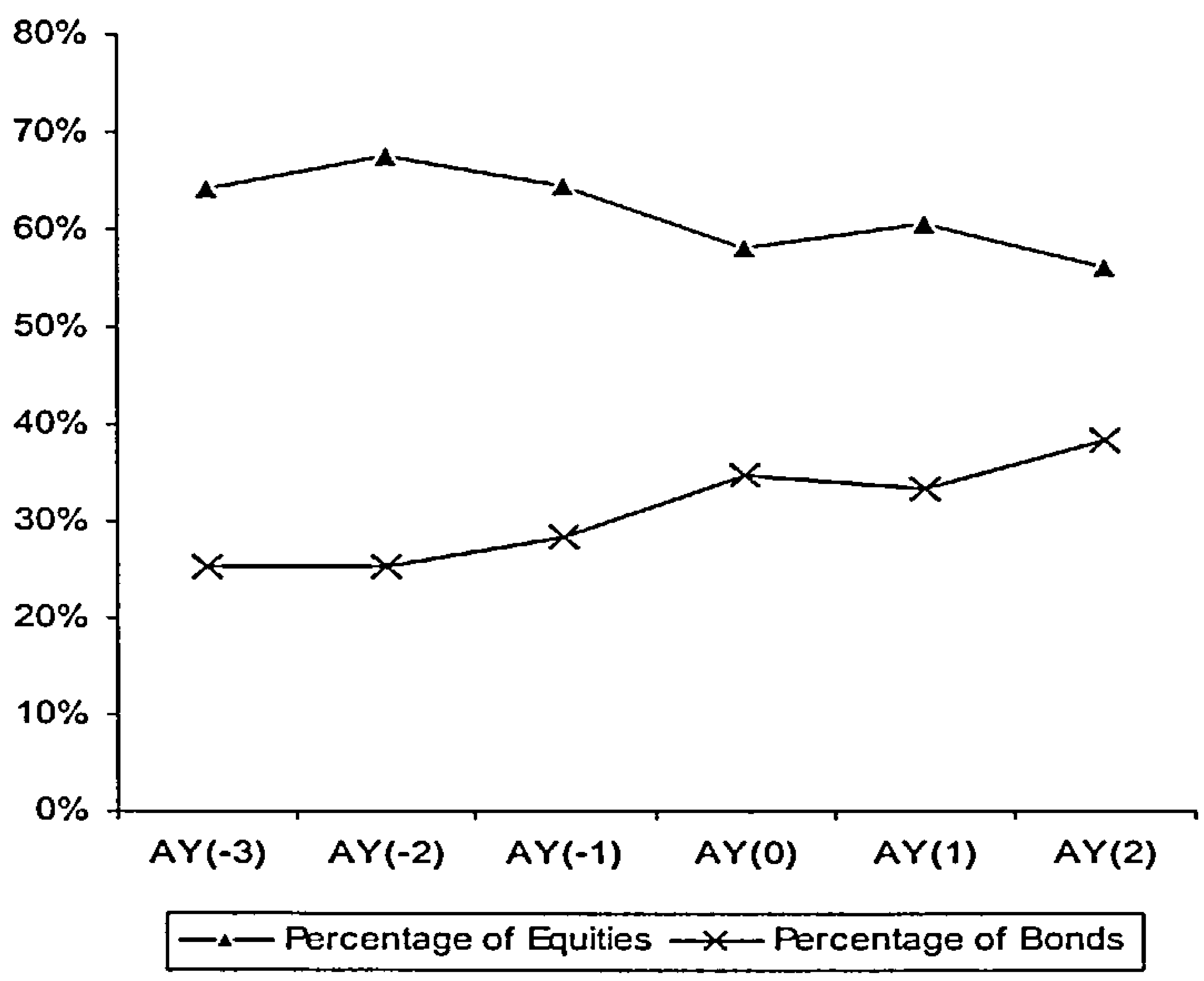


Figure 2.2b: Median Allocation

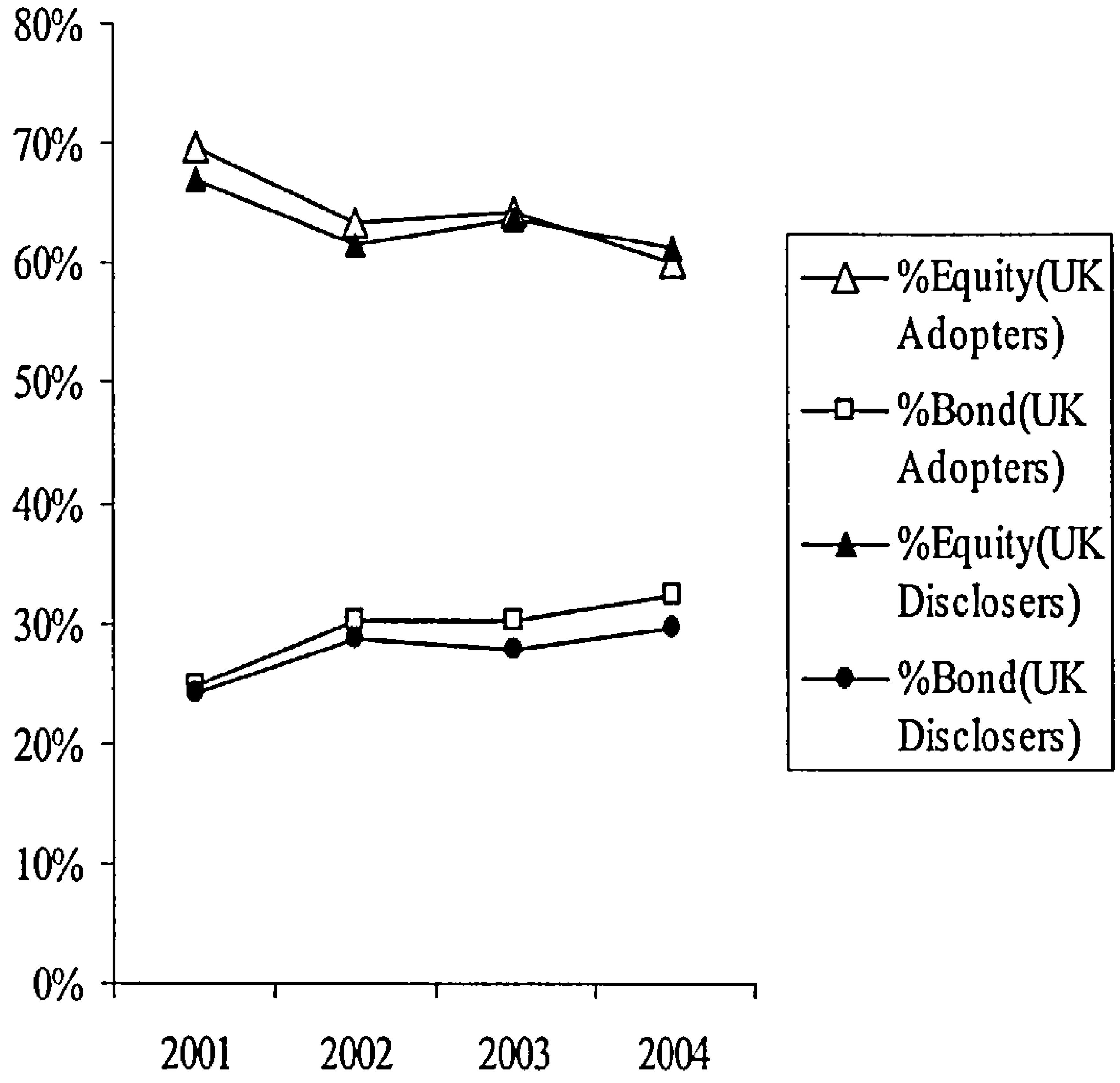


The figures plot mean and median percentage of pension assets allocated to equities and bonds for the companies that fully adopted FRS 17 during the transitional period. On the X-axis AY(0) denotes the year of adoption.

Figure 2.3

Pension Asset Allocation during the FRS 17 Transitional Period

Early Adopters vs. Mandatory Disclosers



The figure plots the mean percentage of pension assets allocated to equities and bonds for UK early adopters and mandatory disclosers during the FRS 17 transitional period. Numerical details are included in Table 2.3.

Table 2.1: Variable Definitions

rEQUITY	The ratio of pension assets allocated to equity securities over the fair value of total pension assets at fiscal year end.
rBONDS	The ratio of pension assets allocated to bonds over the fair value of total pension assets at fiscal year end.
ACTGL1	The magnitude of actuarial gains/losses, measured as the absolute value of realized actuarial gains/losses deflated by shareholders' equity at fiscal year end. I adjust shareholders' equity by undoing the immediate recognition of actuarial gains/losses and the recognition of net pension surplus/deficit for UK early adopters. Winsorized at 1% and 99%.
ACTGL2	The magnitude of actuarial gains/losses assuming that all pension assets are invested in equities, measured as *ACTGL1* deflated by *rEQUITY*. Winsorized at 1% and 99%.
EXPOS1	Firm-specific pension asset exposure to FRS 17 volatility, measured as fair value of pension assets divided by shareholders' equity at fiscal year end. I adjust shareholders' equity by undoing the immediate recognition of actuarial gains/losses and the recognition of net pension surplus/deficit for UK early adopters. Winsorized at 1% and 99%.
EXPOS2	Firm-specific pension obligation exposure to FRS 17 volatility, measured as PBO divided by shareholders' equity at fiscal year end. I adjust shareholders' equity by undoing the immediate recognition of actuarial gains/losses and the recognition of net pension surplus/deficit for UK early adopters. Winsorized at 1% and 99%.
FUND	Funding ratio, measured as fair value of pension assets divided by ABO at fiscal year end. For UK firms, ABO is not reported. I approximate it based on the formula suggested in Amir and Benartzi (1999): $ABO=PBO/(1+G)^N$, where G is the assumed salary growth rate, *PBO* is the projected benefit obligation and N is the pension investment horizon, as defined below. Winsorized at 1% and 99%.
$FUND^2$	*FUND* squared. Winsorized at 1% and 99%.
HOR	Investment horizon of pension assets, measured as the natural logarithm of PBO over current service cost. Winsorized at 1% and 99%.
DIVP	Dividend payout ratio, measured as dividends per share divided by retained earnings per share. If current retained earnings are negative, then it is measured as the average dividends per share over the current and past two years divided by average retained earnings per share over the current and past two years. Winsorized at 5% and 95%.
TAXR	Effective tax rate, measured as total tax expense over pre-tax income. If current pre-tax income is negative, then it is measured as the average tax expense over the current and past two years divided by the average pre-tax income over the current and past two years. Winsorized at 5% and 95%.
SDCF	The standard deviation of operating cash flows over the preceding 5 years, deflated by the book value of common equity at fiscal year end. Winsorized at 1% and 99%.

Continued

LEV	Financial leverage, measured as long term debt divided by the sum of long term debt and market value of equity at fiscal year end. Winsorized at 1% and 99%.
SIZE	Firm size, measured as the natural logarithm of market value of equity at fiscal year end. Winsorized at 1% and 99%.
UK	Indicator variable, equal to one if it is a UK firm, and zero for a US firm.
ADPT	Indicator variable, equal to one if a UK firm voluntarily adopted FRS17 in the transitional period and zero if a UK firm only provided FRS 17 note disclosures during the transitional period.

Table 2.2

Descriptive Statistics for UK and US Companies over 2001-2004*

	UK Sample (927 observations)					US Sample (1,016 observations)				
Variable	p25	Mean	P50	p75	STD	p25	Mean	p50	p75	STD
rEQUITY	0.54	0.64	0.66	0.76	0.17	0.55	0.60	0.62	0.68	0.15
rBONDS	0.16	0.28	0.25	0.36	0.17	0.24	0.31	0.30	0.36	0.12
ACTGL1	0.01	0.08	0.08	0.12	0.16	0.02	0.12	0.06	0.15	0.15
ACTGL2	0.02	0.10	0.11	0.20	0.15	0.03	0.20	0.10	0.26	0.25
EXPOS1	0.28	1.64	0.83	1.95	2.12	0.20	0.78	0.42	0.94	0.93
EXPOS2	0.35	1.92	1.02	2.33	2.41	0.24	0.92	0.49	1.07	1.10
FUND	1.10	1.26	1.23	1.42	0.25	1.04	1.21	1.20	1.36	0.25
$FUND^2$	1.21	1.65	1.52	2.02	0.67	1.09	1.53	1.44	1.86	0.64
HOR	3.46	3.70	3.67	3.92	0.44	3.39	3.71	3.69	4.01	0.44
DIVP	0.08	0.13	0.11	0.15	0.10	0.02	0.09	0.06	0.11	0.11
TAXR	0.27	0.33	0.30	0.36	0.14	0.29	0.34	0.35	0.39	0.10
SDCF	0.03	0.11	0.05	0.12	0.14	0.03	0.09	0.05	0.09	0.12
LEV	0.04	0.12	0.09	0.16	0.11	0.13	0.29	0.25	0.42	0.19
SIZE	6.71	7.76	7.58	8.68	1.39	7.91	8.87	8.89	9.79	1.52

*Note: The table presents variable descriptive statistics for the UK (927 firm/year observations) and US (1,016 firm/year observations) samples used in this study. The samples consist of large companies that sponsor defined benefit pension plans for which financial and pension asset allocation data are available. See Table 2.1 for variable definitions.

Table 2.3

Composition of Pension Assets by Country and Year*

Panel A: UK vs. US

Asset Category	2001	2002	2003	2004	*t*-Test (*p*-val.) (2004 vs. 2001)
UK Sample					
Observations	237	245	250	247	
-Equity	67.7%	62.0%	64.1%	61.1%	**-4.31 (0.00)**
-Bonds	24.2%	28.8%	28.2%	30.2%	**3.96 (0.00)**
-Others	8.1%	9.2%	7.7%	8.7%	0.68 (0.50)
US Sample					
Observations	308	306	303	307	
-Equity	60.8%	60.0%	58.0%	61.1%	0.27 (0.79)
-Bonds	32.2%	32.1%	30.0%	28.4%	**-3.67 (0.00)**
-Others	7.0%	7.9%	11.9%	10.4%	**2.54 (0.01)**

Panel B: UK Early Adopters vs. Mandatory Disclosers

Asset Category	2001	2002	2003	2004	*t*-Test (*p*-val.) (2004 vs. 2001)
Early Adopters					
Observations	53	51	50	54	
-Equity	69.6%	63.3%	64.2%	60.1%	**-3.73(0.00)**
-Bonds	24.8%	30.3%	30.1%	32.2%	**2.63(0.01)**
-Others	5.6%	6.4%	5.7%	7.7%	1.41(0.16)
Mandatory Disclosers					
Observations	184	194	200	193	
-Equity	67.1%	61.5%	63.8%	61.4%	**-3.08(0.00)**
-Bonds	24.2%	28.7%	27.9%	29.6%	**3.03(0.00)**
-Others	8.7%	9.8%	8.3%	9.0%	0.27(0.79)

*Notes:

1. The table provides comparative information on pension asset allocation of US and UK companies (Panel A) and comparative asset allocation of UK early adopters and mandatory disclosers (Panel B).
2. The samples contain large US and UK companies that sponsor defined benefit pension plans for which financial and pension asset allocation data are available during 2001-2004.
3. The *t*-tests (and corresponding *p*-values) are for the difference between allocation in 2004 and allocation in 2001 (the beginning and ending of FRS 17 transitional period).

Table 2.4: Mean Allocation to Bonds by Quintiles of the Independent Variables*

	UK sample (927 firm/year observations)						US sample (1,016 firm/year observations)					
Independent Variables	**Quintile 1**	**Quintile 2**	**Quintile 3**	**Quintile 4**	**Quintile 5**	**t-test Quintiles 5 vs.1**	**Quintile 1**	**Quintile 2**	**Quintile 3**	**Quintile 4**	**Quintile 5**	**t- test Quintiles 5 vs.1**
ACTGL1	0.24	0.27	0.28	0.28	0.33	**5.44(0.00)**	0.29	0.33	0.33	0.32	0.31	1.19(0.24)
ACTGL2	0.25	0.26	0.28	0.29	0.34	**5.82(0.00)**	0.33	0.31	0.30	0.33	0.32	-0.23(0.82)
EXPOS1	0.27	0.26	0.28	0.28	0.32	**3.09(0.00)**	0.35	0.31	0.31	0.29	0.33	**-1.77(0.08)**
EXPOS2	0.27	0.26	0.28	0.27	0.32	**2.57(0.01)**	0.34	0.31	0.31	0.28	0.35	0.55(0.58)
FUND	0.33	0.33	0.30	0.24	0.20	**-7.35(0.00)**	0.33	0.32	0.29	0.33	0.31	-1.12(0.26)
HOR	0.37	0.28	0.28	0.27	0.20	**-11.03(0.00)**	0.35	0.31	0.31	0.32	0.31	**-2.39(0.02)**
DIVP	0.29	0.24	0.28	0.28	0.30	0.74(0.46)	0.29	0.32	0.29	0.33	0.36	**4.64(0.00)**
TAXR	0.27	0.28	0.28	0.27	0.30	0.28(0.78)	0.33	0.32	0.31	0.31	0.33	0.27(0.79)
SDCF	0.26	0.24	0.24	0.32	0.35	**5.38(0.00)**	0.32	0.33	0.29	0.32	0.33	0.93(0.35)
LEV	0.25	0.29	0.28	0.29	0.29	**1.91(0.06)**	0.31	0.32	0.32	0.32	0.32	0.89(0.38)
SIZE	0.31	0.30	0.29	0.25	0.25	**-2.81(0.01)**	0.34	0.32	0.30	0.33	0.30	**-1.98(0.07)**

*Note: The table presents mean allocation to bonds by quintiles formed every year based on independent variables. See Table 2.1 for variable definitions. Tests of differences between Quintile 5 and Quintile 1 (and corresponding p values) are included.

Table 2.5: Explaining Pension Asset Allocation to Bonds in the UK and the US

Effect of Actuarial Gains/Losses on Pension Asset Allocation*

Variable	Exp. Sign	(1) UK Sample	(2) UK and US	(3) UK Sample	(4) UK and US
ACTGL1	+	0.20	0.01		
		(2.88)*	(0.10)		
ACTGL2	+			0.12	-0.03
				(2.99)*	(1.80)***
FUND	-	-0.58	-0.34	-0.56	-0.27
		(5.97)*	(1.76)***	(5.12)*	(1.51)
FUND²	+	0.12	0.16	0.13	0.14
		(5.29)*	(1.90)***	(4.66)*	(1.85)***
HOR	-	-0.09	-0.04	-0.09	-0.04
		(7.26)*	(3.25)*	(7.21)*	(4.25)*
DIVP	+	0.24	0.20	0.26	0.18
		(1.94)***	(5.19)*	(2.30)**	(2.79)*
TAXR	+	0.09	0.00	0.06	0.01
		(2.27)**	(0.10)	(1.90)***	(0.40)
SDCF	+	0.11	0.08	0.10	0.06
		(3.38)*	(1.68)***	(1.35)	(1.13)
LEV	+	0.01	0.05	0.03	0.02
		(0.29)	(1.69)***	(0.87)	(0.97)
SIZE	-	-0.01	-0.01	-0.01	-0.00
		(1.46)	(3.60)*	(1.78)***	(2.42)**
*ACTGL1*UK*	+		0.19		
			(2.64)*		
*ACTGL2*UK*	+				0.15
					(3.43)*
*FUND*UK*	?		-0.24		-0.29
			(1.08)		(1.39)
*FUND²*UK*	?		-0.04		-0.01
			(0.49)		(0.28)
*HOR*UK*	?		-0.05		-0.05
			(2.67)*		(2.86)*
*DIVP*UK*	?		0.04		0.08
			(0.33)		(1.54)
*TAXR*UK*	?		0.08		0.04
			(1.38)		(0.86)
*SDCF*UK*	?		0.03		0.04
			(0.57)		(0.39)
*LEV*UK*	?		-0.03		0.02
			(0.64)		(0.41)
*SIZE*UK*	?		0.01		-0.01
			(1.42)		(1.14)
UK	?		-1.04		0.30
			(6.27)*		(7.08)*
Constant	?	-0.75	0.30	-0.57	0.21
		(8.00)*	(2.15)**	(8.10)*	(2.50)**
Observations		927	1,943	927	1,943
Adj. R^2		0.20	0.13	0.20	0.15

*Notes:

1. The table provides results for estimating Equation (1) using samples of UK and US companies that sponsor defined benefit pension plans and for which financial and pension asset allocation data are available. The dependent variable is the ratio of market value of pension assets allocated to bonds to market value of total pension assets (*rBONDS*).

2. The model is: $$rBONDS_{it} = \beta_0 + \beta_1 SenVol_{it} + \beta_2 FUND_{it} + \beta_3 FUND_{it}^2 + \beta_4 HOR_{it} + \beta_5 LEV_{it} + \beta_6 DIVP_{it} + \beta_7 TAXR_{it} + \beta_8 SDCF_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (1)$$

   See Table 2.1 for variable definitions.

3. Specifications 1 and 3 estimate Equation (1) using the UK sample. Specifications 2 and 4 estimate the model with both UK and US samples. I include an indicator variable (*UK*) equal to one if the observation is a UK company, and zero otherwise. This variable interacts with all the independent variables in Equation (1).

4. All standard errors were computed using the Petersen (2006) methodology, which corrects for within company and over time correlations by clustering.

5. *, **, *** indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 2.6: Explaining Pension Asset Allocation to Bonds in the UK and the US

Impact of Recognizing Net Pension Surplus/Deficit on Pension Asset Allocation*

Variable	Exp. Sign	(1) UK Sample	(2) UK and US	(3) UK Sample	(4) UK and US
EXPOS1	+	0.02	-0.02		
		(2.39)**	(1.69)***		
EXPOS2	+			0.01	-0.01
				(2.36)**	(1.35)
FUND	-	-0.40	-0.05	-0.40	-0.06
		(5.25)*	(0.35)	(5.25)*	(0.44)
FUND^2	+	0.09	0.03	0.09	0.04
		(4.87)*	(0.58)	(4.80)*	(0.64)
HOR	-	-0.09	-0.05	-0.09	-0.05
		(7.42)*	(4.14)*	(7.42)*	(4.14)*
DIVP	+	0.20	0.09	0.21	0.09
		(1.65)***	(2.68)*	(1.70)***	(2.66)*
TAXR	+	0.06	0.01	0.06	0.01
		(1.53)	(0.33)	(1.58)	(0.33)
SDCF	+	0.08	0.04	0.08	0.04
		(2.24)**	(2.26)**	(2.29)**	(2.27)**
LEV	+	-0.02	0.02	-0.02	0.02
		(0.56)	(1.05)	(0.51)	(1.03)
SIZE	-	-0.01	-0.00	-0.01	-0.00
		(1.41)	(0.89)	(1.39)	(0.84)
*EXPOS1*UK*	+		0.04		
			(2.92)*		
*EXPOS2*UK*	+				0.02
					(2.72)*
*FUND*UK*	?		-0.36		-0.35
			(2.36)**		(2.28)**
FUND^2**UK*	?		0.05		0.05
			(0.88)		(0.81)
*HOR*UK*	?		-0.05		-0.05
			(2.61)*		(2.68)*
*DIVP*UK*	?		0.12		0.12
			(0.91)		(0.97)
*TAXR*UK*	?		0.04		0.05
			(0.83)		(0.86)
*SDCF*UK*	?		0.04		0.04
			(0.86)		(0.89)
*LEV*UK*	?		-0.04		-0.04
			(0.94)		(0.88)
*SIZE*UK*	?		-0.00		-0.00
			(0.50)		(0.52)
UK	?		-0.71		-0.73
			(5.85)*		(6.03)*
Constant	?	-0.60	0.12	-0.60	0.13
		(8.07)*	(1.19)	(8.12)*	(1.33)
Observations		927	1,943	927	1,943
Adj. R^2		0.17	0.12	0.17	0.12

*Notes:

1. The table provides results for estimating Equation (1) using samples of UK and US companies that sponsor defined benefit pension plans and for which financial and pension asset allocation data are available. The dependent variable is the ratio of market value of pension assets allocated to bonds to market value of total pension assets (*rBONDS*).

2. The model is:
$$rBONDS_{it} = \beta_0 + \beta_1 SenVol_{it} + \beta_2 FUND_{it} + \beta_3 FUND_{it}^2 + \beta_4 HOR_{it} + \beta_5 LEV_{it} + \beta_6 DIVP_{it} + \beta_7 TAXR_{it} + \beta_8 SDCF_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (1)$$

   See Table 2.1 for variable definitions.

3. Specifications 1 and 3 estimate Equation (1) using the UK sample. Specifications 2 and 4 estimate the model with both UK and US samples. I include an indicator variable (*UK*) equal to one if the observation is a UK company, and zero otherwise. This variable interacts with all the independent variables in Equation (1).

4. All standard errors were computed using the Petersen (2006) methodology, which corrects for within company and over time correlations by clustering.

5. *, **, *** indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 2.7: The Impact of Immediately Recognizing Actuarial Gains/Losses on Pension Asset Allocation (Early Adopters vs. Mandatory Disclosers)*

Variable	Exp. Sign	(1) UK Disclosers	(2) UK Adopters	(3) All UK Firms	(4) UK Disclosers	(5) UK Adopters	(6) All UK Firms
ACTGL1	+	0.20	0.21	0.20			
		(2.43)**	(2.75)*	(2.42)**			
ACTGL2	+				0.12	0.14	0.12
					(2.45)**	(2.39)**	(2.44)**
FUND	-	-0.57	-0.32	-0.57	-0.37	-0.31	-0.37
		(4.60)*	(1.85)***	(4.59)*	(4.06)*	(1.92)***	(4.05)*
$FUND^2$	+	0.11	0.06	0.11	0.08	0.06	0.08
		(3.75)*	(1.76)***	(3.74)*	(3.59)*	(1.79)***	(3.58)*
HOR	-	-0.09	-0.09	-0.09	-0.10	-0.08	-0.10
		(6.28)*	(4.37)*	(6.25)*	(6.19)*	(3.65)*	(6.17)*
DIVP	+	0.23	0.27	0.23	0.24	0.21	0.24
		(1.50)	(1.35)	(1.49)	(1.70)***	(1.07)	(1.69)***
TAXR	+	0.08	0.15	0.08	0.04	0.13	0.04
		(1.63)	(2.53)**	(1.63)	(1.02)	(1.98)**	(1.02)
SDCF	+	0.12	0.04	0.12	0.06	-0.01	0.06
		(2.93)*	(0.82)	(2.91)*	(1.26)	(0.12)	(1.25)
LEV	+	-0.06	0.38	-0.06	-0.02	0.39	-0.02
		(1.17)	(3.86)*	(1.17)	(0.45)	(4.03)*	(0.45)
SIZE	-	-0.01	-0.01	-0.01	-0.01	0.00	-0.01
		(1.72)***	(1.69)***	(1.71)***	(2.16)**	(0.59)	(2.15)**
*ACTGL1*ADPT*	?			0.01			
				(0.18)			
*ACTGL2*ADPT*	?						0.02
							(0.27)
*FUND*ADPT*	?			0.24			0.06
				(1.14)			(0.33)
*$FUND^2$*ADPT*	?			-0.05			-0.02
				(0.98)			(0.50)
*HOR*ADPT*	?			0.00			0.02
				(0.00)			(0.70)
*DIVP*ADPT*	?			0.04			-0.03
				(0.17)			(0.11)
*TAXR*ADPT*	?			0.08			0.09
				(1.04)			(1.10)
*SDCF*ADPT*	?			-0.09			-0.07
				(1.46)			(0.97)
*LEV*ADPT*	?			0.44			0.41
				(4.01)*			(3.90)*
*SIZE*ADPT*	?			0.00			0.01
				(0.25)			(1.43)
ADPT	?			0.22			0.15
				(1.04)			(0.84)
Constant	?	-0.76	-0.54	-0.76	-0.59	-0.43	-0.59
		(6.46)*	(3.03)*	(6.44)*	(6.70)*	(2.66)*	(6.67)*
Observations		715	212	927	715	212	927
Adjusted R^2		0.20	0.25	0.21	0.19	0.22	0.20

*Notes:

1. The table provides results for estimating Equation (1) using a sample of UK companies that sponsor defined benefit pension plans and for which financial and pension asset allocation data are available. The dependent variable is the ratio of market value of pension assets allocated to bonds to market value of total pension assets (*rBONDS*).

2. The model is:
$$rBONDS_{it} = \beta_0 + \beta_1 SenVol_{it} + \beta_2 FUND_{it} + \beta_3 FUND_{it}^2 + \beta_4 HOR_{it} + \beta_5 LEV_{it} + \beta_6 DIVP_{it} + \beta_7 TAXR_{it} + \beta_8 SDCF_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (1)$$

   See Table 2.1 for variable definitions.

3. Specifications 1 and 4 estimate Equation (1) using UK companies that only disclosed information in the notes in accordance with FRS17 during the transitional period (mandatory disclosers). Specifications 2 and 5 estimate Equation (1) with UK companies that fully adopted FRS17 during the transitional period (early adopters). Specifications 3 and 6 estimate Equation (1) using the entire UK sample.

4. I include an indicator variable (*ADPT*) to separate mandatory disclosers from early adopters. *ADPT* equals one for early adopters and zero otherwise. This variable interacts with all the independent variables in Equation (1).

5. All standard errors were computed using the Petersen (2006) methodology, which corrects for within company and over time correlations by clustering.

6. *, **, *** indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 2.8: The Impact of Recognizing Net Pension Surplus/Deficit on Pension Asset Allocation (Early Adopters vs. Mandatory Disclosers)*

Variable	Exp. Sign	(1) UK Disclosers	(2) UK Adopters	(3) All UK Firms	(4) UK Disclosers	(5) UK Adopters	(6) All UK Firms
EXPOS1	+	0.02 (2.02)**	0.02 (2.21)**	0.02 (2.01)**			
EXPOS2	+				0.01 (2.41)**	0.01 (2.46)**	0.01 (2.41)**
FUND	-	-0.41 (4.19)*	-0.29 (1.76)***	-0.41 (4.18)*	-0.41 (4.24)*	-0.28 (1.73)***	-0.41 (4.22)*
FUND²	+	0.09 (3.67)*	0.06 (1.65)	0.09 (3.66)*	0.09 (3.76)*	0.06 (1.65)	0.09 (3.75)*
HOR	-	-0.10 (6.37)*	-0.08 (3.67)*	-0.10 (6.35)*	-0.10 (6.35)*	-0.08 (3.75)*	-0.10 (6.32)*
DIVP	+	0.18 (1.23)	0.15 (0.73)	0.18 (1.23)	0.18 (1.19)	0.14 (0.70)	0.18 (1.19)
TAXR	+	0.04 (0.91)	0.15 (2.32)**	0.04 (0.90)	0.04 (0.84)	0.15 (2.33)**	0.04 (0.83)
SDCF	+	0.10 (2.06)**	0.01 (0.26)	0.10 (2.05)**	0.09 (1.96)***	0.02 (0.37)	0.09 (1.95)***
LEV	+	-0.08 (1.37)	0.36 (3.76)*	-0.08 (1.27)	-0.09 (1.08)	0.36 (3.75)*	-0.09 (1.07)
SIZE	-	-0.01 (1.71)***	0.00 (0.50)	-0.01 (1.70)***	-0.01 (1.72)***	0.00 (0.51)	-0.01 (1.72)***
*EXPOS1*ADPT*	?			0.00 (0.63)			
*EXPOS2*ADPT*	?						0.00 (0.28)
*FUND*ADPT*	?			0.12 (0.66)			0.13 (0.67)
*FUND²*ADPT*	?			-0.03 (0.75)			-0.03 (0.76)
*HOR*ADPT*	?			0.02 (0.61)			0.01 (0.54)
*DIVP*ADPT*	?			-0.04 (0.15)			-0.04 (0.15)
*TAXR*ADPT*	?			0.11 (1.44)			0.11 (1.48)
*SDCF*ADPT*	?			-0.08 (1.28)			-0.07 (1.13)
*LEV*ADPT*	?			0.45 (4.18)*			0.45 (4.19)*
*SIZE*ADPT*	?			0.01 (1.23)			0.01 (1.24)
ADPT	?			0.19 (0.99)			0.19 (0.96)
Constant	?	-0.62 (6.77)*	-0.43 (2.50)**	-0.62 (6.75)*	-0.61 (6.78)*	-0.43 (2.44)**	-0.61 (6.76)*
Observations		715	212	927	715	212	927
Adjusted R^2		0.16	0.21	0.17	0.16	0.21	0.17

*Notes:

1. The table provides results for estimating Equation (1) using a sample of UK companies that sponsor defined benefit pension plans and for which financial and pension asset allocation data are available. The dependent variable is the ratio of market value of pension assets allocated to bonds to market value of total pension assets (*rBONDS*).

2. The model is: $$rBONDS_{it} = \beta_0 + \beta_1 SenVol_{it} + \beta_2 FUND_{it} + \beta_3 FUND_{it}^2 + \beta_4 HOR_{it} + \beta_5 LEV_{it} + \beta_6 DIVP_{it} + \beta_7 TAXR_{it} + \beta_8 SDCF_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (1)$$
   See Table 2.1 for variable definitions.

3. Specifications 1 and 4 estimate Equation (1) using UK companies that only disclosed information in the notes in accordance with FRS17 during the transitional period (mandatory disclosers). Specifications 2 and 5 estimate Equation (1) with UK companies that fully adopted FRS17 during the transitional period (early adopters). Specifications 3 and 6 estimate Equation (1) using the entire UK sample.

4. I include an indicator variable (*ADPT*) to separate mandatory disclosers from early adopters. *ADPT* equals one for early adopters and zero otherwise. This variable interacts with all the independent variables in Equation (1).

5. All standard errors were computed using the Petersen (2006) methodology, which corrects for within company and over time correlations by clustering.

6. *, **, *** indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

Appendix 2.1: Roadmap towards FRS 17

	Standards/Drafts/Amendments	Notes
1988, ASC	SSAP 24, "Accounting for Pension Cost"	SSAP 24 was published by the Accounting Standards Board's predecessor body, Accounting Standards Committee (ASC).
Nov 1999,ASB	FRED 20, "Retirement Benefits"	Financial Reporting Exposure Draft No. 20 proposes a change from using actuarial values for pension assets/liabilities to a market value based approach.
Nov 2000,ASB	FRS 17, "Retirement Benefits"	FRS 17 requires mandatory implementation for accounting periods ending on or after June 22, 2003. Earlier adoption is encouraged. Disclosure in accordance with FRS 17 is required during the transitional period.
Jul 2002,ASB	Exposure Draft of an amendment to FRS 17 for an extended transitional regime	ASB proposes an extended transitional period for FRS 17 during the period of international discussions on IAS 19.
Nov 2002,ASB	An amendment to FRS 17 to extend the transitional arrangements	The requirements of FRS 17 as amended will become mandatory for accounting periods beginning on or after January 1, 2005.
Apr 2004, IASB*	Exposure draft, "Proposed Amendments to IAS 19, Employee Benefits: Actuarial Gains/Losses, Group Plans and Disclosures"	The IASB proposes immediate recognition of actuarial gains/losses in a similar manner to that required by FRS 17.
Dec 2004, IASB*	Amendments to IAS19, "Employee Benefits"	It allows companies to recognize full actuarial gains/losses in a new statement titled "the statement of recognized income and expense."
Dec 2005, ASB	Research project into accounting for pensions	It will reconsider the principles of pension accounting due to the regulatory changes after the publication of FRS 17.
May 2005, ASB	Exposure Draft on Pension Disclosures	It proposes an amendment to FRS 17, suggesting replacing the disclosures required by FRS 17 with those of IAS 19.

* Recent amendments to IAS 19 are included, as these were considered by ASB in the process of revising FRS 17.

Appendix 2.2: A Comparison of Major Pension Accounting Standards

	FRS 17	SSAP 24	SFAS 87	IAS 19
Valuation of Pension Asset	Market value	Actuarial basis	Market value	Market value
Discount Rate for the Valuation of Pension Liability	Return on AA corporate bonds	Long-term actuarial assumptions	Long-term actuarial assumptions but possible to use the rate on AA corporate bonds	Return on AA corporate bonds
Actuarial Gains/Losses	Recognized immediately in the statement of total recognized gains and losses	Amortized and spread forward over a number of years and recognized through the profit and loss account	Deferred and amortized over average remaining service life of employees, subject to corridor method. Amortization is included in periodic pension cost	Choice between amortizing gains and losses based on the corridor method, or immediate recognition in the statement of recognised income and expenses
Surplus/Deficit in the Pension Fund	Recognized as an asset or a liability on the balance sheet	Disclosed in the notes	Disclosed in the notes; Unfunded ABO is recognized on the balance sheet as additional minimum liability (against intangible pension asset or shareholders' equity)	Disclosed in the notes in case that actual gains and losses are deferred and amortized or fully recognized in case that actuarial gains/losses and past service costs are fully recognized in shareholders' equity.

Chapter 3

Auditor Independence, Conditional Conservatism, and the Cost of Public Debt

3.1. Introduction

We study the effect of auditor independence – an important attribute of audit quality – on the cost of new public debt. In recent years, following well-known accounting scandals, the ability of auditors to maintain independence was questioned by legislators, investors and the general public. In the case of Enron the fact that fees paid to Arthur Andersen for consulting were greater than fees paid for audit work was viewed as evidence of lack of auditor independence. These accounting scandals prompted extensive legislation of which one goal was to ensure greater auditor independence. Specifically, the Sarbanes-Oxley Act of 2002 and various Act-related rulings by the SEC now impose restrictions on type of activities that can be performed by the external auditor. The rules also require that all members of an issuer's audit committee be independent and the disclosure of audit fees and non-audit fees in a specific format.

We predict that greater auditor independence will reduce a company's cost of borrowing. In particular, we expect that companies with more independent external auditors would exhibit better bond ratings and benefit from lower bond yield premium. To establish a link between auditor independence and the cost of borrowing, consider the role of accounting conservatism and the information insurance role of external auditors.

It has long been acknowledged in the literature that in the presence of information asymmetries managers have incentives to attempt to transfer wealth from lenders to shareholders or themselves (e.g., Fama and Miller, 1972; Black, 1976; Myers, 1977; Smith and Warner, 1979). From the contracting perspective, accounting conservatism helps mitigate such inappropriate wealth transfers from bondholders through timely loss recognition and delayed recognition of uncertain gains (Watts, 2002). For example, conservative accounting reduces the earnings and retained earnings amounts used in debt contracts to constrain dividends. Moreover, conservatism, which reduces book value of equity, constrains the borrowing firm from excessive additional financing via more conservative leverage ratios (Ahmed et al., 2002). Therefore, greater accounting conservatism leads to reduced risk to bondholders and bondholders accept a lower rate of return given greater accounting conservatism (LaFond and Watts, 2006).

Watts (2002) argues that auditors prefer conservatism to avoid litigation and enhance their reputation. LaFond and Watts (2006) draw attention to the role of auditors in enforcing higher verifiability standards to gains than to losses. This argument, however, rests on the assumption that the external auditor has both the ability and economic incentives to apply such standards. However, the economic bonding between the auditor and the audited firm could compromise conservatism in practice. Specifically, an independent auditor will be more concerned about litigation and reputation and relatively less concerned about losing a particular audit engagement. A more dependent auditor, on the other hand, is expected to be more concerned about losing an audit engagement and related non-audit services, and thus less conservative. To the extent that auditor independence can enhance accounting conservatism and provide independent verification to enhance the credibility of financial reporting, contracting with the firm is made less costly and the cost of capital is reduced (Mansi et al., 2004).

While conservatism may also benefit equity-holders and reduce equity cost of capital by resolving some agency costs, there are a number of reasons why we choose to focus on debt cost of capital. First, since managers' interests are more closely aligned with that of equity-holders than with that of debt-holders, they may make accounting choices that could result in a transfer of wealth from debt-holders to equity-holders. Such accounting choices are unlikely to be conservative in nature (e.g., income-increasing choices to allow higher dividends). Ball et al. (2006) support this argument by showing that timely loss recognition is stronger in countries with larger debt markets whereas the size of equity markets is not correlated with the magnitude of timely loss recognition. Therefore, debt-holders would value auditor independence at least as much as equity-holders. This is the case even in the presence of debt covenants whose purpose is to pre-empt such anticipated transfers. This is because incomplete contracting could result in ineffective covenants. In addition, to the extent that covenants rely on reported figures, their effectiveness is dependent on the degree of conservatism actually exercised.[26] Furthermore, recent empirical evidence also suggests that covenants are not substitutes to accounting conservatism (Beatty et al., 2006).[27]

Second, investigating effects of auditor independence on equity cost of capital is fraught with measurement problems, as it is not directly observable. Failure to detect an association of auditor independence with equity cost of capital may thus be

[26] DeFond and Jiambalvo (1994) find that abnormal total and working capital accruals are positive even in years when debt covenants are violated.

[27] A recent article in *The Economist* highlights a growing trend by lenders to exclude debt covenants from lending contracts. Such practice would result in a greater role for auditor independence (Going Naked – Leveraged Debt, *The Economist*, April 22, 2006).

attributed to model specifications. The need to rely on a proxy for cost of equity capital suggests an advantage to the use of the primary bond market where yields and ratings are readily observable from actual markets. Third, the effects of auditor quality and independence have been mainly explored in equity market settings and relatively little is known about these effects for other stakeholders, such as bondholders.

We employ three measures of auditor independence, which proxy aspects of the economic bonding between auditors and clients. Two of the three economic measures relate to the extent of audit to non-audit services (NAS). These measures are motivated by concerns expressed by regulators (e.g., Levitt, 2000) and new laws that restrict the provision of NAS. The first measure, *R_AUD*, is calculated as the ratio of audit fees to total fees (the sum of audit and non-audit fees) paid by an individual client to the auditor. Gwilliam (2005) notes that even for big audit firms dependence issues can arise at the local office/partner level in the interaction with an individual client. Since the audit of an individual client is likely managed by a single partner in the local office where the client is located, this measure proxies for independence issues at this level. The rationale behind this measure is that higher audit fees indicate a higher audit effort whereas higher non-audit fees suggest rents from other businesses, hence a threat to auditor independence.

The importance of the auditing line of business for an audit firm reflects a different aspect of auditor independence. Significant reliance of the audit firm on NAS captures firm-wide propensity to compromise independence in audit services as a gateway to more lucrative businesses. External auditors that heavily rely on non-audit fees may be more prone to independence problems than firms whose main line of business is pure auditing. The second measure, *R_TOTAL*, is thus based on the ratio of audit fee income to total fee income at the audit firm level.

Auditor independence is also related to the relative economic importance of an individual client to the whole of the external auditor's business. As the other measures do not capture this aspect of auditor independence, we calculate a third measure, *R_COM*, which is the ratio of total fees paid by an individual company to total fees paid by all of the external auditor's clients. Indeed, the SEC for the purpose of its disciplinary actions on independence matters follows this indicator.

We develop the empirical analysis in three steps. First, we employ the Basu (1997) regression model to investigate whether auditor independence is positively associated with conditional conservatism (timely loss recognition). In this model, earnings are regressed on returns whereby positive (negative) returns serve as a proxy for good (bad) news. The coefficient on negative returns is the empirical measure of conservatism (the Basu coefficient). It reflects the incremental sensitivity of earnings to bad news. To find if this measure is larger in the presence of greater auditor independence we interact negative returns with measures of auditor independence and examine the signs of the interaction coefficients.

After documenting the link between conditional conservatism and auditor independence, we proceed to the second phase of our study – exploring the association between measures of auditor independence and ratings of new bond issues, controlling for other known factors that influence bond ratings. At the third phase of the study we investigate pricing implications by estimating the association between auditor independence measures and the yield premium on new bond issues after controlling for bond ratings and other factors. This latter analysis is motivated by our focus on debt cost of capital. In addition, it is motivated by the observation that ratings are discrete in nature, implying a limitation of their capacity to convey the full set of information that pertains to the rating process. More importantly, bondholders may conduct their own analysis of a borrower's financial position irrespective of ratings. The rating regression alone therefore may not be sufficient with respect to assessing the role of auditor independence in determining the cost of debt capital.

Using a sample of auditors during 2000-2005, we find that the Basu coefficient is larger the greater the measure of auditor independence as captured by *R_AUD* and *R_TOTAL*. This evidence is consistent with independent auditors exercising a greater degree of conservatism in recognizing gains than losses. We also find, as expected, that auditor independence is significantly associated with bond ratings. Specifically, the proportion of audit fees to total fees paid by a client (*R_AUD*) is positively related to bond ratings. In addition, we find that client economic importance (*R_COM*) is negatively related to ratings. That is, the greater the client's economic importance to the auditor, the lower the rating. With respect to bond pricing, the evidence indicates that yield premium is negatively related to the proportion of audit fees to total fees paid by a client (*R_AUD*), and negatively related to the importance of audit fee revenues relative to total revenues generated by the external auditor (*R_TOTAL*). These relations are obtained after controlling for bond ratings. Hence, they capture incremental pricing implications of auditor independence beyond their impact on yield through bond ratings.

In summary, the findings suggest that independent auditors play a role in enhancing conditional conservatism and such conservatism is valuable for bondholders. The evidence is consistent with the explanation that rating agencies and bondholders price-protect against the possibility that aggressive accounting leads to wealth transfers from bondholders to equity holders. The market views auditor independence as a mechanism that is capable of restricting such transfers, and thus assigns higher prices to new issues where auditor independence is higher.

The remainder of the chapter is organized as follows. Section 3.2 provides background on auditor independence, reviews the literature and develops the main hypotheses. Section 3.3 discusses the research design while the data is described in Section 3.4. The results of the empirical analyses are reported in Section 3.5. Section 3.6 provides concluding remarks.

3.2. Prior Literature on Auditor Independence and Development of Hypotheses

Economic dependence of the external auditor on its client can arise when fee revenues from a single client constitute a significant portion of the auditor's total revenues. Even for large audit firms, where any given client is relatively small, a loss of a client can dent the credentials of the responsible partner as well as that of the entire firm (Gwilliam, 2005). Wishing to avoid such a loss could potentially compromise the integrity of the external audit task and lead eventually to defect disclosures and/or measurement in the financial statements. In turn, this could result in loss of investor confidence in audited financial statements, higher degree of information asymmetry and higher cost of capital. [28] This argument has been acknowledged in 2003 by the SEC in explaining the rationale for its new rules: "Increased investor confidence in the independence of accountants ...could improve the efficiency of the markets and result in a lower cost of capital".[29]

Over the years auditing firms have modified their business models by

[28] Clients often demand non-audit services when restructuring their business and audit firms likely charge higher fees to clients with higher financial risk. Hence, it is possible that non-audit fees are negatively (positively) associated with bond rating (bond yield premium) regardless of whether the auditor is more or less independent. However, in our tests, we control for this endogeneity by including variables that capture client and bond risk characteristics.

[29] SEC Final Rule Release No. 33-8183, available at http://www.sec.gov/rules/final/33-8183.htm.

increasingly placing greater emphasis on the provision of NAS. Among such services are tax-related services, financial system design and implementation, and investment advice. Levitt (2000) argues that this trend may have exacerbated the independence problem in that audit firms may have been pursuing audit engagement to better position themselves for obtaining more lucrative consulting services.

In response to these concerns, the SEC in 2000 restricted audit firms from providing certain services. From 2001 it is required (SEC Final rule S7-13-00) that disclosure of information about auditor fees is made in proxy statements. The Sarbanes-Oxley Act of 2002 (SOX) and subsequent SEC regulation have further restricted the range of services that audit firms can now provide.[30] This regulation has also made certain changes to the disclosure rules by requiring provision of fee information in the annual filings after December 15, 2003, classified into audit fees, audit-related fees, tax fees and all other fees. This information should be provided for the current and prior years.

The SEC believes that these "rules advance our important policy goal of protecting the millions of people who invest in our securities markets in reliance on financial statements that are prepared by public companies and other issuers and that, as required by Congress, are audited by independent auditors." It further argues: "To allow the issuer's investors to be better able to evaluate the independence of the accountant, we believe that disclosures should be made by issuers of the scope of services provided by their independent public accountants."[31]

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[30] The Act prohibits nine specific services: Bookkeeping or other services related to the accounting records or financial statements of the audit client; Financial information systems design and implementation; Appraisal or valuation services, fairness opinions, or contribution-in-kind reports; Actuarial services; Internal audit outsourcing services; Management functions or human resources; Broker or dealer, investment adviser, or investment banking services; Legal services and expert services unrelated to the audit; Any other service that the Board determines, by regulation, is impermissible.

[31] SEC, "Strengthening the Commission's Requirements Regarding Auditor Independence", Final Release No. 33-8183, 2003.

Prior literature has investigated the association between auditor independence and the quality of financial statements in a number of ways. Frankel et al. (2002) and Ashbaugh et al. (2003) relate audit fees and non-audit fees to abnormal accruals, which serve as a measure of financial reporting quality. Kinney et al. (2004) use restatements as a measure of reporting quality and examine its association with auditor independence. A third approach uses SEC enforcement actions or shareholders' litigation as the dependent variable (e.g., Raghunandan et al., 2003). The evidence, though mixed, seems to have established a link between lack of auditor independence and misreporting. A fourth approach is to analyze SEC disciplinary decisions and judicial ruling adverse to accountants who have violated independence standards (Brown et al., 2000). These strands of the literature, however, have not quantified the cost-of-capital ramifications of auditor independence. The literature is also largely based on data collected prior to the recent SEC rulings and the enactment of SOX 2002.[32]

We have earlier argued that auditor independence will affect cost of capital through the application of conservative accounting in the presence of information asymmetry between bondholders and managers. However, auditor independence can also affect cost of capital to the extent that it leads to better disclosure. Sengupta (1998) uses a similar argument that does not rely on conservatism: firms that provide better disclosures (and thus reduce information asymmetry) benefit from lower cost of debt. This view is also widely held by regulators and practitioners, as was pointed out earlier.[33]

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[32] Griffin and Lont (2005) argue that following the SOX Act costs borne by a client firm from defects in the financial statements should increase.

[33] See the Independence Standards Boards' discussion memorandum: A Conceptual Framework for Auditor Independence that was published in 2000 (available at http://www.cpaindependence.org/). The Independence Standards Board was formed by the SEC and the American Institute of Certified Public

We develop two main hypotheses based on the preceding discussion. First, consistent with LaFond and Watts (2006), we predict that the Basu measure of conditional conservatism will be larger the greater is auditor independence. This is because an independent auditor has greater incentives to restrict aggressive accounting choices by enforcing higher verifiability standards to gains while not compromising on the recognition of losses.

Second, we postulate that greater auditor independence would lead to better bond ratings and lower cost of debt capital. Bondholders assess the risk profile of the new issue, inclusive of the threat of unfavourable wealth transfers to shareholders and/or managers. Anticipating that independent auditors would restrict such transfers through stricter application of conservative accounting and enhance quality of future disclosures, they will be willing to pay more for the same stream of contractual payments on the new bond.

Kinney et al. (2004) argue that the provision of NAS may, contrary to our predictions, improve audit quality and, by implication, reduce information asymmetry. This is because through NAS the auditor gathers information and in-depth knowledge of its client. This view provides an alternative to our hypothesis. Thus finding relations opposite to our predictions would lend support to NAS having a net positive effect on cost of debt capital.

Our study is related to Mansi et al. (2004) who examine the relation between the cost of debt capital and auditor size and auditor tenure (their measures of audit quality). Though audit quality (perceived or real) is influenced by size and tenure, it is also affected by auditor independence, an issue not explored by Mansi et al. (2004). Because our sample is comprised of only Big 5 auditors, auditor size is not playing an

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Accountants in May 1997 and dissolved in July 2001 after much of its work was incorporated into recent SEC auditor independence rules.

important role here. Nonetheless, the results reported here are obtained after controlling for auditor tenure. Our research design also differs from Mansi et al. (2004) in that we focus on the primary bond market. While both the primary and the secondary bond markets probably enable a more precise measurement of prices and cost of capital relative to equity markets, the primary bond market provides a more powerful and interesting setting to investigate the role of auditor independence. It is more powerful because we use the cost of capital actually paid by the company. The secondary market reflects trading among investors, not with the issuing company. Moreover, unlike the secondary market there is no concern about market liquidity, stale prices and sticky ratings. It is an interesting setting because the primary bond market represents a point in time in which the amount borrowed by the issuing firm is determined. Any frictions between investors and managers would affect the ability of this market to facilitate efficient investments in the economy. We study one potential friction – lack of auditor independence.

Brandon et al. (2004) also use non-audit services as a proxy for (lack of) external auditor independence and estimate the association between the extent of non-audit services performed by the firm's external auditor and bond ratings. They find that bond ratings are negatively associated with lower auditor independence. However, this result is hard to interpret as Brandon et al's model is quite parsimonious and fails to control for many factors that were shown in the literature to be associated with ratings. Indeed, they show that this association is not economically significant in that adding measures of non-audit fees to a benchmark bond rating prediction model does not change much the rate of correct classifications. In addition, unlike this study, they use only one measure of auditor independence. More important, Brandon et al. (2004)

do not advance any model and set of hypotheses to support their results, nor do they link auditor independence and conservatism.

We also examine the effect of auditor independence on bond yield premium, after controlling for bond ratings. Focusing only on bond ratings, as in Brandon et al. (2004), may undermine the effect of auditor independence on the bond market. First, ratings are categorical measures while bond yield premium is a continuous variable that captures more information. Second, bondholders are likely to conduct their own research generating information not captured in ratings. Third, researchers usually convert bond ratings into numerical measures introducing measurement error, as ratings are not necessarily linear. Fourth, bond ratings can be affected by the relations between rating agencies and the issuing firm. Bond yield premium, on the other hand, represents a more efficient measure of the cost of borrowing. Thus, an analysis of bond yield premium, after controlling for bond ratings, is potentially more useful than an analysis of bond ratings alone.[34]

3.3. Research Design

We first examine the association, if any, between auditor independence and conditional conservatism. For this purpose we employ the Basu (1997) model:

$$DEPS_{it} = \alpha_0 + \alpha_1 DR_{it} + \alpha_2 R_{it} + \alpha_3 DR_{it} * R_{it} + \varepsilon_{it} \qquad (1)$$

where, *DEPS* is deflated earnings per share, measured as the earnings per share for firm *i* in fiscal year *t* divided by share price at the beginning of the fiscal year, and *R* is the return on firm *i* from nine months before fiscal year end *t* to three months after

[34] Our study also employs a much larger sample over a longer period than Brandon et al. (2004). While they use a small sample of 333 new bond issues over a two-year period (February 2001 to December 2002). We use about 1,650 bond issues over a period of six years (2000-2005). Thus our results are potentially more powerful and robust relative to those obtained by Brandon et al. (2004).

fiscal year-end *t*. *DR* is a dummy variable equal to one for negative return, and zero otherwise. Since negative returns proxy for bad news, α_3 represents the incremental sensitivity of earnings to bad news relative to good news, i.e., α_3 is the measure of conditional conservatism in this model.

We augment this model by including auditor independence variables, the main test variables in this study. We construct three fee-based variables that capture aspects of auditor independence. The first one (*R_AUD*) is the ratio of audit fees paid by client *i* to audit firm *j* in period *t* divided by total fees paid by client *i* to audit firm *j* in period *t*. This captures the economic importance of audit work at the local audit office/partner level and is common in prior literature (e.g., Frankel et al., 2002; Ashbaugh et al., 2003; and Brandon et al., 2004). The larger the proportion of audit fees from total fees, we expect the audit work to be more independent.

The second fee-based variable measures the economic importance of the client to the audit firm as a whole (that is, beyond the local level). This variable (*R_COM*) is measured as total fees paid by client *i* to audit firm *j* in period *t* divided by total fees paid to audit firm *j* by all clients in period *t*. The larger the proportion of fees from one client, the less independent the auditor is expected to be of client *i*. Thus, we expect a positive relation between this variable and the cost of borrowing. Note the difference between this measure and the previous one. As pointed out by Larcker and Richardson (2004), the first measure is not sensitive to scale, as a client with $1 of audit and non-audit fees produces the same measure (i.e., 1/2) as a client with $10 million of both audit and non-audit fees. In contrast, if both clients employ the same auditor, *R_COM* for the smaller (bigger) client is 2/22 (20/22).

The third fee-based independence variable (*R_TOTAL*) measures the strategic importance of audit services at the audit firm level. This variable is measured as the sum of audit fees paid to firm i's audit firm in period t divided by total fees paid to this audit firm by all of its clients in period t. The larger this ratio, the more independent we expect the audit firm to be. Note that this ratio is calculated for each audit firm once for a given year.

Adding these three measures to the Basu model and including the appropriate interactions we estimate the following model:

$$\begin{aligned} DEPS_{it} &= \alpha_0 + \alpha_1 DR_{it} + \alpha_2 R_{it} + \alpha_3 DR_{it} * R_{it} + \alpha_4 R\_AUD_{it} + \alpha_5 R\_AUD_{it} * DR_{it} \\ &+ \alpha_6 R\_AUD_{it} * R_{it} + \alpha_7 R\_AUD_{it} * DR_{it} * R_{it} + \alpha_8 R\_COM_{it} + \alpha_9 R\_COM_{it} * DR_{it} \\ &+ \alpha_{10} R\_COM_{it} * R_{it} + \alpha_{11} R\_COM_{it} * DR_{it} * R_{it} + \alpha_{12} R\_TOTAL_{it} + \alpha_{13} R\_TOTAL_{it} * DR_{it} \\ &+ \alpha_{14} R\_TOTAL_{it} * R_{it} + \alpha_{15} R\_TOTAL_{it} * DR_{it} * R_{it} + \varepsilon_{it} \qquad (2) \end{aligned}$$

The coefficients α_7 and α_{15} in Equation (2) capture the incremental responsiveness of earnings to bad news as auditor independence increases, while the coefficient α_{11} captures the incremental responsiveness of earnings to bad news as auditor independence decreases. Thus, to the extent that greater auditor independence is positively related to a larger degree of conservatism, we predict that α_7 and α_{15} are positive while α_{11} is negative. Finding that these coefficients are statistically significant with the predicted signs will therefore support the argument that a more independent auditor enforces a greater degree of conditional conservatism. That is, when losses occur they are recognized in earnings in a more timely fashion the greater the degree of auditor independence. Furthermore, if this is the case, then it is expected that auditor independence would be priced in the bond market because conservative accounting is a mechanism that helps bondholders to secure their investment.

We proceed to the rating and bond yield analyses. Consistent with Reiter (1991), Ziebart and Reiter (1992) and Shi (2003), we use bond rating assigned by credit rating agencies and bond yield premium as measures of the cost of borrowing. We construct one equation where bond rating is the dependent variable and a second equation where bond yield premium is the dependent variable. Though we are particularly interested in the effect of auditor independence on bond ratings and bond yield premium, we control for a number of factors that prior studies (e.g., Ziebart and Reiter, 1992; Mansi et al., 2004) have identified to be associated with the dependent variables. The bond rating equation contains the following components:

Bond Rating = *f* (Auditor Independence, Other Auditor Characteristics, Firm Characteristics, Bond Characteristics, Economic Cycle) (3)

The bond yield premium equation is similar to the bond ratings equation. However, it also includes characteristics of bond ratings as explanatory variables.

Yield Premium = *h* (Auditor Independence, Other Auditor Characteristics, Firm Characteristics, Bond Rating Characteristics, Bond Characteristics, Economic Cycle) (4)

Bond ratings are measured as integer values from 1 (Aaa) to 22 (D) based on Moody's categorical bond rating (higher integer value implies worse rating). Yield premium is defined as the difference in percentage points between the yield to maturity for the corporate debt and the yield of a US treasury bond with comparable maturity on the issuance date. Higher yield premium thus implies higher cost of debt capital.

A larger proportion of audit fees from total fees at the individual client level (*R_AUD*) suggests greater independence. Thus, we expect this ratio to be negatively related to the dependent variables. The second variable, *R_COM*, captures the proportion of fees from one client relative to total fees from all clients. Since a higher ratio implies lower independence, we expect a positive relation between this variable and the cost of borrowing. The larger the third ratio (*R_TOTAL*), the greater the weight of audit services in the revenue mix of the audit firm and the more independent we expect the audit firm to be. We therefore expect a negative relation between this variable and the cost of borrowing.

We use two additional control variables to capture other auditor characteristic. The first one is audit tenure (*AUDTEN*), measured as the natural logarithm of one plus the length in years of the audit-client relationship. Longer audit tenure suggests that the auditor is more familiar with the client, thus increases the quality of the audit, and hence reduces cost of capital. In contrast, it has been argued in recent years that longer audit-client relationship creates friendly relationship between management and the auditor, thus reduces the effectiveness of the audit. Reflecting this concern, there have been calls for mandatory auditor rotation aimed at increasing auditor independence. The second control variable is audit switch (*SWITCH*) - an indicator variable equal to one if the auditor was replaced in the year prior to the bond issue, and zero otherwise. Lenders may regard replacing an auditor in a year prior to raising debt as a negative signal about management embarking on opinion shopping exercise (Lennox, 2000). On the other hand, the switch prior to the bond issue may be related to an attempt to enhance the credibility of the audited numbers with a view to possible reduction in borrowing costs. Since tenure and auditor switch may be correlated with auditor independence, we include these variables in the model. However, we do not have a prediction as to the signs of the coefficients on these two variables. We do not include an indicator variable for a Big-5 auditor, since all but one observation in our final sample are Big-5 auditors.

We control for firm characteristics that may affect ratings and yield premium using the following variables:

(a) Firm size (*FSIZE*) – measured as the natural logarithm of one plus total assets. Ceteris paribus, we expect larger firms to have better bond ratings and lower bond yield premium (Carey et al., 1993).

(b) Firm age (*FAGE*) – measured as the natural logarithm of the years since the firm initially appeared on CRSP. Consistent with Lang (1991), more mature (older) firms are also perceived as less risky, thus associated with better bond rating and lower bond yield premium.

(c) Financial leverage (*LEV*) – measured as the ratio of long-term debt divided by total assets. We expect higher leverage ratios to be associated with lower ratings (higher assigned integers) and higher bond yield premium, because leverage is an essential indicator of the firm's overall financial burden.

(d) Interest coverage ratio (*COVERAGE*) – measured as operating income divided by interest expenses. This captures the ability of the borrowing firm to make regular interest payment. We thus expect higher coverage ratio to be positively (negatively) related to ratings (bond yield premium).

(e) Operating profitability (*PROF*) – measured as operating income divided by total assets. Consistent with Shi (2003), we expect higher profitability to be positively (negatively) related to ratings (bond yield premium).

(f) Bank-related debt (*BANKDEBT*) – measured as the ratio of bank debt over total debt. The existence of bank-related debt is associated with additional layer of monitoring. We expect this variable to be negatively related to the cost of borrowing.

(g) Bankruptcy risk (*OSCORE*) – measured as Ohlson's (1980) O-score. This score captures likelihood of bankruptcy that may not be captured by other variables and is expected to be negatively related to the cost of borrowing.

(h) Dividend payout ratio (*DIVPAY*) – measured as the dividends per share by payable date over retained earnings per share. Dividend payout ratio is related to the scope of potential for any wealth transfer from bondholders to shareholders. Also, it serves as a proxy for the tightness of unobservable debt covenants related to dividends. The higher the ratio, the greater the likelihood of violating covenants. Thus it is expected to be positively related to the cost of borrowing.

Various bond characteristics are also expected to be related to the cost of borrowing. We include the following variables:

(a) The issue size (*ISIZE*) – measured as the total amount of issuance divided by total assets. Large issue size is related to high probability of default and therefore increases the cost of borrowing (Sengupta, 1998).

(b) Bond maturity (*MATU*) – measured as the natural logarithm of one plus the number of years to maturity. Debt with longer maturity is exposed to a higher risk of default. Consistent with Ziebart and Reiter (1992), debt maturity is predicted to be positively associated with the cost of debt.

(c) The duration of call protection (*CALL*) – measured as the ratio of years to first call over years to final maturity. We set the value of this ratio to one if the bond is not callable. Callable debt contains prepayment risk and loss of high rate interest income from the bondholders' perspective. Therefore, shorter call protection duration suggests higher cost of debt (Datta et al., 1999).

(d) The existence of conversion option (*CONV*) – measured as an indicator variable, equal to one for convertible bonds and zero otherwise. Convertible debt is expected to have a lower cost of borrowing because the option to convert bonds to equity will be exercised by bondholders when it is profitable to do so (Shi, 2003).

(e) The subordinate status (*SUB*) – measured as an indicator variable, equal to one for subordinate bonds and zero otherwise. Subordinated bond is expected to have a higher cost of borrowing (Shi, 2003).

(f) The existence of put option (*PUT*) – measured as an indicator variable, equal to one if the bond is puttable and zero otherwise. Puttable bonds reduce the risk to bondholders and thus are expected to be associated with lower cost of borrowing.

(g) The existence of sinking fund provision (*SINK*) – measured as an indicator variable, equal to one for bonds that contain sinking fund provisions and zero otherwise. Sinking fund provisions increase the likelihood of bondholders receiving the principal of the loan and therefore result in a lower cost of borrowing.

(h) The existence of bondholder protection provisions (*COVE*) – measured as an indicator variable, equal to one if the contract contains a special provision that protects bondholders' interests (e.g,, limit on dividend payout and additional debt, negative pledge, and cross default) and zero otherwise. The presence of such provisions is predicted to reduce the cost of borrowing.

(i) The reputation of the investment banker (*LEAD*) – measured as an indicator variable, equal to one if the lead banker is included in the list of high reputation investment bankers provided by Balvers et al. (1988), and zero otherwise. The reputation of lead banker has been found to reduce the under-pricing of IPOs (Balvers et al., 1988). In the same vein, we expect the reputation of the leading banker in the bond issue to be negatively related to cost of borrowing.

Additionally, we include one variable (*BASPREAD*) to capture market conditions. It is measured as the difference in yield between Moody's Aaa and Baa bond. This variable is expected to be positively associated with the cost of borrowing (Sengupta, 1998; Shi, 2003).

Relative to equation (1), we include three additional variables in equation (2) to capture bond rating characteristics. The first one is *RATE* as defined earlier, and the other two are described below:

(a) Difference in bond ratings between Moody's and S&P's (*SPLIT*) – measured as an indicator variable, equal to one if Moody's rating is different from that of S&P's and zero otherwise. Differences in ratings signal information problem between managers and investors (Morgan, 2002). Thus, we expect *SPLIT* to increase the cost of debt capital.

(b) Non-investment grade (*JUNK*) bonds – measured as an indicator variable, equal to one for non-investment grade bonds and zero otherwise. Junk bonds result in higher cost of borrowing (Mansi and Reeb, 2002).

Variable names, definitions and their expected relation to bond rating and yield premium are summarized in Table 3.1.[35]

(Table 3.1 about here)

3.4. Sample Selection and Descriptive Statistics

Two main datasets are used in this study. The first one is used to explore the link between auditor independence and conservatism. It is described later in the chapter. The second dataset involves firms that issued new bonds in the sample period.

[35] Company issuing bonds usually file the preliminary prospectus together with the preliminary bond ratings with the SEC first. The final ratings (confirmed, revised, or withdrawn) are announced/published before the publication of the final prospectus and the formal bond issuance.

In this study, firm characteristics and audit characteristics are based on the latest annual reports available in the bond filing month. Since the dependent variable *RATE* is the final published rating, it implies that for rating agencies, all independent variables are available to them before they assign the final ratings.

We use the SDC to extract all information about new bond issues by US firms from January 2000 to June 2005, including non-convertible debt issues, convertible debt issues and mortgage and asset-backed debt issues. Bonds that are not rated by either Moody's or S&P's are removed from the sample. We also exclude all issues with maturities of one year or less. In addition, we exclude bonds issued by financial institutions (4-digit SIC codes 6000-6999) and public utilities (4-digit SIC codes 4900-4949) due to the different structure of their financial statements and regulatory environment. If a bond issue coincides with mergers and acquisitions and initial public offerings, then we remove it in order to mitigate the effect of confounding events.[36]

Financial information is taken from Compustat. We use the Audit-Analytics database to extract all data about auditor independence characteristics, including the client-level audit/non-audit fees, auditor-level audit/non-audit fees, and other variables. One limitation of this database is that it provides information pertaining only to public firms as only public firms are required to disclose audit and non-audit fees. Therefore we do not have data on fees paid by private clients.

The observations included in the final sample meet the following criteria: data on bond issuance characteristics is available on the SDC; firms' financial data is available on Compustat; data on audit firms' characteristics and audit/non-audit fees is available on Audit-Analytics. Information on the constant maturity yield on US treasury bonds and Moody's bonds is retrieved from the website of the Federal Reserve Board of Governor's Statistical Release.

The final sample consists of 1,652 bond issuances over a sample period of six fiscal years (2000-2005). This sample size is comparable with other studies on bond

[36] Mergers and acquisitions or initial public offerings that occur three months before or after bond issuance are considered as confounding events.

pricing (e.g., Sengupta, 1998; Shi, 2003; Pittman and Fortin, 2004). All continuous explanatory variables, except the three auditor independence variables, are winsorized at 1% and 99% to mitigate the effect of extreme observations. Note that for the purpose of calculating *R_COM* and *R_TOTAL*, we use all client-auditor fee observations available on Audit-Analytics. Table 3.2, Panel A, summarizes the sample selection process.

Panel B of Table 3.2 presents the industrial composition of the final sample based on the Fama-French (FF) twelve-industry classification. The table shows that a large number of bonds in the sample are issued by companies in the following industries: consumer durables (FF2), manufacturing (FF3), chemicals and applied products (FF5), and wholesale, retail and services (FF9). Overall, the composition of the observations exhibits no significant clustering of firms or industries. Note that a number of firms are involved in multiple bond issues (about five issues per firm, on average). We take account of this in the various analyses, as described later.

(Table 3.2 about here)

Table 3.3 presents descriptive statistics for the continuous variables and indicator variables separately. Panel A shows that, at the client/audit office level, audit fees account for about 51% of the total fees paid to the audit firm on average while the median is somewhat higher (mean/median *R_AUD* = 0.51/0.57). At the audit firm level, about half of total revenue of the audit firms comes from non-audit services (mean/median *R_TOTAL* = 0.52/0.57). Also, the mean/median revenue from a single client (*R_COM*) accounts, on average, for about 1% of total revenues. However, the median is below 0.5%. This small ratio is expected as the denominator is based on the entire client population in the database and auditors are Big-5 auditors.

Panel B provides a brief description of the indicator variables. Since no bonds in the final sample contain any feature of sinking fund or conversion option, the two dummy variables (*CONV* and *SINK*) are dropped from the final analysis. In almost half of the cases ratings by S&P and Moody are dissimilar (*SPLIT* = 48%). Panel B also shows that only a small number of firms switch to a different audit firm prior to bond issuance (*SWITCH* = 3.5%). Finally, only a small proportion of bonds in the sample contain special provisions, such as subordinate status (*SUB*), put option (*PUT*), and special bondholders' protection covenants (*COVE*).

(Table 3.3 about here)

Panel A of Table 3.4 presents further descriptive statistics for auditor independence measures by examining the five-year sample period. *R_AUD* and *R_TOTAL*, the share of audit fees of total fees at the client/local office and audit firm levels, respectively, have steadily increased over time, especially after 2001. During the sample period these ratios have more than doubled. This pattern is likely attributable to the regulatory change following the Sarbanes-Oxley Act, which suggests a structural change in the auditing environment. Mean/median amount paid by a single client to the audit firm (*R_COM*) is very low and is stable over time. Although this ratio is close to zero, it is still possible that cross sectional variation in this variable affects bond pricing.

Panel B of Table 3.4 presents the proportion of audit fees from total fees (*R_TOTAL*) for each of the Big-5 audit firms (bond issuers in our sample are audited by Big-5 audit firms). Except for Arthur Andersen, all other big-four audit firms have a consistently increasing percentage of their total income from providing auditing services. In 2002, for all Big-5 except for Arthur Andersen, over 40% of the audit firms' total income is from auditing, while in 2005 it increased to as much as 78%.

Again, this probably reflects the impact of Sarbanes-Oxley Act. Based on this descriptive evidence, and to the extent that the three auditor independence measures capture underlying independence attribute, it may be concluded that this Act has resulted in increased independence. We therefore check in our main analyses whether the relations between auditor independence and bond ratings and yield premium change over time.

Panel C of Table 3.4 provides details on the composition of non-audit fees based on the data provided by Audit-Analytics. Non-audit fees are broken down to benefit fees, IT fees, tax fees, audit-related fees and other fees. The table reveals that tax fees and audit-related fees have steadily increased over time. From 2002 these two component fees combined account for over eighty percent of the non-audit fees. This is perhaps due to the need to spin-off consulting services from the main audit firms.

(Table 3.4 about here)

Table 3.5 reports Spearman (above diagonal) and Pearson (below diagonal) correlation coefficients for the variables. Bond ratings are highly correlated with the yield spread as indicated by correlation coefficients of about 0.70. As expected, both bond ratings and the yield spread are positively correlated with financial leverage (*LEV*) and Ohlson's (1980) O-score (*OSCORE*) and negatively correlated with firm size (*FSIZE*), interest coverage ratio (*COVERAGE*), and operating profitability (*PROF*).

The three independence variables are significantly correlated with the cost of borrowing whereby correlation coefficients having the expected signs. The proportion of audit fees from total fees at the audit firm level (*R_TOTAL*) is negatively correlated with the yield spread (Spearman = -0.18) and with Moody's bond ratings (Spearman = -0.14). As expected, *R_COM*, the proportion of fees paid by one client out of total audit firm revenues, is positively correlated with Moody's bond rating (Spearman = 0.31) and yield spread (Spearman = 0.07). *R_AUD*, the proportion of audit fees from total fees at the client level, is also negatively correlated with yield spread (Spearman = -0.29) and with bond rating (Spearman = -0.36). These correlations support the argument that auditor independence reduces the cost of borrowing and increases bond ratings.[37]

(Table 3.5 about here)

3.5. Empirical Results

3.5.1. Is conditional conservatism associated with auditor independence?

We begin by examining the link between conservatism and independence. Using the intersection of CRSP, Compustat and Audit-Analytic we collected 20,927 observations during 2000-2005 to form the dataset for this analysis. The descriptive statistics for this sample are reported in Panel A of Table 3.6. Note that this sample includes non Big-5 auditors and firms that do not issue debt in the primary market. Comparing this panel to Panel A of Table 3.4 reveals that the three independence measures are somewhat larger than in the main sample, suggesting the possibility of greater reliance on audit fees in smaller audit firms.

Panel B of Table 3.6 presents the regression results for the link between conservatism and auditor independence. Model 1 provides the Basu regression (Eq. (1) above), which confirms Basu's (1997) findings. The coefficient on negative returns is positive and significantly larger than zero. Consistent with the notion of conservatism,

[37] The auditor independence variables are also correlated with each other, though not always significantly. We conducted a factor analysis to identify a common component that provides a summary measure of independence. However, this analysis did not identify any such factor. Therefore we keep all three measures in our analyses.

this implies that earnings are more sensitive to bad news. The results of estimating Equation (2) are presented in Model 2 through Model 5. First, we look at the link between each measure of auditor independence and conservatism separately (Models 2-4). Then we run the full model where all auditor independence measures are used (Model 5). The coefficient on *R_AUD*DR*R* is positive and significant in Model 2. This suggests that earnings are more conservative when independence is higher at the local office/client level. Model 3 suggests no association between *R_COM* and conservatism, as the coefficient on *R_COM*DR*R* is statistically insignificant. That is, the relative economic importance of a particular client has no bearings on the sensitivity of earnings to bad news. Model 4 indicates that conservatism is increasing in the third measure of auditor independence, *R_TOTAL*. The last model, Model 5, confirms the above results. Overall, consistent with our predictions, the evidence suggests that greater auditor independence is associated with a higher degree of conditional conservatism as reflected in the timely recognition of bad news.

(Table 3.6 about here)

We further check whether the link between auditor independence and conditional accounting conservatism holds for two sub-periods 2000-2001 and 2002-2005. The results (not tabulated) for the sub-period 2000-2001 are very similar to those reported in Panel B of Table 3.6, suggesting that greater auditor independence at the client/audit firm level (*R_AUD* and *R_TOTAL)* results in more conservative earnings. For the sub-period 2002-2005, we find that conservatism is increasing only in the first measure of auditor independence, *R_AUD*. We also run the same regressions using a reduced sample consisting of only those firm-year observations included in our reduced sample (565 observations) where each issuing firm is represented only once even if it makes multiple issues. The results (not tabulated) are quite similar to those reported above, confirming that *R_AUD* and *R_TOTAL* are associated with conditional accounting conservatism.

3.5.2. Is auditor independence associated with lower cost of borrowing?

Table 3.7 provides the results for estimating Equation (3) using OLS. Table 3.8 provides the results of estimating Equation (4) – bond yield premium. Following Petersen (2006), we adjust the standard errors for the effects of cross sectional dependence (time effects) and serial correlation (firm effect) in panel data by clustering both on time and firm.

In both tables we distinguish between two sub-periods. The first, 2000-2001, represents the period before Sarbanes-Oxley Act while the second, 2002-2005, captures the period after its enactment. It is possible that the various measures included in the Act provide sufficient safeguards against poor auditing quality due to weak auditor independence. For example, the Act's requirements for better governance could overcome weaknesses in the audit process, such as lack of independence. If this is the case, then it is possible that the association between auditor independence and the cost of borrowing becomes weaker following the Act. On the other hand, to the extent that the Act has not eliminated the potential for weak independence, we would expect to see no difference. Furthermore, it could be that investor pay greater attention to independence issues in 2002 and after, as a result of past accounting scandals. In such a case, the market may place greater weight on independence variables in determining ratings and premium yield.

In Table 3.7, the coefficient on *R_AUD* (ratio of client audit fees to total client fees) in the full sample is negative, as predicted, and significant at the 0.05 level (-

0.51, $t = -2.06$). This coefficient is also negative and significant at the 0.10 level in the period 2002-2005. The coefficient on *R_COM* (the ratio of client audit fees to total audit fees from all clients) in the full sample as well as the two sub-periods is positive, as expected, and significant at the 0.05 level or better. The coefficient on the third variable, *R_TOTAL* (total audit fees from all clients divided by total fees from all clients) is not significantly different from zero except for 2000-2001, where it is negative, as expected, and significant at the 0.10 level.

Many of the control variables are significant and obtain the predicted signs. These include issue size (*ISIZE*), the duration of call protection (*CALL*), subordinate status (*SUB*), firm size (*FSIZE*), the leverage ratio (*LEV*), and interest coverage ratio (*COVERAGE*), consistent with prior literature. Also note that *AUDTEN* (auditor tenure) is negative and significant in the full period as well as in the post Sarbanes-Oxley-Act period. Interestingly, switching auditor prior to issuing debt seems to assist in improving ratings, at least in the 2002-2005 period.

The table also reports results of *F*-tests that the coefficients on all three independence variables are equal to zero. The *F*-values are significant at the 0.02 level or better in all periods. Overall, these findings suggest that auditor independence is associated with bond ratings. In particular, the results are consistent with the argument that when non-audit services outweigh the auditing service at the client/local office level, auditor's independence is questioned and bond ratings are negatively affected. Similarly, at the audit firm level, rating agencies seem to lower bond ratings the greater the economic significance of a client.

The dependent variable in Table 3.7 – Moody's bond rating – is a categorical variable converted into cardinal bond ratings, imposing a linear structure on categorical bond ratings. Furthermore, attaching numerical labels to rating scores is quite arbitrary and results may be sensitive to the scale chosen. We therefore repeat the analysis using an ordered logit regression for limited dependent variable to ensure that the results in Table 3.7 are robust. The results and statistical inferences (not tabulated) are very similar to those reported in Table 3.7.

(Table 3.7 about here)

Table 3.8 reports results on the association between auditor independence and bond yield premium (*SPREAD*). Both *R_AUD* (ratio of client audit fees to total client fees) and *R_TOTAL* (total audit fees from all clients divided by total fees from all clients) are statistically significant at the 0.05 level or better with the predicted negative signs. This relation holds in the full sample and both sub-periods, consistent with the argument that higher auditor independence leads to lower cost of debt capital. However, *R_COM* (the ratio of client audit fees to total audit fees from all clients) is significant with the predicted sign in the period following the Sarbanes-Oxley Act, but not in the 2000-2001 period.

The findings in Table 3.8 suggest that auditor independence measures are statistically significant in explaining the cross sectional variation in bond yield premium incrementally to bond ratings. In addition, the *F*-tests confirm that the three independence variables are collectively associated with the yield premium. The behaviour of the other control variables is generally consistent with Table 3.7 and our predictions, though some, such as leverage and put option, lose significance. This may be due to the inclusion of the *MOODY* variable, which was shown before to be associated with these variables.

(Table 3.8 about here)

Since the dependent variable in Table 3.8, *SPREAD*, is bounded, it is not normally distributed. We therefore re-estimate this model using lognormal transformation of the dependent variable to check the sensitivity of our findings to the normality assumption. Specifically, we take the natural logarithm of one plus *SPREAD* and then rerun the regressions in Table 3.8. We find that the results for the full sample as well as for 2002-2005 are unchanged. For 2000-2001, *R_TOTAL* is insignificant, in contrast to the previous specification. In addition, the *F*-tests are significant at the 0.05 level or better in the three models, confirming that collectively the three auditor independence measures are associated with the yield premium after controlling for bond ratings, bond characteristics and fundamental financial ratios.

3.5.3. Sensitivity analysis and economic significance

The inclusion of multiple issues by the same firm raises a concern regarding the over-estimation of t-statistics in Tables 3.7 and 3.8. To overcome this problem, we replicate the results reported in Tables 3.7 and 3.8 using a reduced pooled sample. If a firm issues multiple bonds in the same fiscal year, then only the first issue is used in the sample. This results in a reduced sample of 565 firm-year observations. Table 3.9 provides the results of this analysis for the entire sample period. In addition, this table provides the results for the ordered logit rating regression and estimating the yield premium regression by transforming the yield spread to the natural logarithm of one plus the *SPREAD* as a distinct dependent variable.

As can be seen, the results based on the reduced sample are very similar to those reported in Tables 3.7 and 3.8. We therefore conclude that the previous findings are unaffected by the inclusion of multiple observations for any issuing company.

(Table 3.9 about here)

We also run a three stage least squares procedure to accommodate the possibility of correlations in the error terms in the rating and yield premium equations. This method uses information concerning the endogenous variables in the system and takes into account error covariances across equations and hence is asymptotically efficient in the absence of specification error. We perform this procedure on both the entire and reduced sample (in which each issuing firm is represented only once). The results (not tabulated) are very similar to those reported in Tables 3.7 and 3.8. We thus believe that the main findings are not misstated due to any potential endogeneity problem.

As a robustness check, we also measure the leverage ratio in an alternative way to take into account the effect of new bond issuance on the firm leverage. Since a large amount of new issuance significantly increases the financial leverage of the issuing company, investors would incorporate this consequence into default risk assessment and bond pricing. Therefore, we redefine *LEV* to equal the existing long-term debt plus the amount of the new issuance deflated by total assets. We replicate Tables 3.7, 3.8, and 3.9 using this alternative measure of leverage. The results are similar to those tabulated.

It can be argued that using ratios to capture degree of independence, as we do here, may fail to capture the importance of the absolute size of the fees paid to auditors by the client firm. We therefore repeat the analysis performed in Tables 3.7 and 3.8 using total audit fees and non-audit fees (scaled by total assets). Since the two variables are highly correlated, we perform the regressions while including each time one of these variables. Untabulated results indicate that only non-audit fees are associated with ratings and yield premium in that higher non-audit fees are associated with lower ratings and higher yield premium. This suggests that debt holders and rating agencies suspect that auditor independence is on average lower when non-audit fees are higher. Interestingly, this is consistent with the concern expressed by the public following the Enron and other scandals as well as in Levitt (2000).

Since prior studies have shown that accounting conservatism leads to reduced cost of borrowing (Ahmed et al., 2002), it is unclear whether the pricing implications of auditor independence simply result from correlation between accounting conservatism and auditor independence. In particular, it is unknown whether auditor independence is still priced by bond investors after controlling for accounting conservatism. To address such concern, we rerun the regressions in Tables 3.7 and 3.8 by adding one more measure for accounting conservatism. We estimate the conditional conservatism at the firm level using equation (1). We require quarterly earnings and returns over the past seven years before the bond filing month. To mitigate the measurement errors in firm-level conservatism (Roychowdhury and Watts, 2004), we rank the firm-specific asymmetric timeliness ratios $(\alpha_2 + \alpha_3)/\alpha_2$ by industry. The untabulated results show that, as expected, conservatism is negatively related to the cost of borrowing at a significance level of 0.05 or better. Moreover, proxies for auditor independence provide incremental explanatory power for both bond ratings and bond yield premium even after controlling for the firm-level accounting conservatism (*R_AUD* and *R_COM* are significant at the 0.10 level or better in the rating regressions, and *R_AUD* and *R_TOTAL* are significant at the 0.05 level or better in the yield premium regressions), although the magnitudes of the coefficients on the three auditor independence measures become smaller relative to the earlier results.

The last test attempts to assess the economic significance of our results. First, we compute the predicted yield premium setting all the independent variables to their mean value based on the estimation results in Table 3.8. Second, we recompute the predicted yield premium setting all variables, except the three auditor independence variables, to their mean and the auditor independence variables at the lower quartile (low auditor independence). Third, we recompute the predicted yield premium setting all variables, except the three auditor independence variables, to their mean and the auditor independence variables at the upper quartile (high auditor independence). Finally, we compute the difference in the predicted yield premium between the upper quartile and the lower quartile and test for significance.

The results, reported in Table 3.10, suggest that for the pooled model, the yield premium is 0.28% lower for the higher auditor independence quartile than for the lower auditor independence quartile. The inter-quartile difference in yield premium ranges from 0.12% to 0.34% in the years 2000-2003 and 2005. For the year 2004, we find no difference in yield premium. Note from Table 3.3 that for the entire sample the *SPREAD* difference between the lower and upper quartile is 1.03%. Thus for the pooled model, increasing independence from the lower quartile to the upper one is accountable for 27.2% of the inter-quartile range.

(Table 3.10 about here)

We also perform similar computation using the reduced sample in Table 3.9. The results (not tabulated) show that the yield premium is 0.41% lower for the higher auditor independence quartile than for the lower auditor independence quartile. For the reduced sample the *SPREAD* difference between the lower and upper quartile is 1.38%. Thus for the pooled model, increasing independence from the lower quartile to the upper one is accountable for 29.7% of the inter-quartile range.

Furthermore, we also assess the economic significance of auditor independence on cost of debt capital by investigating the impact of auditor independence on interest payments. For our main sample (1,652 observations), on average, long-term debt for the sample firms amounts to $18,826 million and operating income before interest payment amounts to $3,058.5 million. As discussed above, the yield premium is 0.28% lower for the higher auditor independence quartile than for the lower auditor independence quartile. This suggests that increasing independence from the lower quartile to the upper one can save approximately $52.7 million interest expense, which represents around 1.72% of operating profit before interest payment.

3.6. Summary

In this study we postulate that greater auditor independence is likely to affect a company's cost of borrowing. In particular, we expect that companies with more independent external auditors would exhibit better bond ratings and benefit from lower bond yield premium. Following the emerging literature on conservatism we build on the notion that conservatism is a mechanism that mitigates conflicts between equity holders and debt-holders as well as between managers and debt-holders. Consistent with Watts (2000), we argue that it is also preferred by external auditors absent independence problems. Such problems may arise when an auditor is economically dependent on a specific client and/or on non-audit services. Therefore we conjecture that the cost of public debt may be higher when debt holders suspect that auditor independence, and consequently, conservatism are compromised.

Our results are consistent with the basic hypothesis whereby we show that auditor independence is related to the Basu's (1997) measure of conservatism. Having established this link we then provide evidence supporting the conjecture that auditor independence is priced in the primary bond market. Specifically, higher auditor independence is shown to be positively related to bond ratings and negatively related to the bond yield premium.

We believe our findings contribute to the literature on conservatism and auditor independence in that they speak about one potential cost of lack of independence and related conservatism not pointed out in the literature before. This evidence may be useful in understanding why conservatism is a long-standing institution and what are the benefits in employing independent auditors.

Although employing independent auditors reduces the cost of borrowing, auditor independence may not always be maintained in practice. The auditor-related decisions are made by the audit committee of the board of directors. Therefore, the composition of the audit committee heavily influences the selection and retention of auditors (Mayhew and Pike, 2004). If the audit committee is dominated by management, managers could select dependent auditors to seek private perquisites. On the other hand, managers and shareholders can collude in selecting auditors and transferring wealth from debt-holders to equity holders. In such circumstances, debt-holders price protect against the compromised auditor independence by requiring a high investment return. Therefore, to reduce the cost of borrowing is only a subset of the various incentives behind the selection and retention of auditors. Everything else being equal, if the wealth transfer from employing a dependent auditor outweighs the benefit of reduced cost of borrowing from employing an independent auditor, the benefit of reduced cost of borrowing may become secondary in selecting auditors.

As a concluding note, it is interesting to contrast these results with a different view of auditor independence that has been advanced in the literature. It has been argued that dependence may arise in situations where the auditor knows a great deal about the client (e.g., a major client). Such better information would lead to higher audit quality despite lack of independence, as auditors are better equipped to constrain managers' accounting choices (e.g., Simunic, 1984; Dopuch et al., 2003). This, in turn, could lower the firm's cost of capital. Our findings that independence and cost of debt capital are inversely related seem inconsistent with such a view.

Table 3.1

Variable Definitions

Variable Type	Definitions	Rating	Yield
Dependent Variables		Expected Sign	
MOODY	Moody's bond rating on a cardinal scale from 1 for Aaa to 22 for D	NA	+
SPREAD	The difference in percentage points between the yield to maturity for the corporate bond and the yield of a U.S. treasury bond with comparable maturity	NA	NA
Auditor Independence			
R_AUD	Audit fees paid by client i to audit firm j divided by total fees paid by client i to audit firm j	-	-
R_COM	Total fees paid by client i to audit firm j divided by total fees paid by all clients of auditor j	+	+
R_TOTAL	Audit fees paid by all clients of audit firm j divided by total fees paid to audit firm j by all its clients	-	-
Other Auditor Charac.			
AUDTEN	The natural logarithm of (1+*TENURE*), where *TENURE* is the length of the auditor-client relationship, measured as the number of years the firm has been consistently audited by the current auditor	?	?
SWITCH	Indicator variable, equal to one if the bond-issuing firm switches to a different audit firm in the fiscal year prior to the bond issuance, and zero otherwise	?	?
Firm Characteristics			
FSIZE	Firm size, measured as log (1+total assets) = log (1+ Compustat data #6)	-	-
FAGE	Firm age, measured as the natural logarithm of the years since the firm initially appeared on CRSP	-	-
LEV	Firm leverage, measured as the ratio of long term debt (Compustat data #9) over total assets (Compustat data #6)	+	+
COVERAGE	Interest coverage, measured as the ratio of firm's operating income after depreciation (Compustat data #178) over interest expense (Compustat data #15)	-	-
PROF	Profitability, measured as the ratio of operating income after depreciation (Compustat data #178) over total assets (Compustat data #6)	-	-

Continued

BANKDEBT	The ratio of bank debt (Compustat data #44 plus data #91 plus data #92) over total debt (Compustat data #9 plus data #34)	-	-
OSCORE	Measure of default risk based on the coefficients obtained by Ohlson (1980)	+	+
DIVPAY	Dividend payout ratio, measured as the dividends per share by payable date (Compustat data #201) over retained earnings per share (Compustat data #36 divided by data #54)	+	+
Bond Characteristics			
SP	S&P's bond rating on a cardinal scale from 1 for AAA to 22 for D	NA	+
SPLIT	Indicator variable, equal to one if Moody's rating differs from S&P's rating and zero otherwise	NA	+
JUNK	Indicator variable, equal to one for non-investment grade bonds (BB+ or below for S&P's, Ba1 or below for Moody's) and zero otherwise	NA	+
ISIZE	Debt issue size, measured as the ratio of total principal amount of the bond over firm's total assets	+	+
MATU	Natural logarithm of (1+number of years to final maturity)	+	+
CALL	The ratio of years to first call over years to final maturity	-	-
CONV	Indicator variable, equal to one for convertible bond and zero otherwise	-	-
SUB	Indicator variable, equal to one for subordinated bonds and zero otherwise	+	+
PUT	Indicator variable, equal to one if the contract contains a put option and zero otherwise	?	-
SINK	Indicator variable, equal to one if the contract contains a sinking fund provision and zero otherwise	-	-
COVE	Indicator variable, equal to one if the contract contains a special provision that protects bondholders' interests, like limit on dividend payout and additional debt, negative pledge, and cross default; zero otherwise	-	-

Continued

LEAD	Indicator variable, equal to one if the lead manager of the bond issuance consistently appears in the TOP 25 in the annual *Institutional Investor* (Balvers et al.,1988) and zero otherwise	-	-
Economic Cycle			
BASPREAD	The difference of yield spread between Moody's Baa bonds and Aaa bonds	+	+

Note:

A positive (negative) relation with *MOODY* suggests worse (better) ratings. Variables listed here may not appear in all empirical regressions due to the violation of the full rank requirement.

Table 3.2

Sample Selection*

Panel A: Sampling Criterion	Observations
Bonds that are rated by either Moody's or S&P's, excluding utilities and financial institutions and bonds with maturities of less than one year	2,821
Missing bond yield premium	(759)
	2,062
Loss of observations on merging SDC bond data with Compustat and Audit-Analytics data	(308)
	1,754
Missing financial data	(102)
Final sample	1,652

Panel B: Sample Selection by Industry		Observations	Firms
FF1	Consumer Non Durables	123	35
FF2	Consumer Durables	268	16
FF3	Manufacturing	397	53
FF4	Oil, Gas and Coal Extraction and Products	75	33
FF5	Chemicals and Allied Products	134	28
FF6	Business Equipment	78	25
FF7	Telephone and Television Transmission	82	23
FF8	Utilities	-	-
FF9	Wholesale, Retail and Some Services	127	36
FF10	Healthcare, Medical Equipment, and Drugs	58	25
FF11	Finance	-	-
FF12	Other	310	53
Total		**1,652**	**327**

*Note: Panel A presents details of the sample selection. Panel B presents the number of observations and firms by industry according to the Fama and French twelve-industry classification (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french). Utilities and financial institutions are excluded from the sample.

Table 3.3

Descriptive Statistics*

Panel A: Main Variables							
	MIN	25%	MEAN	50%	75%	MAX	STD
Cost of Borrowing							
SPREAD	0.02	0.88	1.58	1.31	1.91	7.41	1.01
MOODY	1.00	6.00	6.79	7.00	8.00	17.00	2.81
SP	1.00	5.00	6.56	6.00	8.00	16.00	2.85
Firm Characteristics							
FSIZE	6.85	9.01	10.02	10.07	10.69	12.82	1.42
FAGE	1.10	2.83	3.14	2.94	3.78	4.38	0.85
LEV	0.05	0.20	0.27	0.27	0.36	0.58	0.11
COVERAGE	0.11	1.99	5.82	3.85	7.37	19.58	5.59
PROF	-0.01	0.05	0.10	0.09	0.13	0.27	0.06
OSCORE	-3.74	-2.14	-1.34	-1.06	-0.15	0.98	1.13
BANKDEBT	0.00	0.14	0.31	0.29	0.45	0.75	0.20
DIVPAY	0.00	0.03	0.28	0.26	0.44	0.85	0.25
Bond Characteristics							
ISIZE	0.00	0.00	0.02	0.02	0.03	0.17	0.03
CALL	0.02	1.00	0.91	1.00	1.00	1.00	0.26
MATU	0.70	1.79	2.09	2.09	2.41	4.63	0.62
BASPREAD	0.55	0.81	1.03	1.01	1.27	1.41	0.24
Audit Characteristics							
AUDTEN	0.69	2.64	2.53	2.71	2.77	2.94	0.54
R_AUD	0.03	0.29	0.51	0.57	0.69	1.00	0.23
R_COM	0.00	0.00	0.01	0.00	0.01	0.09	0.01
R_TOTAL	0.26	0.32	0.52	0.57	0.59	0.78	0.16

Panel B – Indicator Variables			
Variable	# of obs=1	Total	%
SPLIT	793	1,652	48.0%
JUNK	135	1,652	8.2%
CONV	-	1,652	-
SUB	35	1,652	2.1%
PUT	51	1,652	3.1%
COVE	21	1,652	1.3%
SINK	-	1,652	-
LEAD	271	1,652	16.4%
SWITCH	58	1,652	3.5%

*Note: See Table 3.1 for variable definitions.

Table 3.4

Audit Characteristics during the Sample Period

Panel A: Mean and median fee-based auditor independence ratios over time

	2000	2001	2002	2003	2004	2005	Total
R_AUD	0.33	0.33	0.54	0.60	0.73	0.78	0.51
	0.29	0.25	0.62	0.61	0.74	0.77	0.57
R_COM	0.02	0.01	0.01	0.01	0.00	0.00	0.01
	0.01	0.00	0.01	0.00	0.00	0.00	0.00
R_TOTAL	0.31	0.33	0.48	0.60	0.72	0.77	0.52
	0.32	0.32	0.51	0.59	0.72	0.77	0.57
Observations	167	371	486	258	241	129	1,652

Panel B: Audit fees over total fees (*R_TOTAL*) for Big-5 audit firms over time

Year	PWC	EY	DT	KPMG	AA
2000	0.26	0.29	0.32	0.32	0.35
2001	0.28	0.35	0.32	0.40	0.32
2002	0.44	0.51	0.57	0.59	0.29
2003	0.58	0.61	0.57	0.64	-
2004	0.71	0.73	0.69	0.73	-
2005	0.74	0.78	0.77	0.78	-

Panel C: Components of non-audit fees

	Benefits	IT	Taxes	Audit-Related	Other	Total
2000	9.7	696.7	218.9	338.0	3,807.3	5,070.6
	0.2%	13.7%	4.3%	6.7%	75.1%	100%
2001	89.7	726.8	1,166.3	1,011.7	3,590.8	6,585.3
	1.4%	11.0%	17.7%	15.4%	54.5%	100%
2002	15.9	248.6	2,059.2	1,518.2	2,412.8	6,254.7
	0.3%	4.0%	32.9%	24.3%	38.6%	100%
2003	8.0	52.8	2,569.7	1,822.2	808.4	5,261.1
	0.2%	1.0%	48.8%	34.6%	15.4%	100%
2004	4.3	-	2,284.0	1936.5	503.5	4728.3
	0.1%	-	48.3%	41.0%	10.6%	100%
2005	3.1	0.3	1581.0	1560.6	302.4	3447.4
	0.1%	0.0%	45.9%	45.3%	8.8%	100%

Notes:

1. The three audit fee ratios are measured using all available data retrieved from Audit-Analytics database, and are defined as follows:

   R_COM: Total fees paid by client i to audit firm j divided by total fees paid by all clients of auditor j

   R_AUD: Audit fees paid by client i to audit firm j divided by total fees paid by client i to auditor j.

   R_TOTAL - Audit fees paid by all clients of audit firm j divided by total fees paid to audit firm j by all its clients.

2. PWC – PricewaterhouseCoopers, EY - Ernst & Young, DT - Deloitte & Touche, KPMG – KPMG, AA - Arthur Andersen.

3. In Panel C, fees are measured as the total component fees paid by all client firms to all audit firms (in millions of US dollars) as reported on the Audit-Analytics database.

Table 3.5: Correlation Matrix*

	SPREAD	*MOODY*	*AUDTEN*	*R_TOTAL*	*R_COM*	*R_AUD*	*ISIZE*	*CALL*	*MATU*	*FSIZE*	*FAGE*	*LEV*	*COVERAGE*	*PROF*	*OSCORE*
SPREAD		0.70	-0.19	-0.18	0.07	-0.29	0.16	-0.09	0.17	-0.11	-0.32	0.37	-0.51	-0.45	0.48
MOODY	0.69		-0.15	-0.14	0.31	-0.36	0.21	-0.21	0.08	-0.09	-0.37	0.39	-0.60	-0.52	0.64
AUDTEN	-0.20	-0.24		0.17	0.03	0.15	0.02	0.12	0.03	0.42	0.22	0.02	-0.05	-0.09	0.06
R_TOTAL	-0.19	-0.16	-0.15		-0.05	0.48	0.10	0.17	0.07	0.09	-0.11	0.10	-0.11	-0.19	0.19
R_COM	0.02	0.30	-0.23	0.03		-0.30	-0.04	-0.01	-0.08	0.13	-0.15	0.20	-0.20	-0.27	0.20
R_AUD	-0.27	-0.31	0.11	0.45	-0.19		0.13	0.12	-0.10	0.26	0.62	-0.24	0.09	0.04	-0.14
ISIZE	0.19	0.32	-0.11	0.17	0.05	0.17		0.19	0.11	0.12	0.26	0.04	-0.16	-0.22	0.23
CALL	-0.08	-0.29	-0.05	0.19	0.01	0.15	0.10		-0.24	-0.01	0.37	0.12	-0.22	-0.20	0.20
MATU	0.11	0.05	0.02	0.06	-0.08	0.04	0.12	-0.23		0.18	0.06	0.10	-0.11	-0.06	0.01
FSIZE	-0.40	-0.48	0.28	-0.09	-0.18	0.46	0.12	-0.02	0.21		0.00	-0.21	0.04	-0.14	0.03
FAGE	-0.08	-0.17	0.26	0.09	0.18	0.17	0.24	0.49	-0.15	0.01		0.04	0.01	0.02	0.08
LEV	0.31	0.51	-0.13	0.05	0.16	-0.13	0.13	0.12	0.03	-0.26	0.13		-0.51	-0.20	0.40
COVERAGE	-0.37	-0.57	-0.02	-0.01	-0.17	-0.02	-0.14	-0.36	-0.05	0.08	-0.15	-0.49		0.83	-0.67
PROF	-0.35	-0.51	0.03	-0.17	-0.15	-0.11	-0.22	-0.22	-0.04	-0.15	-0.07	-0.16	0.65		-0.73
OSCORE	0.41	0.62	-0.11	0.17	0.23	0.04	0.35	-0.07	0.10	-0.03	0.15	0.49	-0.62	-0.78	

*Note: See Table 3.1 for variable definitions. Spearman correlations are presented above diagonal, while Pearson correlations are presented below diagonal. Correlations above (below) 0.07 (-0.07) are significant at the 0.05 level.

Table 3.6

Auditor Independence and Accounting Conservatism*

Panel A: Descriptive Statistics (20,927 observations)

	P25	Mean	Median	P75	STD
DEPS	-0.023	-0.007	0.043	0.080	0.41
R	-0.189	0. 218	0.110	0.442	1.01
R_AUD	0.485	0.651	0.677	0.837	0.23
R_COM	0.000	0.028	0.000	0.002	0.13
R_TOTAL	0.396	0.559	0.587	0.709	0.17

Panel B: Auditor Independence and Accounting Conservatism

	Sign	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	+	0.039	0.046	0.038	0.026	0.032
		(9.30)*	(3.46)*	(8.76)*	(1.68)+	(1.91)+
DR	?	- 0.003	0.015	-0.001	0.013	0.019
		(-0.30)	(0.58)	(-0.07)	(0.47)	(0.60)
R	+	0.145	0.130	0.132	0.137	0.160
		(4.52)*	(2.28)**	(3.98)*	(2.34)**	(3.27)*
*DR*R*	+	0.319	0.182	0.321	0.202	0.126
		(17.16)*	(3.53)*	(16.88)*	(3.47)*	(1.95)+
R_AUD	?		-0.015			-0.023
			(-0.80)			(-1.09)
*R_AUD *DR*	?		-0.019			-0.044
			(-0.53)			(-1.24)
*R_AUD *R*	?		-0.060			-0.059
			(-3.45)*			(-3.79)*
*R_AUD *DR*R*	+		0.220			0.200
			(2.86)*			(2.30)**
R_COM	?			0.042		0.045
				(1.39)		(1.45)
*R_ COM *DR*	?			-0.064		-0.028
				(-0.99)		(-0.48)
*R_ COM *R*	?			-0.036		-0.013
				(-1.70)+		(-0.63)
*R_ COM *DR*R*	-			-0.064		-0.154
				(-0.45)		(-1.03)
R_TOTAL	?				0.021	0.031
					(0.81)	(1.05)
*R_TOTAL *DR*	?				-0.021	0.006
					(-0.44)	(0.11)
*R_ TOTAL *R*	?				-0.085	-0.059
					(-3.31)*	(-2.15)**
*R_ TOTAL *DR*R*	+				0.228	0.141
					(2.13)**	(1.83)+
Adj. R^2		0.026	0.028	0.026	0.027	0.028

Notes:

1. The analysis in all models includes 20,927 firm/year observations with complete data over 2000-2005. Data is obtained from the intersection of Compustat, CRSP and Audit-Analytics.

2. Model 1 (Basu, 1997): $DEPS_{it} = \alpha_0 + \alpha_1 DR_{it} + \alpha_2 R_{it} + \alpha_3 DR_{it} * R_{it} + \varepsilon_{it}$. Where, $DEPS_{it}$ is earnings per share for firm i in fiscal year t divided by share price at the beginning of the fiscal year; R_{it} is stock return for firm i from nine months prior to fiscal year end t to three months after fiscal year-end; DR_{it} is an indicator variable that obtains the value of one for negative stock returns, and zero otherwise.

3. Models 2-5 estimate the effect of auditor independence on conditional conservatism by including measures of auditor independence (*R_AUDIT*, *R_COM*, and *R_TOTAL*) and interaction terms with the Basu (1997) variables.

Table 3.7

Audit Characteristics and Bond Ratings – OLS Regressions*

	Sign	Model 1 (2000-2001)	Model 2 (2002-2005)	Model 3 (2000-2005)
AUDTEN	?	-0.54	-0.47	-0.50
		(-1.32)	(-3.99)*	(-4.47)*
R_AUD	-	0.08	-0.73	-0.51
		(0.16)	(-2.14)**	(-2.06)**
R_COM	+	20.76	8.05	10.34
		(3.15)*	(2.12)**	(2.77)*
R_TOTAL	-	-3.04	-0.63	-2.86
		(-1.86)+	(-0.72)	(-1.59)
SWITCH	?	0.76	-0.89	-0.63
		(0.62)	(-2.89)*	(-2.23)**
ISIZE	+	11.80	22.02	19.65
		(3.22)*	(4.42)*	(4.95)*
CALL	-	-0.19	-1.34	-0.83
		(-0.72)	(-5.02)*	(-4.61)*
MATU	+	0.55	0.42	0.49
		(0.20)	(4.54)*	(1.03)
PUT	-	-1.04	-1.89	-1.70
		(-1.78)+	(-3.39)*	(-3.77)*
SUB	+	2.88	2.56	2.57
		(4.91)*	(4.61)*	(4.31)*
COVE	-		-0.47	-0.65
			(-1.44)	(-2.03)**
LEAD	-	-0.45	0.04	-0.13
		(-2.50)**	(0.31)	(-1.16)
FAGE	-	-0.14	0.09	-0.08
		(-0.66)	(1.33)	(-1.51)
FSIZE	-	-0.83	-0.47	-0.54
		(-3.34)*	(-4.84)*	(-5.26)*
BANKDEBT	-	-0.63	0.40	0.04
		(-1.15)	(1.37)	(0.16)
LEV	+	4.39	3.00	3.14
		(4.25)*	(3.50)*	(3.14)*
OSCORE	+	0.16	-0.07	0.02
		(1.32)	(-0.95)	(0.35)
COVERAGE	-	-0.15	-0.14	-0.15
		(-3.01)*	(-3.79)*	(-5.14)*
PROF	-	-11.09	-7.93	-7.88
		(-4.07)*	(-4.41)*	(-5.59)*
DIVPAY	+	1.64	1.73	1.58
		(3.44)*	(5.45)*	(4.27)*
BASPREAD	+	0.24	0.25	0.25
		(0.35)	(2.32)**	(1.38)
***F*-test**		3.45	5.11	5.64
(*P*-value)		(0.02)	(0.00)	(0.00)
Adj. R^2		0.67	0.68	0.70
Observations		538	1,114	1,652

*Notes:

1. The table provides estimation results for Equation (3) using OLS. The dependent variable is Moody's cardinal bond ratings. Independent variables are defined in Table 3.1. We exclude indicator variables that violate the full rank condition.

2. Model 1 estimates Equation (3) using firm-year observations from fiscals 2000-2001. Model 2 uses firm-year observations from fiscals 2002-2005. Model 3 uses firm-year observations from fiscals 2000-2005.

3. All standard errors are adjusted for serial correlation using two dimension clustering (within firm and over time) as suggested by Petersen (2006).

4. F-test results refer to the test that the coefficients on the three auditing variables are all equal to zero.

5. *, **, + indicate significance at the 0.01, 0.05, and 0.10 levels respectively.

Table 3.8

Audit Characteristics and the Bond Yield Premium (*SPREAD*)*

	Sign	Model 1 (2000-2001)	Model 2 (2002-2005)	Model 3 (2000-2005)
AUDTEN	?	-0.11	-0.08	-0.09
		(-2.15)**	(-2.20)**	(-2.03)**
R_AUD	-	-0.34	-0.31	-0.22
		(-2.62)*	(-2.30)**	(-2.21)**
R_COM	+	3.00	4.57	2.78
		(1.39)	(3.36)*	(1.29)
R_TOTAL	-	-0.76	-0.66	-0.75
		(-2.12)**	(-3.46)*	(-3.36)*
SWITCH	?	-0.97	0.10	-0.17
		(-2.09)**	(0.63)	(-1.14)
MOODY	+	0.16	0.18	0.16
		(5.75)*	(7.31)*	(6.60)*
SPLIT	+	0.14	0.08	0.10
		(2.47)**	(2.29)**	(2.32)**
JUNK	+	0.78	1.00	0.96
		(3.39)*	(6.87)*	(7.82)*
ISIZE	+	2.94	2.37	2.49
		(2.73)*	(3.49)*	(5.67)*
CALL	-	-0.08	-0.51	-0.40
		(-0.90)	(-3.52)*	(-3.15)*
MATU	+	0.39	0.17	0.24
		(3.86)*	(4.63)*	(3.20)*
PUT	-	0.03	-0.31	-0.18
		(0.08)	(-1.52)	(-0.98)
SUB	+	0.30	0.52	0.45
		(1.06)	(2.44)**	(2.58)**
COVE	-		-0.31	-0.28
			(-1.38)	(-1.22)
LEAD	-	0.06	-0.22	-0.11
		(1.17)	(-3.03)*	(-2.37)**
FAGE	-	-0.00	-0.04	-0.01
		(-0.12)	(-1.55)	(-0.30)
FSIZE	-	0.08	-0.08	-0.07
		(1.05)	(-2.34)**	(-2.71)*
BANKDEBT	-	-0.68	0.14	-0.16
		(-3.40)*	(0.95)	(-1.36)
LEV	+	-0.50	0.07	-0.13
		(-0.34)	(0.19)	(-0.51)
OSCORE	+	0.11	0.06	0.08
		(3.83)*	(2.25)**	(4.14)*
COVERAGE	-	-0.04	-0.02	-0.03
		(-3.05)*	(-2.79)*	(-3.65)*
PROF	-	-2.68	-3.13	-3.24
		(-3.26)*	(-4.48)*	(-3.74)*
DIVPAY	+	0.47	0.27	0.19
		(2.43)**	(2.97)*	(2.28)**
BASPREAD	+	0.11	0.15	0.12
		(0.37)	(5.12)*	(4.72)*
F-test		5.70	8.79	5.81
(p-value)		(0.00)	(0.00)	(0.00)
Adj. R^2		0.63	0.72	0.68
Observations		538	1,114	1,652

*Notes:

1. The table provides estimation results for Equation (4) using OLS. The dependent variable is bond yield premium (*SPREAD*). Independent variables are defined in Table 3.1. We exclude indicator variables that violate the full rank condition.

2. Model 1 estimates Equation (4) using firm-year observations from fiscals 2000-2001. Model 2 uses firm-year observations from fiscals 2002-2005. Model 3 uses firm-year observations from fiscals 2000-2005.

3. All standard errors are adjusted for serial correlation using two dimension clustering (within firm and over time) as suggested by Petersen (2006).

4. F-test results refer to the test that the coefficients on the three auditing variables are all equal to zero.

5. *, **, + indicate significance at the 0.01, 0.05, and 0.10 levels respectively.

Table 3.9

Model Estimation using a Reduced Sample

	Sign	MOODY (OLS)	MOODY (Ordered Logit)	SPREAD	LOG (1+SPREAD)
AUDTEN	?	-0.40	-0.15	-0.06	-0.02
		(-2.49)**	(-1.94)+	(-1.85)+	(-1.84)+
R_AUD	-	-0.43	-0.17	-0.15	-0.03
		(-2.90)*	(-2.06)**	(-2.85)*	(-2.16)**
R_COM	+	6.35	0.66	3.83	0.61
		(2.68)*	(2.09)**	(1.11)	(0.43)
R_TOTAL	-	-2.59	-1.41	-2.20	-0.81
		(-1.15)	(-1.46)	(-4.04)*	(-4.31)*
SWITCH	?	-0.09	0.10	-0.31	-0.09
		(-0.25)	(0.37)	(-1.52)	(-1.63)
MOODY	+			0.17	0.07
				(8.31)*	(7.83)*
SPLIT	+			0.07	0.02
				(1.17)	(1.13)
JUNK	+			0.91	0.24
				(5.99)*	(5.76)*
ISIZE	+	12.58	9.05	2.79	0.42
		(3.73)*	(4.87)*	(3.15)*	(3.53)*
CALL	-	-0.56	-0.49	-0.51	-0.12
		(-1.12)	(-1.76)+	(-2.17)**	(-1.73)+
MATU	+	0.02	0.05	0.10	0.02
		(0.15)	(0.54)	(1.75)+	(4.13)*
PUT	-	-1.27	-0.67	-0.28	-0.07
		(-3.67)*	(-2.95)*	(-2.19)**	(-1.36)
SUB	+	2.32	1.38	0.10	0.06
		(6.79)*	(5.23)*	(2.47)**	(2.31)**
COVE	-	-0.63	-0.31	-0.04	-0.01
		(-1.72)+	(-1.04)	(-0.15)	(-0.18)
LEAD	-	-0.05	-0.02	-0.12	-0.03
		(-0.28)	(-0.12)	(-1.48)	(-1.29)
FAGE	-	-0.14	-0.11	-0.06	-0.01
		(-1.43)	(-1.87)+	(-1.53)	(-1.18)
FSIZE	-	-0.55	-0.32	-0.07	-0.02
		(-4.87)*	(-5.16)*	(-1.73)+	(-1.95)+
BANKDEBT	-	-0.25	-0.11	-0.37	-0.10
		(-0.71)	(-0.51)	(-1.92)+	(-1.98)**
LEV	+	2.96	1.85	0.15	-0.05
		(3.40)*	(3.72)*	(0.39)	(-0.45)
OSCORE	+	0.16	0.09	0.06	0.02
		(1.91)+	(1.60)	(1.78)+	(1.96)+
COVERAGE	-	-0.15	-0.11	-0.03	-0.01
		(-5.57)*	(-6.14)*	(-3.05)*	(-1.81)+
PROF	-	-6.24	-2.42	-4.08	-1.00
		(-2.85)*	(-1.81)+	(-4.56)*	(-4.06)*
DIVPAY	+	1.99	1.04	0.14	0.03
		(5.91)*	(5.34)*	(1.01)	(0.71)
BASPREAD	+	0.45	0.07	0.13	0.03
		(1.21)	(0.24)	(3.15)*	(2.39)**
Adj. (*Pseudo*) R^2		0.68	0.24	0.70	0.73
Observations		565	565	565	565

Notes:

1. This table replicates the results in Tables 3.7 and 3.8 using a reduced pooled sample. In particular, if a firm issues multiple bonds in the same fiscal year, then only the first issuances are kept in the sample. The reduced sample consists of 565 firm-year observations. See Table 3.1 for variable definitions.

2. The dependent variables in the four models are: (i) Cardinal Moody's bond ratings using OLS regression; (ii) Cardinal Moody's bond ratings using an ordered logit model; (iii) Yield spread using OLS regression; (iv) Natural logarithm of (1 + SPREAD) using OLS regression.

3. All OLS standard errors have accounted for two dimensions of within cluster correlation, namely correlation within firm and over time (Petersen, 2006).

4. *, **, + indicate significance at the 0.01, 0.05, and 0.10 levels respectively.

Table 3.10

The Effect of Auditor Independence on Bond Yield Premium*

Level of Auditor Independence	2000	2001	2002	2003	2004	2005	Pooled
Average Independence (Mean)	1.67	1.64	1.55	1.51	1.60	1.53	1.58
Low Independence (1st Quartile)	1.81	1.81	1.61	1.59	1.58	1.67	1.78
High Independence (3rd Quartile)	1.47	1.60	1.49	1.46	1.64	1.36	1.50
T- values	10.33*	5.84*	3.24*	3.71*	-0.97	9.48*	8.27*

Notes:

1. The table presents predicted bond yield premium based on the yearly regressions using the same model as that in Table 3.8.

2. Average level of auditor independence is obtained by setting all variables to their mean value. Low level of auditor independence is obtained by setting *R_AUD* and *R_TOTAL* at their sample specific 25th percentile and *R_COM* at the sample specific 75th percentile, while all other variables are set at the mean value. High level of auditor independence is obtained by setting *R_AUD* and *R_TOTAL* at their sample specific 75th percentile and *R_COM* at the sample specific 25th percentile, while all other variables are set at the mean value.

3. T-values are from a test of the difference in predicted bond yield premium between high and low levels of auditor independence. * indicates significance at the 0.01 level.

Chapter 4

Continuous Default Risks versus Categorical Bond Ratings: The Effects of Analysts' Forecasts on Bond Pricing

4.1. Introduction

This study examines the effects of analysts' forecasts on bond pricing. Specifically, I investigate whether and how analysts' earnings forecast, cash flow forecast and growth forecast are priced by primary bond market investors. Within the aggregate bond market, the volume of new corporate bond issues each year is substantially larger than the volume of new stock issues (Mishkin, 1998). Nevertheless, prior research on analysts' forecasts has focused largely on the equity market and relatively little is known about the effects of analysts' forecasts on the bond market. This study aims at providing a different perspective on the literature by focusing on the bond market.

It is well established in the bond pricing literature that default risk is an important risk factor carried by corporate bonds and that bond ratings assigned by professional rating agencies are good indicators of default risks (Ziebart and Reiter, 1992; Sengupta, 1998; Shi, 2003). As a result, bond ratings are highly correlated with bond yield premium and bond ratings serve as an important benchmark for bond market participants in assessing default risks. Nevertheless, published bond ratings fall into limited categories. Even if the further differentiation within each rating category is taken into account, there are no more than twenty-two categories. In contrast, the market's assessment of default risk reflected in bond yield premium is a continuous variable (Khurana and Raman, 2003). Moody's KMV, the leading provider of credit risk management solutions, points out that bonds with identical ratings may carry different levels of default risks (Moody's KMV, 2004).

Given that the discrete ratings provide only incomplete indication of default risk, bond investors are likely to seek additional information to help assessing default risk in order to establish yield differentials between higher-quality and lower-quality bonds within each rating category (Khurana and Raman, 2003). This study investigates whether bond investors incorporate analysts' forecasts into default risk assessment and thus bond pricing.

I focus on analysts' forecasts for several reasons. First, the extant literature on analysts' forecasts suggests that financial analysts are important information intermediaries and analysts' forecasts contain both public and private information (Barron et al., 2002). Second, empirical evidence also indicates that analysts mitigate the deficiency of current financial reporting and analysts' earnings forecasts outperform time series models in forecasting future profitability (Brown and Rozeff, 1978; Brown and Chen, 1990; Amir et al., 2003). Taken together, due to these properties of analysts' forecasts, analysts' forecasts may enable bond investors to discern the difference in default risks within each categorical rating class. If bond investors extract useful information from analysts' forecasts in assessing default risk, then I expect analysts' forecasts to provide incremental power in explaining bond yield premium over and above the categorical bond ratings.

To empirically test this, I model the bond yield premium as a linear function of categorical bond ratings and analysts' forecasts variables while controlling for firm characteristics, bond characteristics, and market condition. My main objective is to test whether analysts' forecasts variables are significantly associated with the bond yield premium. I further examine whether the explanatory power of analysts' forecasts in bond pricing varies in different scenarios. First, I investigate whether the association between analysts' forecasts and bond yield premium is stronger when bond investors perceive a higher likelihood of default. Next, I examine whether the association between analysts' forecasts and bond yield premium is stronger when information asymmetry is higher. Furthermore, I test whether the association between analysts' forecasts and bond yield premium depends on the expected use of proceeds from bond financing. Specifically, I test whether the explanatory power of analysts' forecasts for bond yield premium is stronger when the proceeds from debt financing are spent on risky new projects or merger and acquisition activities.

I use a sample of 763 new bond issuances in the US during the period 1993-2005. The results show that analysts' forecasts provide significant incremental explanatory power for the bond yield premium. Overall, I find that earnings forecast and cash flow forecast are negatively associated with the bond yield premium after controlling for categorical bond ratings and fundamental financial ratios. The contextual analyses further show that analysts' forecasts are priced in the primary bond market especially when the perceived default risk or information asymmetry is high. Furthermore, the effects of analysts' forecasts on bond pricing do not depend on the purpose of debt financing. I also find that the continuous measures of default risks derived from a simple ordered logit model outperform the categorical bond ratings in explaining bond yield premium.

Overall, the results are consistent with the notion that bond investors demand more quantitative measures of default risk in the presence of high information uncertainty or high investment risk. Therefore, they seek additional information to help assessing default risk beyond categorical bond ratings. Financial analysts, as professional information intermediaries, provide predicted information about firms' future profitability, liquidity and growth potential by processing publicly available information and acquiring private information. The empirical evidence suggests that analysts' forecasts enable bond investors to discern quality differences among new bond issues, especially those issues that have exactly the same or similar published ratings and therefore are incorporated by bond investors into bond prices. This study compliments the extant literature by providing evidence on the value of analysts' forecasts from bondholders' perspective.

The remainder of the chapter is organized as follows. The next section outlines the research background and motivation. Section 4.3 describes the research methodology and model specification. Sample selection and data description are presented in section 4.4. Section 4.5 provides the empirical results and section 4.6 describes the sensitivity tests. Section 4.7 concludes the chapter.

4.2. Research Background and Motivation

The value of a corporate bond can be computed as the discounted sum of coupons and principal payment weighted by survival probabilities and expected recovery value in the case of default. For example, the price of a corporate bond with face value one and with coupon payments $C(T_j)$, j =1,2,3,........, n, can be expressed as:

$$D(0,T) = \sum_{j=1}^{n} (1 - pd) \frac{C(T_j)}{(1+r)^i} + pd * G(T_j)$$

Where, *pd* is the probability of default, *r* denotes the discount factor, and *G(T)* is the present value of receiving one unit of currency if default occurs on time T_j. As a result, the probability of default is a crucial factor in bond pricing. The importance of default risk in bond pricing is well reflected by the numerous credit risk models proposed by both practitioners and academics. It is widely agreed that professional rating agencies incorporate both public and non-public information into bond ratings. Empirical studies therefore normally use bond ratings as a proxy for default risk. The extant studies show that bond ratings are good indicators of default risk and are strongly associated with bond yield premium (Fisher, 1959; Ziebart and Reiter, 1992; Sengupta, 1998; Shi, 2003).

Meanwhile, researchers find that some financial ratios still provide significant incremental explanatory power for bond yield premium after controlling for bond ratings (Ziebart and Reiter, 1992; Sengupta, 1998; Shi, 2003). For example, Ziebart and Reiter (1992) construct simultaneous equations to capture the interrelation between financial information, bond ratings and bond yields. They find that financial information not only indirectly affects bond yields through its effect on ratings but also directly affects bond yields.

A more recent study by Khurana and Raman (2003) suggests that the categorical nature of bond ratings results in a direct association between financial information and bond yields. Khurana and Raman (2003) find that the earnings-related fundamental score based on the nine fundamental signals is priced in the bond market. They conclude that, because the published bond ratings are discontinuous with limited rating classifications, bond investors need to seek additional information from fundamentals in order to discern the differences in bond credit quality within each single rating class.

This study aims at further exploring the argument briefly mentioned in Khurana and Raman (2003). The bond ratings released by the big credit rating agencies, like Moody's, S&P's, and Fitch, fall into limited categories ranging from AAA to D. Even if the further differentiation within each broad category (e.g., 1, 2 and 3 for Moody's ratings, minus/plus for S&P's ratings) is taken into account, there are no more than twenty-two categories. The primary reason for the standing practice of publishing categorical bond ratings rather than releasing the estimated probability of default is that credit risk cannot be measured with precision. Many of the qualitative factors that affect the probability of default, like the capability and experience of management, the quality of risk controls, and the ability to adapt quickly to the changing market demands, require a significant degree of subjective judgement in assessing default risk. Therefore, rating agencies only provide a reasoned and categorical assessment of the relative creditworthiness of the credit instrument (The Bond Market Association, 2002).

Nevertheless, the market's assessment of default risk reflected in yield premium is a continuous variable. Since the categorical ratings only provide gross measures of default risk, bond investors may find the discrete bond ratings insufficient in assessing default risk. For a similar reason, equally-rated bonds may carry different levels of default risks from bond investors' perspective. Moody's KMV *Risk Analyst* (2004) also indicates that the expected default frequency is a more quantitative measure for default risk than bond ratings and has stronger differential power across bonds. As a result, categorical bond ratings only serve as an important benchmark for bond investors in assessing default risk. Given the categorical nature of bond ratings, bond investors need to seek additional information to further discern the differences in default risks across bonds.

In summary, bond investors can assess default risk based on the whole information set available to them in order to price corporate bonds. Consequently, the assessment of probability of default by bond investors is a function of publicly available categorical ratings, historical financial information, projected financial information provided by information intermediaries, and so on. In essence, whether the borrowing firm will default depends on firms' future cash flow and profitability. Therefore, the projected financial information provided by information intermediaries may become valuable to bond investors in discerning differences in default risks and thus setting bond price.

This study examines whether analysts' forecasts enable bond investors to discern such differences in default risks. Specifically, I examine whether analysts' forecasts provide any incremental explanatory power for bond yield premium after controlling for categorical bond ratings and fundamental financial ratios. I focus on analysts' forecasts for several reasons. First, in essence, the probability of default depends on firms' future cash flow and profitability. Analysts' forecasts provide a direct estimation of the firms' future cash flow and profitability. Prior studies indicate that analysts' forecasts outperform time series models in predicting future earnings (Brown and Rozeff, 1978; Brown and Chen, 1990). Therefore, bond investors may incorporate analysts' forecasts into default risk assessment and thus bond prices. Second, professional analysts are important information intermediaries in the capital market. The extant literature suggests that analysts' forecasts contain private information and financial analysts help mitigate the deficiency of current financial reporting (Barron et al., 2002; Amir et al., 2003). Taken together, given that the categorical bond ratings provide incomplete indication of default risk, analysts' forecasts may enable the market to discern quality differences across bonds. Therefore, bond investors are likely to extract information from analysts' forecasts in order to establish yield differentials between higher-quality and lower-quality bonds within each single rating class (Khurana and Raman, 2003).

4.3. Model Development and Research Methodology

4.3.1. Model Specification

Consistent with the extant literature (Reiter, 1991; Ziebart and Reiter, 1992; Sengupta, 1998; Shi, 2003), I construct one equation with bond yield premium as the dependent variable to examine whether analysts' forecasts are incorporated by bond investors into bond prices. I control for a number of factors that prior studies have identified to be associated with bond yield premium (e.g., Ziebart and Reiter, 1992; Mansi et al., 2004). The equation contains the following components:

Yield Premium = f (Rating Characteristics, Other Bond Characteristics, Firm Characteristics, Market Condition, Analysts' Forecasts) (1)

Yield premium (*PREMIUM*) is defined as the difference in percentage points between the yield to maturity for the corporate bond and the yield of a US treasury bond with comparable maturity on the issuance date.

The main test variables in this study relate to analysts' forecasts. Particularly I investigate whether analysts' forecasts are associated with bond yield premium after controlling for published bond ratings and fundamental financial ratios. I construct three variables to capture analysts' forecasts. The first one is the price-deflated mean one-year-ahead earnings per share forecast (*EPSF*).[38] This variable captures analysts' estimation of future corporate profitability. Higher future profitability results in lower likelihood of default. As a result I expect this variable to be negatively associated with bond yield premium. The second one is the price-deflated mean one-year-ahead cash flow from operations per share forecast (*CPSF*). Borrowing firms ultimately rely on

[38] All forecasts are taken from the month of bond filing. If filing date is missing, the forecasts six months before the issuance date are used instead.

future cash flow to pay interest and repay the principal. The higher the expectation on future cash inflow, the lower the expected probability of default. Therefore, this variable is expected to be negatively associated with bond yield premium as well. I include a third variable (*GROWF*) to capture analysts' estimation of firms' growth potential. *GROWF* is calculated as below:

$$GROWF = \frac{EPS(t_3) - EPS(t_0)}{|EPS(t_0)|}$$

$EPS(t_3)$ represents the mean three-years-ahead earnings per share forecast and $EPS(t_0)$ denotes the actual earnings per share in the current fiscal year.[39] Higher growth potential may suggest higher future cash flow, but it is related to higher risk as well. Therefore, the effect of growth forecast on the default risk and thus the cost of borrowing is ambiguous.

I include three variables to capture the bond rating characteristics.

(a) Bond ratings (*RATE*) – measured as integer values from 1 (Aaa) to 22 (D) based on Moody's categorical bond ratings. Since bond rating is an indicator of default risk, I expect *RATE* to be positively related to the yield premium.

(b) Non-investment grade (*JUNK*) bonds – measured as an indicator variable, equal to one for non-investment grade bonds and zero otherwise. As borrowing costs tend to jump for non-investment grade bonds, I expect *JUNK* to be positively associated with the yield premium (Mansi and Reeb, 2002).

(c) Difference in bond ratings between Moody's and S&P's (*SPLIT*) – measured as an indicator variable, equal to one if Moody's rating is different from that of S&P's and zero otherwise. Differences in ratings signal information problem

[39] If three-years-ahead earnings forecast is not available, I use two-years-ahead earnings forecast.

between managers and investors (Morgan, 2002). Thus, I expect *SPLIT* to be positively related to the cost of debt capital.

I control for firm characteristics that may affect bond yield premium using the following variables:

(a) Firm Size (*FSIZE*) – measured as the natural logarithm of one plus fiscal-year-end market value of equity. Ceteris paribus, I expect larger firms to have lower cost of debt capital (Carey et al., 1993).

(b) Financial leverage (*DE*) – measured as the ratio of long-term debt divided by the sum of long-term debt and market value of equity. I expect higher leverage ratios to be associated with higher bond yield premium, because leverage is an essential indicator of the firm's overall financial burden.

(c) Bank-related debt (*BDEBT*) – measured as an indicator variable, equal to one for firms with notes payable and zero otherwise. The existence of bank-related debt is expected to reduce the cost of debt capital due to the monitoring functions of banks (Datta et al., 1999).

(d) The inverse of interest coverage ratio (*TIMES*) – measured as interest expenses divided by income before interest expense. This variable captures the interest payment burden relative to firm profitability. I thus expect this ratio to be positively related to the bond yield premium.

(e) Bankruptcy risk (*ZSCORE*) – measured as Altman's Z-Score (Altman, 1968). A higher Z-score means a lower likelihood of bankruptcy and therefore would result in lower cost of borrowing.

(f) Firm beta (*BETA*) – measured as the value-weighted market model beta using five-year monthly returns. A minimum of twenty-four monthly returns are required. Beta is an indicator of overall firm risk and thus is expected to be positively related to the bond yield premium.

Various bond characteristics are also identified by prior literature to be related to the cost of borrowing. I include the following variables:

(a) The issue size (*ISIZE*) - measured as the natural logarithm of one plus the total principal amount of debt. This variable is expected to be positively related to the cost of borrowing since larger issue size means heavier debt burden (Sengupta, 1998).

(b) The duration of call protection (*CALL*) – measured as the ratio of years to first call over years to final maturity. I set the value of this ratio to one if the bond is not callable. Callable debt contains prepayment risk and loss of high rate interest income from the bondholders' perspective. Therefore, shorter call protection duration suggests higher cost of debt (Datta et al., 1999).

(c) Bond maturity (*MATU*) – measured as the natural logarithm of the number of years to maturity. Debt with longer maturity is exposed to a higher risk of default. Therefore, debt maturity is predicted to be positively associated with cost of debt.

(d) Whether the bond is subordinate (*SUB*) – measured as an indicator variable, equal to one if the debt is subordinate and zero otherwise. Bond investors require a higher yield premium for subordinate debts (Shi, 2003).

(e) The existence of bondholder protection provision (*COVE*) – measured as an indicator variable which equals one if the contract contains special provisions that protect bondholders' interests (e.g., limit on dividend payout and additional debt, negative pledge, and cross default) and zero otherwise. The presence of such provisions is predicted to reduce the cost of borrowing.

Additionally, I include one variable to control for the overall market conditions. It is measured as the difference in yield between Moody's Aaa and Baa bond (*ECYC*). I expect this variable to be positively associated with the bond yield premium.[40]

Note that the final sample is constrained to those firms that have analyst following and analysts' earnings forecasts and cash flow forecasts are available. I employ the Heckman (1979) correction model to correct the sample selection bias. Following the extant literature (Bhushan, 1989; Barth et al., 2001; DeFond and Hung, 2003), I construct a binary model as below (firm and year subscripts omitted):

$$\begin{cases} Y = 1, & \text{if } Y^* > 0 \\ Y = 0, & \text{Otherwise} \end{cases}$$

where,

$$Y^* = \beta_0 + \beta_1 * FSIZE + \beta_2 GROW + \beta_3 BETA + \beta_4 ZSCORE + \beta_5 ACCR + \beta_6 CAP + \varepsilon$$

FSIZE denotes firm size as defined earlier. *GROW* denotes intangibles, measured as the sum of R&D expense and advertising expense divided by total assets. *BETA* is firm's beta value based on the market model. *ZSCORE*, measured as the Altman (1968) Z-score, captures firm's financial health. *ACCR* is the magnitude of firm's absolute accruals and *CAP* denotes capital intensity. Detailed definitions for

[40] Company issuing bonds usually file the preliminary prospectus together with the preliminary bond ratings with the SEC first. The final ratings (confirmed, revised, or withdrawn) are announced /published before the publication of the final prospectus and the formal bond issuance.

In this study, firm characteristics are based on the latest annual reports available in the bond filing month. All analysts' forecasts are taken from the bond filing month. Since the dependent variable *RATE* is the final published rating, it implies that, for rating agencies, all the independent variables are available to them before they assign the final ratings.

these variables are presented in Panel C of Table 4.2. I calculate the inverse Mills ratio (*MILLS*) based on this model and then include it in equation (1).[41]

4.3.2. Contextual Analyses

I further perform some contextual tests on the association between analysts' forecasts and bond yield premium. As aforementioned, default risk is crucial to bond investors and bond ratings provide an important benchmark for bond investors to assess default risk. If the categorical rating assigned by rating agencies is quite high (e.g., Aaa or Aa) and therefore the default probability is quite small, default risk is thus not the main concern in bond pricing. In contrast, when the bond rating is low and bondholders are exposed to high investment risk, bond investors have a stronger motivation to obtain additional information in order to assess default risk over and above the categorical ratings. To test this argument, I partition the sample into two sub-samples based on whether the published Moody's bond rating is below Aa. I expect the association between analysts' forecasts and the bond yield premium to be stronger for the sub-sample where bond ratings are below Aa.

I also divide the sample into two based on the level of information asymmetry. High information asymmetry leads to high investment uncertainty. Therefore, bond investors are likely to seek additional information in order to complement the categorical bond ratings in assessing default risk and establishing yield differentials. When the information asymmetry between insiders and external investors is high, there is a high demand for non-public information and financial analysts collect more private information to meet such demand (Schipper, 1991; Das et al., 1998; Graves et

[41] Results for the Heckman correction model are not tabulated. All explanatory variables, except *CAP* have the expected signs and are significant at the 0.01 level. The overall concordance percentage is 94.6%.

al., 2002). Consequently, I expect the association between analysts' forecasts and the bond yield premium to be stronger for the sub-sample where information asymmetry is higher. I use intangible intensity, measured as the sum of advertising expenditure and research and development expenditure scaled by total assets, to proxy information asymmetry (Graves et al., 2002).

Finally, I also examine whether the association between analysts' forecasts and bond yield premium depends on the expected use of the proceeds from debt financing. There are various ways to spend the proceeds from debt financing. For example, it can be spent on merger and acquisition activities or risky new projects. Alternatively, it can be spent for general corporate purposes, like paying tax, refinancing, and redeeming shares. Since investment in the former category of activities changes the overall risk profile of the corporation and investment in the latter category does not, I expect investors to be more concerned about the investment risk associated with the activities in the former category. Thus, investors need to further discern the differences in credit quality in such circumstances. Consequently, I expect the association between analysts' forecasts and bond yield premium to be stronger for the sub-sample where the use of proceeds from debt financing falls into the former category.

4.3.3. Continuous Default Risks versus Categorical Bond Ratings

As previously noted, bond ratings fall into limited categories and the default risk reflected in bond yield premium is a continuous variable. Due to the categorical nature of bond ratings, bond investors would seek additional information to discern the difference in default risks over and above the categorical ratings (Khurana and Raman, 2003). Specifically, I posit that bond investors use categorical ratings as a benchmark to derive continuous measures of default risk by extracting other relevant information to complement the categorical ratings. If this is the case, the continuous measures of default risk developed by bond investors are expected to have higher explanatory power for the bond yield premium relative to the categorical bond ratings. Nevertheless, it remains another research question as to how bond investors process other relevant information to derive continuous measures of default risks. For the purpose of this study, I employ an ordered logit model to convert the categorical bond ratings into continuous measures of default risk. Then I compare the power of the derived measures of default risk with that of the categorical ratings in explaining bond yield premium. The model is described below:

$$p(RATE = n) = p(C_{n-1} < C^* < C_n) \qquad (2)$$

where $\begin{cases} C_0 = -\infty \\ C_{22} = +\infty \end{cases}$ and n =1,2, ...,22.[42]

C* = f (Bond Characteristics, Firm Characteristics, Market Condition, Analysts' Forecasts, etc.)

Similar to equation (1), the following variables are included to capture bond characteristics: debt issue size (*ISIZE*), the duration of call protection (*CALL*), debt maturity (*MATU*), subordinate status (*SUB*), debt convertibility (*CON*), and the existence of bondholder protection provisions (*COV*). The variables capturing firm characteristics include firm size (*FSIZE*), financial leverage (*DE*), the existence of bank debt (*BDEBT*), the inverse of interest coverage ratio (*TIMES*), return on asset (*ROA*), Altman's Z-score (*ZSCORE*), firm's beta (*BETA*), the number of analyst following (*ANALYST*), intangible intensity (*GROW*), firm age (*FAGE*), and an indicator variable for negative book value (*BVDUM*). I use *ECYC* to control for

[42] In this study the maximum integer value for bond rating (*RATE*) is 16.

market condition. *EPSF*, *CPSF*, and *GROWF* are used to capture analysts' forecasts. Detailed variable definitions are provided in Panel C of Table 4.2. I estimate equation (2) by excluding and including the three analysts' forecasts variables separately, and then I derive two sets of more quantitative measures of default risks relative to the categorical bond ratings:

$$PRATE1 = \sum_{n=1}^{22} \hat{p}_1(RATE = n) * n$$

$$PRATE2 = \sum_{n=1}^{22} \hat{p}_2(RATE = n) * n \text{, where } n=1,2,\ldots\ldots\ldots\ldots\ldots,22$$

In the above formula, $\hat{p}_1$ denotes the estimated probability corresponding to a specific outcome based on the model excluding the three analysts' forecasts variables, and $\hat{p}_2$ is the estimated probability corresponding to a specific outcome based on the model including the three analysts' forecasts variables. I expect both *PRATE1* and *PRATE2* to outperform *RATE* in explaining bond yield premium.

4.4. Sample Selection and Descriptive Statistics

I obtain data on the new bond issuances by US companies from the SDC. The initial sample consists of all new public bond issues in the United States from 1993 to 2005, including non-convertible bond issues, convertible bond issues and mortgage and asset-backed bond issues. I exclude those issues with maturities of one year or less. Additionally, I exclude financial institutions (4-digit SIC codes 6,000-6,999) and public utilities (4-digit SIC codes 4,900-4,999) due to the different structures of their financial statements and regulation environment. I also exclude those bond issuances that coincide with mergers and acquisitions from the final sample in order to mitigate the effect of confounding events.[43]

Financial data is taken from Compustat. Analysts' forecasts are retrieved from Institutional Brokers Estimates System (I/B/E/S) summary database. The observations in the final sample meet the following criteria: i) data on bond issuance characteristics is available on the SDC; ii) firms' financial data is available on Compustat; iii) each firm has at least one analyst following it; iv) the following analysts' forecasts are available on I/B/E/S in the bond filing month: one-year-ahead earnings per share forecast, three-years-ahead earnings per share forecast, one-year-ahead cash flow per share forecast and the actual earnings per share for the current year.[44]

The constant maturity yields on US treasury bonds and Moody's bonds are obtained from the website of Federal Reserve Board of Governor's Statistical Release. The final sample consists of 763 new bonds issued by 231 companies during the period 1993-2005. All continuous explanatory variables are winsorized at 1% and 99% to mitigate the effect of extreme observations. Table 4.1 presents the industrial composition of the final sample based on the Fama-French twelve-industry classification. The table reveals that the number of bonds included in the final sample varies across industries. A large number of bonds are issued by companies in the following industries: oil, gas and coal extraction and products (FF4), wholesale, retail and some services (FF9), manufacturing (FF3), and consumer non-durables (FF1). Overall, the composition of the sample exhibits no significant clustering of firms or industries.

(Table 4.1 about here)

[43] Mergers and acquisitions that occur three months before or after bond issuance are considered as confounding events.
[44] If date of filing is missing on the SDC, the analysts' forecasts six months before issuance are used instead.

Descriptive statistics and variable definitions are provided in Table 4.2. Panel A shows that the three analysts' forecasts variables, *EPSF, CPSF*, and *GROWF*, exhibit wide variation across firm-year observations. The table also shows that most bonds in the sample are not callable, since the duration of call protection (*CALL*) has a median of 1.00. In addition, it reveals that some firms are financially poor, while some are financially healthy, with *ZSCORE* ranging from 0.08 to 8.98. Further, bond issue size (*ISIZE*), firm age (*FAGE*), firm leverage (*DE*), return on asset (*ROA*), and number of analyst following (*ANALYST*) also vary significantly across firm-year observations.

Panel B of Table 4.2 presents descriptive statistics for the indicator variables. It shows that most companies have bank debt outstanding (about 62%), and only sixteen firms in the final sample have negative book value of shareholders' equity. Moreover, twenty bonds are subordinate and fifty-six bonds contain special provisions to protect bondholders. Finally, only a small proportion of bonds in the sample have non-investment grade ratings (*JUNK*). In a large number of cases S&P's and Moody's provide identical bond ratings. However, in 29.5% of the cases there is disagreement between the two agencies.

(Table 4.2 about here)

Table 4.3 reports Spearman (above diagonal) and Pearson (below diagonal) correlation coefficients for the continuous variables. Bond ratings (*RATE*) are highly correlated with the yield premium (*PREMIUM*) as indicated by the correlation coefficients of 0.56 and 0.57. As expected, both bond ratings and the yield premium are positively correlated with bond issue size (*ISIZE*), beta (*BETA*), financial leverage (*DE*), and the inverse of interest coverage ratio (*TIMES*), and negatively correlated with firm size (*FSIZE*), call protection (*CALL*), and firms' Z-score (*ZSCORE*).

Among the three forecast variables, earnings forecast (*EPSF*) and cash flow forecast (*CPSF*) are negatively related to *PREMIUM*. Nevertheless, there is no significant correlation between growth forecast (*GROWF*) and *PREMIUM*.

(Table 4.3 about here)

4.5. Empirical Results

Table 4.4 provides the results for estimating equation (1) under different model specifications. Model 1 regresses bond yield premium on variables capturing rating characteristics, bond issue characteristics, firm characteristics, and market condition. Relative to Model 1, Model 2 also includes the three analysts' forecasts variables. Year-fixed effects and industry-fixed effects are included in Model 3, while Model 4 also takes into account sample selection bias. The results show that most independent variables have the expected signs. Specifically, bond ratings are positively associated with bond premium and the coefficient on *RATE* is significant at the 0.01 level in all models. The positive and significant coefficients on *JUNK* imply that bond investors demand a much higher premium for junk bonds compared with that for investment grade bonds. Bond issue size (*ISIZE*), duration of call protection (*CALL*), bond maturity (*MATU*), firm size (*FSIZE*), financial leverage (*DE*), firms' Z-score (*ZSCORE*) and market condition (*ECYC*) are important determinants of bond yield premium. The coefficients on these variables are significant at the 0.05 level or better. Although the coefficients on *SPLIT* have the expected signs, they are insignificant in all the models. Additionally, the coefficient on the inverse Mills ratio (*MILLS*) is significant at the 0.10 level in Model 4. Nevertheless, the coefficients on the other variables remain similar after I include the inverse Mills ratio to correct sample selection bias.

With respect to the analysts' forecasts variables, the results suggest that earnings forecast and cash flow forecast are both significantly and negatively associated with bond yield premium at the 0.05 level or better. However, the effect of growth potential (*GROWF*) on bond yield premium is insignificant. The F-statistics testing the joint contribution of the three analysts' forecasts variables indicate that analysts' forecasts provide significant incremental explanatory power over and above categorical ratings and fundamental financial ratios for the bond yield premium (with F-values of 6.18, 5.03, and 4.99 respectively). The results are robust to the alternative model specifications. Overall, the results in Table 4.4 are consistent with the findings in prior studies. Bond ratings are strongly associated with bond yield premium. Moreover, analysts' forecasts provide incremental explanatory power for the bond yield premium after controlling for both categorical ratings and fundamental financial ratios.

(Table 4.4 about here)

The contextual analyses about the association between analysts' forecasts and bond yield premium are presented in Table 4.5. The sample is first divided into two sub-samples based on whether the Moody's bond ratings are below Aa. For the sub-sample where bond ratings are below Aa, bond investors anticipate a higher likelihood of default. The results show that analysts' earnings forecast and cash flow forecast are strongly associated with bond yield premium only in the sub-sample of lower bond ratings. The F-value testing the joint contribution of the three interaction terms is significant at the 0.01 level. The results suggest that, when the perceived default likelihood is higher, bond investors are more concerned about the investment risk that they are exposed to. Therefore, they presumably incorporate other information such as analysts' forecasts into default risk assessment and thus bond prices.

In Model 2, I partition the sample into two sub-samples based on the level of information asymmetry. The dummy variable *IADUM* equals one in the sub-sample of higher information asymmetry and zero otherwise. The results show that for the sub-sample of lower information asymmetry, earnings forecast (*EPSF*) is negatively associated with bond yield premium at a significance level of 0.10, but the coefficients on cash flow forecast (*CPSF*) and growth forecast (*GROWF*) are insignificant at the 0.10 level. Among the three interaction terms, two of the three coefficients are significant at the 0.01 level. The results indicate that in the presence of higher information asymmetry, bond investors are exposed to higher investment uncertainty and therefore they are likely to extract information from analysts' forecasts to help assessing default risk and pricing new bonds.

In Model 3 the sample is partitioned by the use of proceeds from debt financing. The results show that the F-test that the coefficients on the three forecasts variables equal zero is significant at the 0.05 level, while the F-test that all the coefficients on the three interaction terms are equal to zero is insignificant at the 0.10 level. Therefore, analysts' forecasts provide incremental explanatory power for bond yield premium in both sub-samples and the explanatory power of analysts' forecasts for bond yield premium does not vary significantly across these two sub-samples. Since engagement in new projects or mergers or acquisition tends to change the overall risk profile of a company, bond investors are likely to extract additional information from analysts' forecasts to complement categorical bond ratings in assessing default risk. However, contrary to my hypothesis, the results suggest that analysts' forecasts are also priced by bond investors when the proceeds are spent only for general corporate purposes.

(Table 4.5 about here)

The preceding analyses reveal an association between analysts' forecasts and bond yield premium even after both categorical bond ratings and fundamental financial ratios are controlled for. The findings support the claim that categorical bond ratings provide a benchmark for bond investors to evaluate default risk. Meanwhile, bond investors seek additional information to complement the categorical ratings in establishing yield differentials and pricing bonds. Tables 4.6 and 4.7 provide further analyses to test this claim. Table 4.6 estimates an ordered logit model using the original bond rating as the outcome variable. The results show that the pseudo R-squared is 0.46 and 0.52 for Model 1 and Model 2 respectively. Among the variables to capture bond characteristics, issue size (*ISIZE*), duration of call protection (*CALL*), subordinate status (*SUB*) and the existence of bondholder protection provisions (*COVE*) are significantly associated with bond ratings. The coefficients on firm characteristics variables, such as firm size (*FSIZE*), financial leverage (*DE*), Z-score (*ZSCORE*), beta (*BETA*), and firm age (*FAGE*), have the expected signs and are significant at the 0.10 level or better. Model 2 reveals that two of the three coefficients on analysts' forecasts variables are significant at the 0.01 level. Based on Models 1 and 2, I use the predicted probability for each outcome to calculate two sets of default risk measures, *PRATE1* and *PRATE2*.

(Table 4.6 about here)

Compared with the discrete published bond ratings (*RATE*), *PRATE1* and *PRATE2* are continuous and thus more quantitative. Table 4.7 compares the predicted default risk measures with the original categorical ratings with respect to explaining bond yield premium. Panel A shows that both *PRATE1* and *PRATE2* are highly correlated with the original ratings (*RATE*). The correlation coefficients are 0.89 and 0.93 respectively. This is not surprising since bond investors are assumed to use categorical bond ratings as a benchmark in assessing default risk. In comparison, the predicted default risk measures exhibit stronger correlation with bond yield premium. The correlation coefficient between *PRATE1* (*PRATE2*) and *PREMIUM* is 0.69 (0.71), higher than that between *RATE* and *PREMIUM* (0.57). Panel B of Table 4.7 presents the descriptive statistics to further compare *PRATE1* (*PRATE2*) with *RATE*. The panel reveals that *PRATE1 (PRATE2)* and *RATE* have similar means, minimum values and maximum values. The descriptive statistics for *DIFF1*, *DIFF2*, *ABSDIFF1*, and *ABSDIFF2*, which are constructed based on the difference between *RATE* and *PRATE1* (*PRATE2*), also suggest that both *PRATE1* and *PRATE2* approximate *RATE* well.

Panel C of Table 4.7 compares the continuous default risk measures (*PRATE1*, *PRATE2*) with the categorical ratings (*RATE*) with respect to explaining bond yield premium. The results reveal that both *PRATE1* and *PRATE2* are strongly associated with bond yield premium. The coefficient on *PRATE1* (*PRATE2*) is positive and significant at the 0.01 level. More interestingly, the adjusted R-squared increases from 0.68 (the last column in Table 4.4) to 0.72 (0.74) when the categorical bond ratings are replaced with the continuous default risk measures *PRATE1* (*PRATE2*). Further, when both categorical ratings (*RATE*) and continuous default risk measures *PRATE1* (*PRATE2*) are included in the model, *PRATE1* (*PRATE2*) remains significant. Such findings suggest that *PRATE1* (*PRATE2*) still explains a significant portion of bond yield premium even after categorical bond ratings are controlled for. Overall, the results indicate that the continuous default risk measures outperform the categorical bond ratings in explaining bond yield premium. The evidence suggests that bond investors incorporate both categorical bond ratings and also other useful information into assessing default risk and pricing bonds.

(Table 4.7 about here)

In summary, analysts' forecasts are priced by bond investors, especially when published bond ratings are low or when information asymmetry is high. Due to the categorical nature of bond ratings released by rating agencies, bond investors seek additional information including analysts' forecasts to complement the publicly available bond ratings in assessing default risk and pricing new corporate bonds.

4.6. Sensitivity Analyses

Throughout the empirical analyses analysts' forecasts are obtained from the bonds' filing months. If the filing date is missing on the SDC, I extract the analysts' forecasts six months before the bond issuance. Nevertheless, price discovery process in the primary market may take different time lengths for different firms. Therefore, it is difficult to track exactly when bond investors submit their demand and price information. As a robustness check, I replicate Tables 4.4 and 4.5 using the analysts' forecasts three months before the bond issuance and the analysts' forecasts one month before the bond issuance separately. The results are similar to those reported above. However, the interpretation of these similar results should be cautious. Given that analysts may be required to remain silent for the upcoming new offerings, such robustness could be possibly driven by the stickiness of analysts' forecasts in that period.

It is also noticeable that bond yield premium (*PREMIUM*) is bounded to be positive by definition. As another robustness check, I transform the bond yield premium to an unbounded variable by taking the natural logarithm of one plus the original premium. All results and statistical inferences remain very similar to those reported, except that the magnitudes of the coefficients on all independent variables are much smaller.

Additionally, the categorical bond ratings are measured on a cardinal scale from 1 for Aaa to 22 for D in most models. Such transformation inherently imposes a linear structure on the level of default risk contained in each rating classification. However, the jump in the credit spreads of the junk bonds documented in prior literature suggests a presumably non-linear relationship between bond ratings and bond yield premium. Therefore imposing a linear structure on the categorical bond ratings could be inappropriate. To address such concern, I rerun the regressions in Tables 4.4 and 4.5 by replacing the cardinal ratings with rating dummies. Specifically, each dummy takes the value of one for a specific rating category and zero otherwise. The results using such rating dummies are very similar to those reported in Tables 4.4 and 4.5. However, the adjusted R-squared slightly decreases since a significant number of degrees of freedom are lost.

I also perform a sensitivity test by converting the Z-score into a binary measure, which takes the value of one if the Z-score is greater than 2.99 and zero otherwise. A Z-score above 2.99 indicates sound financial health while a Z-score below 2.99 indicates potential trouble or even fiscal danger. Therefore, this binary measure is expected to be negatively associated with cost of borrowing. In addition, I use book-to-market ratio as an alternative measure for intangible intensity (information asymmetry) in the contextual analyses. I replicate Tables 4.4-4.7 using the binary Z-score to proxy overall financial health and the book-to-market ratio to proxy intangibles. The untabulated results remain very similar.

As another robustness check, I measure the leverage ratio in an alternative way to take into account the effect of new bond issuance on the firm leverage. Since a large amount of new issuance significantly increases the financial leverage of the issuing company, investors would incorporate this consequence into default risk assessment and bond pricing. Therefore, I redefine *DE* to equal the existing long-term debt plus the amount of the new issuance divided by the sum of existing long-term debt, the amount of new issuance and the market value of common equity. I replicate Tables 4.4, 4.5, 4.6 and 4.7 using this alternative measure of leverage. The results are similar to those tabulated.

Finally, to maintain a reasonable sample size, multiple bonds issued by the same firm in the same fiscal year are all included in the final sample. This engenders potential non-independence among observations since the bond yield premium and some financial ratios for the same firm are possibly stable over time. If this is the case, the reported t-statistics would be overestimated. Apart from the aforementioned cluster analysis, I employ two alternative methods to address such concern. First, if a firm issues multiple bonds in the same fiscal year, only the first issuance is included. This results in a reduced sample of 403 firm-year observations. Additionally, I average all variables (both dependent and independent) over the sample period for each firm separately and obtain a reduced sample consisting of 231 firms. Performing tests on these two reduced samples separately generates similar results. Nevertheless, the adjusted R-squared are smaller, ranging between 0.42 and 0.63. The coefficients on firm beta (*BETA*) become insignificant in most regressions.

4.7. Conclusions

Prior studies on analysts' forecasts have largely focused on the equity market. In contrast, relatively little is known about the role of financial analysts in the bond market. This study examines whether analysts' forecasts are priced by primary bond market participants.

Using a sample of 763 new bond issuances in the US from 1993 to 2005, I find that earnings forecast and cash flow forecast are negatively associated with bond yield premium after controlling for categorical bond ratings and fundamental financial ratios. The contextual analyses reveal that the association between analysts' forecasts and bond yield premium is stronger when the perceived default risk is higher or information asymmetry is higher. Furthermore, analysts' forecasts are priced by bond investors no matter what the purpose of debt financing is. Finally, the continuous measures of default risk derived from a simple ordered logit model using categorical bond ratings as a benchmark outperform the categorical bond ratings in explaining bond yield premium.

Taken together, the findings are consistent with the notion that bond investors demand more quantitative measures of default risk in the presence of high information uncertainty or high investment risk. Therefore, they seek additional information to help assessing default risk beyond categorical bond ratings. Financial analysts, as professional information intermediaries, provide expectation about firms' future profitability, liquidity and growth potential by processing publicly available information and acquiring private information. The empirical evidence suggests that analysts' forecasts enable bond investors to discern quality differences among new bond issues, especially those issues that have exactly the same or similar published ratings and therefore are incorporated by bond investors into bond prices.

Table 4.1: Fama-French Twelve-Industry Classification

		# of Observations	# of Firms
FF1	Consumer Non-Durables	85	19
FF2	Consumer Durables	20	10
FF3	Manufacturing	96	36
FF4	Oil, Gas and Coal Extraction and Products	103	40
FF5	Chemicals and Allied Products	71	21
FF6	Business Equipment	33	11
FF7	Telephone and Television Transmission	69	30
FF8	Utilities	-	-
FF9	Wholesale, Retail and Some Services	97	26
FF10	Healthcare, Medical Equipment, and Drugs	26	10
FF11	Finance	-	-
FF12	Other	163	28
Total		**763**	**231**

Note:
1. Public utilities and financial firms are excluded from the sample.
2. The Fama-French twelve-industry classification can be obtained at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french

Table 4.2: Descriptive Statistics and Variable Definitions

Panel A: Descriptive Statistics – Continuous Variables

Variable	MIN	MEAN	MEDIAN	MAX	STD
PREMIUM	0.10	1.51	1.22	5.40	1.01
RATE	1.00	6.84	7.00	16.00	3.47
ISIZE	0.47	4.93	5.52	7.41	1.69
CALL	0.07	0.84	1.00	1.00	0.30
MATU	0.02	2.19	2.32	3.70	0.67
FSIZE	4.01	9.48	9.46	12.50	1.48
DE	0.01	0.21	0.16	0.66	0.16
TIMES	-1.02	0.28	0.16	3.64	0.52
ROA	-0.10	0.06	0.06	0.20	0.05
BETA	0.01	0.88	0.89	2.06	0.41
ACCR	0.00	0.06	0.05	0.27	0.04
CAP	0.06	1.16	0.74	4.97	1.19
GROW	0.00	3.13	3.08	6.95	3.09
ANALYST	0.69	2.80	2.89	3.71	0.45
ZSCORE	0.08	3.28	2.91	8.98	1.93
FAGE	0.69	3.06	3.43	4.33	1.66
EPSF	-0.06	0.05	0.04	0.17	0.03
CPSF	0.00	0.11	0.08	0.49	0.09
GROWF	-1.80	0.25	0.08	2.13	1.71
ECYC	0.80	1.73	1.65	2.46	0.39
MILLS	0.47	1.52	1.51	3.69	0.54

Panel B: Descriptive Statistics – Indicator Variables [45]

Variable	# of Obs. (=1)	Total Obs.	Percentage (=1)
BDEBT	470	763	61.6%
SPLIT	225	763	29.5%
JUNK	81	763	10.6%
SUB	20	763	2.6%
CON	9	763	1.2%
BVDUM	16	763	2.1%
COVE	56	763	7.3%
AADUM	586	763	76.8%
IADUM	381	763	49.9%
USEDUM	131	763	17.2%

Panel C: Variable Definitions

PREMIUM	The difference in percentage points between the yield to maturity for the public bond and the yield of a US treasury bond with comparable maturity on the issuance date.
RATE	Moody's bond rating on a cardinal scale from 1 for Aaa to 22 for D. See Appendix 4.1 for more details.
ISIZE	Bond issue size, measured as natural logarithm of (1+ total principal amount of bond).
CALL	Call protection ratio, measured as the ratio of years to first call over years to final maturity.
MATU	Bond's maturity, measured as the natural logarithm of years to final maturity.
FSIZE	Firm size, measured as the natural logarithm of (1+firm's market value), and market value is measured as the number of common shares outstanding times the fiscal-year-end closing stock price.
DE	Firm leverage, measured as the ratio of long-term debt to the sum of long-term debt and the market value of common equity.
TIMES	The inverse of interest coverage ratio, measured as the interest expense divided by income before interest expense.
ROA	Return on asset, measured as net income divided by total asset.
BETA	The value-weighted market model beta estimated over the five-year period using monthly returns. A minimum of 24 monthly returns are required.
ACCR	The magnitude of absolute accruals, measured as the absolute difference between the net income before extraordinary items and the operating cash flows divided by total assets.

[45] Only a few bond covenants in the final sample contain a put option or sinking fund provision. Therefore, these two indicator variables are not included in the empirical analyses.

CAP	Capital intensity, measured as the ratio of gross property, plant and equipment to sales revenue.
GROW	Intangible intensity, measured as the sum of research and development and advertising expense divided by total assets.
ANALYST	Number of analyst following, measured as the natural logarithm of (1+ the number of analysts following the firm).
ZSCORE	Altman's (1968) Z-score for public firms.
FAGE	Firm age, measured as the natural logarithm of years since the firm initially appeared on CRSP.
EPSF	The mean one-year-ahead earnings per share forecast divided by the stock price in the bond filing month. If bond filing date is not available, the forecast six months before the bond issuance is used.
CPSF	The mean one-year-ahead cash flow per share forecast divided by the stock price in the bond filing month. If bond filing date is not available, the forecast six months before the bond issuance is used.
GROWF	The growth forecast in the bond filing month, measured as the difference between the mean three-years-ahead earnings per share forecast and the current actual earnings per share divided by the absolute value of the current actual earnings per share. If the mean three-years-ahead earnings per share forecast is not available, then the mean two-years-ahead earnings per share forecast is used.
ECYC	Market condition, measured as the average yield on Moody's AAA bonds less the average yield on the 30-year US treasury bonds.
MILLS	The inverse Mills ratio in Heckman's model (1979).
BDEBT	Indicator variable, equal to one for firms with notes payable or bank debt and zero otherwise.
SPLIT	Indicator variable, equal to one if Moody's rating differs from S&P's rating and zero otherwise.
JUNK	Indicator variable, equal to one for junk bonds and zero otherwise.
SUB	Indicator variable, equal to one for subordinate bonds and zero otherwise.
CON	Indicator variable, equal to one for convertible bonds and zero otherwise.
BVDUM	Indicator variable, equal to one for firms with negative book value of equity and zero otherwise.
COVE	Indicator variable, equal to one for debt covenants that contain bondholder protection provisions (e.g., cross default, limited dividend, limited additional debt, negative pledge) and zero otherwise.
AADUM	Indicator variable, equal to one for bonds with Moody's ratings below Aa and zero otherwise.
IADUM	Indicator variable, equal to one for the sub-sample with higher information asymmetry and zero otherwise.
USEDUM	Indicator variable, equal to one if the proceeds of financing are used for new projects or mergers or acquisition and zero otherwise

Table 4.3: Correlation Matrix

	ISIZE	*CALL*	*MATU*	*FSIZE*	*TIMES*	*DE*	*ZSCORE*	*BETA*	*ECYC*	*EPSF*	*CPSF*	*GROWF*	*RATE*	*PREMIUM*
ISIZE		-0.06	-0.02	0.25*	-0.02	-0.06	0.17*	0.04	0.23*	0.01	0.01	-0.03	-0.17*	0.21*
CALL	0.10*		-0.16*	0.04	-0.13*	-0.08*	0.28*	-0.03	-0.12*	0.08*	0.03	-0.02	-0.18*	-0.26*
MATU	-0.01	-0.16*		-0.17*	0.15*	-0.04	-0.01	0.12*	-0.18*	-0.14*	-0.05	0.00	0.11*	0.10*
FSIZE	0.21*	0.14*	-0.19*		-0.13*	0.14*	0.50*	-0.36*	0.36*	0.38*	0.23*	-0.06	-0.55*	-0.18*
TIMES	0.03	-0.11*	0.14*	-0.03		0.40*	-0.11*	0.59*	-0.19*	-0.26*	0.00	0.11*	0.36*	0.30*
DE	-0.05	-0.17*	-0.06	0.18*	0.19*		-0.20*	0.19*	-0.09*	0.03	0.18*	0.01	0.34*	0.28*
ZSCORE	0.19*	0.33*	-0.03	0.48*	-0.17*	-0.22*		0.21*	0.04	0.08*	0.14*	0.04	-0.14*	-0.17*
BETA	0.07*	-0.04	0.17*	-0.28*	0.41*	0.24*	0.16*		0.02	0.02	-0.08*	0.24*	0.51*	0.45*
ECYC	0.23*	0.12*	-0.20*	0.39*	-0.10*	-0.06	0.02	0.04		0.26*	0.14*	-0.04	0.30*	0.21*
EPSF	-0.02	0.15*	-0.10*	0.36*	-0.18*	0.03	0.07*	0.01	0.22*		0.43*	0.02	-0.20*	-0.21*
CPSF	0.04	0.08*	-0.01	0.16*	-0.02	0.12*	0.10*	-0.04	0.14*	0.44*		-0.07	-0.49*	-0.34*
GROWF	0.00	-0.07	0.00	-0.03	0.09*	0.12*	0.02	0.36*	-0.07	0.01	-0.04		-0.08*	0.05
RATE	0.14*	-0.34*	0.08*	-0.57*	0.17*	0.35*	-0.11*	0.48*	0.29*	-0.12*	-0.45*	-0.13*		0.56*
PREMIUM	0.25*	-0.32*	0.05	-0.23*	0.23*	0.31*	-0.18*	0.42*	0.12*	-0.16*	-0.37*	0.03	0.57*	

Note:

1) The Spearman correlation coefficients are presented in the upper right triangle, and the Pearson correlation coefficients are presented in the lower left triangle.

2) * Significant at 5%.

Table 4.4: Analysts' Forecasts and Bond Yield Premium

	Exp. Sign	Model 1	Model 2	Model 3	Model 4
Constant	?	0.49	0.35	0.57	0.12
		(1.17)	(0.83)	(1.28)	(0.22)
RATE	+	0.09	0.11	0.13	0.14
		(6.33)*	(6.06)*	(5.94)*	(5.91)*
SPLIT	+	0.01	0.03	0.01	0.02
		(0.47)	(0.24)	(0.21)	(0.15)
JUNK	+	1.02	0.95	0.96	0.93
		(6.52)*	(6.32)*	(6.24)*	(6.15)*
ISIZE	+	0.07	0.06	0.03	0.04
		(3.17)*	(3.10)*	(2.40)**	(2.32)**
CALL	-	-0.31	-0.30	-0.35	-0.34
		(-3.11)*	(-3.03)*	(-2.93)*	(-2.79)*
MATU	+	0.19	0.18	0.21	0.20
		(5.14)*	(4.80)*	(4.28)*	(4.14)*
SUB	+	-0.01	-0.02	0.10	0.08
		(-0.04)	(-0.10)	(0.62)	(0.70)
COVE	-	-1.10	-0.49	-0.73	-0.72
		(-1.52)	(-1.35)	(-1.15)	(-1.14)
FSIZE	-	-0.19	-0.17	-0.18	-0.16
		(-5.63)*	(-5.05)*	(-4.46)*	(-3.41)*
BDEBT	-	-0.23	-0.47	-0.48	-0.46
		(-1.13)	(-2.34)*	(-2.13)**	(-2.03)**
DE	+	0.36	0.28	0.27	0.28
		(3.30)*	(2.71)**	(2.51)*	(2.49)**
TIMES	+	0.16	0.11	0.13	0.14
		(3.61)*	(3.07)**	(3.12)*	(2.97)*
ZSCORE	-	-0.24	-0.22	-0.19	-0.21
		(-3.15)*	(-2.99)*	(-2.56)**	(-2.48)**
BETA	+	0.23	0.19	0.11	0.11
		(3.07)*	(2.55)**	(1.61)	(1.52)
ECYC	+	0.64	0.68	0.48	0.49
		(4.08)*	(3.76)*	(3.48)*	(3.07)*
MILLS	?				0.22
					(1.90)+
EPSF	-		-0.49	-0.46	-0.41
			(-3.61)*	(-2.53)**	(-2.41)**
CPSF	-		-0.85	-0.85	-0.78
			(-4.71)*	(-4.46)*	(-4.22)*
GROWF	?		0.00	0.01	0.01
			(0.68)	(0.53)	(0.50)
Fixed effects (year)		Excluded	Excluded	Included	Included
Fixed effects (industry)		Excluded	Excluded	Included	Included

Adj.R^2	0.62	0.66	0.68	0.68
F-test		6.18	5.03	4.99
(*p*-value)		(0.00)*	(0.00)*	(0.00)*

Notes:

1) T-statistics are presented in parentheses; *, **, and + indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.
2) All t-statistics are adjusted for White (1980) heteroskedasticity. Possible non-independence among observations is adjusted by clustering on each company-year combination (Rogers, 1993).
3) F-test results refer to the test that the coefficients on the three analysts' forecasts variables are all equal to zero.

Table 4.5: Contextual Analyses

Variable	Exp. Sign	Model 1	Model 2	Model 3
Constant	?	-0.80	-1.24	-0.74
		(-0.87)	(-1.91)+	(-0.77)
RATE	+	0.11	0.12	0.11
		(6.24)*	(6.88)*	(6.90)*
SPLIT	+	-0.01	0.01	0.02
		(-0.27)	(0.34)	(0.43)
JUNK	+	0.96	0.98	0.95
		(6.70)*	(6.37)*	(5.99)*
ISIZE	+	0.06	0.05	0.06
		(2.85)*	(2.71)*	(2.82)*
CALL	-	-0.29	-0.33	-0.32
		(-3.48)*	(-3.22)*	(-3.04)*
MATU	+	0.18	0.19	0.19
		(4.86)*	(4.52)*	(4.19)*
SUB	+	0.01	-0.02	-0.03
		(0.21)	(-0.40)	(-0.42)
COVE	-	-0.64	-0.63	-0.62
		(-0.77)	(-0.80)	(-0.74)
FSIZE	-	-0.17	-0.19	-0.18
		(-5.22)*	(-5.30)*	(-5.01)*
BDEBT	-	-0.49	-0.41	-0.43
		(-1.20)	(-0.73)	(-0.85)
DE	+	0.34	0.25	0.26
		(2.44)**	(2.31)**	(2.29)**
TIMES	+	0.12	0.16	0.13
		(1.28)	(1.39)	(0.79)
ZSCORE	-	-0.18	-0.18	-0.17
		(-2.47)**	(-2.51)**	(-2.74)*
BETA	+	0.15	0.20	0.19
		(1.91)+	(2.98)*	(2.22)**
ECYC	+	0.64	0.82	0.69
		(6.29)*	(7.16)*	(7.07)*
MILLS	?	0.22	0.21	0.23
		(1.47)	(1.59)	(1.54)
EPSF	-	-0.16	-0.21	-0.48
		(-1.24)	(-1.89)+	(-2.37)**
CPSF	-	-0.20	-0.14	-0.86
		(-0.74)	(-0.57)	(-2.91)*
GROWF	?	-0.04	0.03	0.04
		(-1.47)	(1.14)	(0.92)
*AADUM*EPSF*	-	-0.48		
		(-3.08)*		
*AADUM*CPSF*	-	-0.74		
		(-3.21)*		
*AADUM*GROWF*	?	0.05		
		(1.10)		

*IADUM*EPSF*	-		-0.39	
			(-4.21)*	
*IADUM*CPSF*	-		-0.69	
			(-3.05)*	
*IADUM*GROWF*	?		-0.06	
			(-1.04)	
*USEDUM*EPSF*	-			0.04
				(0.49)
*USEDUM*CPSF*	-			-0.05
				(-0.98)
*USEDUM*GROWF*	?			-0.07
				(-0.77)
Adj.R^2		0.68	0.69	0.68
F-test1		1.28	2.24	3.19
(*p*-value)		(0.28)	(0.08)+	(0.02)**
F-test2		4.54	5.11	1.32
(*p*-value)		(0.00)*	(0.00)*	(0.27)

Notes:

1) T-statistics are presented in parentheses; *, **, and + indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.
2) All t-statistics are adjusted for White (1980) heteroscedasticity. Possible non-independence among observations is adjusted by clustering on each company-year combination (Rogers, 1993).
3) F-test1 refers to the test that the coefficients on the three analysts' forecasts variables all equal zero. F-test2 refers to the test that the coefficients on the three interaction terms all equal zero.
4) Year-fixed effects and industry-fixed effects are included.
5) AADUM: indicator variable, equal to one if Moody's bond rating is below Aa and zero otherwise.
6) IADUM: indicator variable, equal to one for the sub-sample of higher information asymmetry and zero for the sub-sample of lower information asymmetry. Information asymmetry is measured as the sum of R&D and advertising expense deflated by total assets.
7) USEDUM: indicator variable, equal to one if the proceeds of debt financing are primarily used for new project or mergers or acquisitions and zero otherwise.

Table 4.6: Ordered Logit Model for Categorical Bond Ratings

	Exp. Sign	Model 1	Model 2
ISIZE	+	0.28	0.27
		(7.93)*	(7.82)*
CALL	-	-0.20	-0.20
		(-3.38)*	(-3.32)*
MATU	+	0.07	0.13
		(0.30)	(0.61)
SUB	+	1.78	1.79
		(5.65)*	(5.56)*
CON	-	-1.10	-0.98
		(-4.47)*	(-3.85)*
COVE	-	-2.27	-2.27
		(-4.95)*	(-4.94)*
FSIZE	-	-1.76	-1.43
		(-4.91)*	(-3.77)*
DE	+	1.49	1.87
		(3.18)*	(3.06)*
BDEBT	-	-0.29	-0.24
		(-1.34)	(-1.09)
TIMES	+	0.06	0.11
		(0.76)	(1.22)
ROA	-	-0.39	-0.33
		(-4.22)*	(-4.01)*
ZSCORE	-	-1.97	-1.41
		(-3.05)*	(-2.51)**
BETA	+	0.21	0.11
		(3.59)*	(3.83)*
ANALYST	-	-0.10	-0.03
		(-2.87)*	(-2.22)**
GROW	?	0.19	0.14
		(2.96)*	(1.97)**
FAGE	-	-0.02	-0.02
		(-3.30)*	(-2.82)*
BVDUM	+	-0.45	-0.39
		(-1.52)	(-1.31)
ECYC	+	0.33	0.33
		(1.89)+	(1.89)+
MILLS	?	-2.42	-1.59
		(-2.78)*	(-1.71)+
EPSF	-		-1.08
			(-3.48)*
CPSF	-		-2.03
			(-2.63)*
GROWF	?		1.79
			(1.14)
Pseudo R^2		0.46	0.52

Notes:

1) The dependent variable is the Moody's bond ratings on a cardinal scale (*MOODY*). This ordered logit model is estimated to obtain continuous measures of default risk.
2) T-statistics are presented in parentheses; *, **, and + indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.
3) Year-fixed effects and industry-fixed effects are included.

Table 4.7: Comparison of Continuous Default Risks and Categorical Bond Ratings

Panel A: Correlation Matrix

	RATE	*PRATE1*	*PRATE2*	*PREMIUM*
RATE	1.00			
PRATE1	0.89	1.00		
PRATE2	0.93	0.92	1.00	
PREMIUM	0.57	0.69	0.71	1.00

Note:

1) *PRATE1* is the predicted default risk measure from Model 1 in Table 4.6, and *PRATE2* is the predicted default risk measure from Model 2 in Table 4.6. Specifically, I calculate *PRATE1* and *PRATE2* as below:

$$PRATE\,1 = \sum_{n=1}^{22} \hat{p}_1(RATE = n) * n$$

$$PRATE\,2 = \sum_{n=1}^{22} \hat{p}_2(RATE = n) * n \text{ , where } n=1, 2, \ldots\ldots\ldots\ldots, 22$$

Panel B: Descriptive Statistics

	Min	Mean	Median	Max	SD
RATE	1.00	6.84	7.00	16.00	3.47
PRATE1	1.00	6.82	7.16	15.89	3.09
PRATE2	1.00	6.83	7.17	15.84	3.31
DIFF1	-5.94	-0.02	0.07	3.05	1.56
DIFF2	-5.10	-0.02	0.06	2.99	1.54
ABSDIFF1	0.001	1.18	0.92	5.94	0.97
ABSDIFF2	0.001	1.16	0.90	5.10	0.91

Note:
1) *DIFF1=PRATE1-RATE*
2) *DIFF2=PRATE2-RATE*
3) *ABSDIFF1=|DIFF1|*
4) *ABSDIFF2=|DIFF2|*

Panel C: Comparison of Explanatory Power

	Exp. Sign	Model 1	Model 2	Model 3	Model 4
Constant	?	1.47	1.16	0.91	-0.17
		(0.81)	(0.86)	(0.95)	(-0.33)
RATE	+			0.04	0.01
				(1.18)	(1.28)
PRATE1	+	0.15		0.14	
		(5.44)*		(5.27)*	
PRATE2	+		0.16		0.18
			(6.91)*		(6.21)*
SPLIT	+	0.01	0.01	0.01	0.02
		(0.24)	(0.27)	(0.34)	(0.35)
JUNK	+	0.89	0.92	0.91	0.92
		(3.86)*	(3.47)*	(3.77)*	(3.20)*
ISIZE	+	0.04	0.05	0.06	0.07
		(2.91)*	(2.18)**	(2.17)**	(2.05)**
CALL	-	-0.28	-0.27	-0.30	-0.31
		(-2.79)*	(-2.85)*	(-2.71)*	(-2.80)*
MATU	+	0.17	0.18	0.17	0.18
		(3.90)*	(4.10)*	(3.23)*	(3.78)*
SUB	+	0.23	0.24	0.23	0.22
		(1.11)	(1.14)	(1.07)	(1.07)
COVE	-	-0.49	-0.52	-0.50	-0.54
		(-1.91)+	(-1.88)+	(-1.74)+	(-1.80)+
FSIZE	-	-0.20	-0.21	-0.22	-0.23
		(-2.63)*	(-2.84)*	(-2.43)**	(-2.29)**
BDEBT	-	-0.02	-0.04	-0.03	-0.02
		(-0.11)	(-0.20)	(-0.04)	(-0.06)
DE	+	0.19	0.18	0.20	0.22
		(1.48)	(1.33)	(1.22)	(1.16)
TIMES	+	0.14	0.15	0.14	0.13
		(1.44)	(1.32)	(1.05)	(1.24)
ZSCORE	-	-0.16	-0.17	-0.08	-0.07
		(-1.17)	(-1.09)	(-1.01)	(-0.99)
BETA	+	0.14	0.14	0.17	0.16
		(2.42)**	(2.38)**	(2.14)**	(2.19)**
ECYC	+	0.66	0.67	0.66	0.68
		(4.07)*	(4.11)*	(3.75)*	(3.74)*
MILLS	?	0.14	0.15	0.14	0.13
		(1.76)+	(1.89)+	(1.33)	(1.27)
EPSF	-	-0.43	-0.14	-0.38	-0.08
		(-4.12)*	(-0.76)	(-3.82)*	(-0.24)
CPSF	-	-0.70	-0.36	-0.79	-0.21
		(-2.95)*	(-1.14)	(-2.63)*	(-1.01)
GROWF	?	0.01	0.00	0.00	0.01
		(0.37)	(0.45)	(0.10)	(0.18)
Adj.R^2		0.72	0.74	0.71	0.74
F-test		4.81	0.69	4.26	0.87
(p-value)		(0.00)*	(0.56)	(0.01)*	(0.46)

Notes:

1) T-statistics are presented in parentheses; *, **, + indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.
2) All t-statistics are adjusted for White (1980) heteroscedasticity. Possible non-independence among observations is adjusted by clustering on each company-year combination (Rogers, 1993).
3) The F-test refers to the test that the coefficients on the three analysts' forecasts variables all equal zero.
4) Year-fixed effects and industry-fixed effects are included.

Appendix 4.1: Transformation of Credit Ratings

Explanation	S&P's	Moody's	Cardinal Scale
Investment Grade	AAA	Aaa	1
	AA(+,none,-)	Aa(1,2,3)	2,3,4
	A(+,none,-)	A (1,2,3)	5,6,7
	BBB(+,none,-)	Baa(1,2,3)	8,9,10
Speculative Grade	BB(+,none,-)	Ba (1,2,3)	11,12,13
	B(+,none,-)	B(1,2,3)	14,15,16
	CCC(+,none,-)	Caa(1,2,3)	17,18,19
	CC	Ca	20
	C	C	21
	D		22

Chapter 5
Conclusions

This thesis investigates the impact of pension accounting standard, auditor independence, and analysts' forecasts on the allocation of corporate pension assets to bonds and the pricing of corporate bonds. Chapter 1 outlines the research motivation. Chapter 2 examines whether the new pension accounting standard FRS 17 in the UK affects corporate pension assets allocated to bonds. Chapter 3 investigates whether greater auditor independence leads to greater accounting conservatism and thus reduced cost of borrowing. Chapter 4 examines the effects of analysts' forecasts on the pricing of corporate bonds given that categorical public ratings provide incomplete indication of default risks.

The results show that UK companies shifted pension assets from equities to bonds during the transitional period of FRS 17, although in the same period US companies exhibited a slightly decreasing allocation to bonds. The results also indicate that higher external auditor independence is associated with greater conditional conservatism and thus reduced cost of borrowing. I also find that earnings forecast and cash flow forecast are significantly and negatively associated with the bond yield premium after controlling for categorical bond ratings and fundamental financial ratios. Moreover, such association is stronger when the perceived default risk or information asymmetry is higher.

I conclude that since the valuation and disclosure of pension asset and liabilities matter to the financial statement users in the presence of information asymmetry and high information processing cost, management care about the volatility introduced by the new pension accounting standard. The contracting cost of full recognition further motivates UK firms to find ways to deal with such volatility, including the switch to a more conservative portfolio in managing pension fund.

The findings in Chapter 3 suggest that in the presence of litigation risk and reputation concerns, independent auditors lead to greater accounting conservatism relative to dependent auditors. Since conservatism mitigates the wealth transfer from debt-holders to equity holders, companies with independent auditors and greater accounting conservatism enjoy a lower cost of borrowing. The findings in Chapter 4 imply that bond investors extract relevant information from analysts' forecasts to assess default risk over and above the categorical bond ratings in pricing corporate bonds. This study adds to the literature by suggesting that analysts' forecasts are value relevant to not only equity market participants but also bond market participants.

Overall, given the limited bond-market-based studies, the thesis contributes to the literature by providing empirical evidence about the impact of important market functions, such as accounting policy makers, auditors, and financial analysts, on the pricing of corporate bonds and the capital flow to the bond market.

Nevertheless, the bond pricing studies have been based on at-issue primary bond market data. The impact of those market functions on the long-run performance of bond issuance awaits future research. Furthermore, the empirical evidence on the impact of pension accounting standard on corporate pension assets is conducted in the UK context, it would be interesting to know how other European countries have responded to the revised international pension accounting standard IAS 19. Finally, it is also possible that companies have responded to the new pension accounting standard in other manners than shifting pension assets from equities to bonds. For example, companies may close defined benefit plans to new entrants and switch to defined contribution plans. These issues await future research.

References

Chapter 1: Introduction

Ahmed, A.S., B.K. Billings, R.M. Morton, and M. Stanford-Harris. 2002. The Role of Accounting Conservatism in Mitigating Bondholder-Shareholder Conflicts over Dividend Policy and in Reducing Debt Costs. *The Accounting Review* 77: 867-890.

Anderson, S., R. Beard, and J. Born. 1994. *Initial Public Offerings: Findings and Theories*. Kluwer Academic Publishers: Boston.

Basu, S. 1997. The Conservatism Principle and Asymmetric Timeliness of Earnings. *Journal of Accounting and Economics* 24, 3-37.

Datta, S., M. Iskandar-Datta, and A. Patel. 1999. Bank Monitoring and the Pricing of Corporate Public Debt. *Journal of Financial Economics* 51, 435-449.

Fabozzi, F.J. 2000. *The Handbook of Fixed-Income Securities*. McGraw-Hall: New York.

Khurana, I.K., and K.K. Raman. 2003. Are Fundamentals Priced in the Bond Market? *Contemporary Accounting Research* 20, 465-494.

Mansi, S.A., W.F. Maxwell, and D.P. Miller. 2004. Does Auditor Quality and Tenure Matter to Investors? Evidence from the Bond Market. *Journal of Accounting Research* 42, 755-793.

Mishkin, F. 1998. *Financial Markets and Institutions*. Addison-Wesley: Reading.

Pittman, J.A., and S. Fortin. 2004. Auditor Choice and the Cost of Debt Capital for Newly Public Firms. *Journal of Accounting and Economics* 37, 113-136.

Sengupta, P. 1998. Corporate Disclosure Quality and the Cost of Debt. *The Accounting Review* 73, 459-474.

Shi, C. 2003. On the Trade-off between the Future Benefits and Riskiness of R&D: a Bondholders' Perspective. *Journal of Accounting and Economics* 35, 227-254.

Watts, R.L. 2002. Conservatism in Accounting. Working paper, University of Rochester, Simon School (December).

Ziebart, D.A., and S. Reiter. 1992. Bond Ratings, Bond Yields and Financial Information. *Contemporary Accounting Research* 9, 252-282.

Chapter 2: The Effect of Pension Accounting on Corporate Pension Asset Allocation: A Comparative Study of UK and US

Aboody, D. 1996. Recognition versus Disclosure in the Oil and Gas Industry. *Journal of Accounting Research* 34, 21-32.

Accounting Standards Board (ASB). 1999. *Financial Reporting Exposure Draft (FRED) No. 20, Accounting for Retirement Benefits*. London: ASB.

Accounting Standards Board (ASB). 2000. ASB Issues Financial Reporting Standard FRS 17 'Retirement Benefits'. Newsletter, London: ASB.

Accounting Standards Board (ASB). 2000. *Financial Reporting Standards (FRS) No. 17, Retirement Benefits*. London: ASB.

Accounting Standards Committee (ASC). 1988. *Statements of Standard Accounting Practice (SSAP) No. 24, Accounting for the Cost of Pensions*. London: ASC.

Akerlof, G.A. 1970. The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics* 84, 488-500.

Amir, E., and S. Benartzi. 1998. The Expected Rate of Return on Pension Funds and Asset Allocation as Predictors of Portfolio Performance. *The Accounting Review* 73, 335-352.

Amir, E., and S. Benartzi. 1999. Accounting Recognition and the Determinants of Pension Asset Allocation. *Journal of Accounting, Auditing and Finance* 14, 321-343.

Bader, L. N. 1991. *The Financial Executive's Guide to Pension Plans*. New York: Salomon Brothers, Inc.

Balsam, S., E. Bartov, and J. Yin. 2006. Disclosure versus Recognition of Option Expense: An Empirical Investigation of SFAS No. 148 and Stock Returns. Working Paper, Temple University.

Barth, M.E. 1991. Relative Measurement Errors among Alternative Pension Asset and Liability Measures. *The Accounting Review* 66, 433-463.

Barth, M.E., W.H. Beaver, and W.R. Landsman. 2001. The Relevance of the Value-Relevance Literature for Financial Accounting Standard Setting: Another View. *Journal of Accounting and Economics* 31, 77-104.

Black, F. 1980. The Tax Consequences of Long-run Pension Policy. *Financial Analysts Journal* 36, 25-31.

Blake, D. 2001. UK Pension Fund Management: How is Asset Allocation Influenced by the Valuation of Liabilities. *The Pension Institute* Discussion Paper PI-0104.

Bodie, Z. , J.O. Light, R. Morck, and R.A. Taggart. 1984. Funding and Asset Allocation in Corporate Pension Plans: An Empirical Investigation. NBER Working Paper No. 1315.

Brewsterin, D. 2005. US Pension Accounting Shift "would Hit Equities". *Financial Times*, November 21.

Burr, B.B. 2005. FASB Pension Accounting Reform Expected to Have a Big Impact. *Pensions & Investments Daily*, November 14.

Cameron, A.C., J.B. Gelbach, and D.L. Miller. 2006. Robust Inference with Multi-way Clustering. Working Paper, University of California-Davis.

Daley, L. 1984. The Valuation of Reported Pension Measures for Firms Sponsoring Defined Benefit plans. *The Accounting Review* 59, 177-198.

Davis-Friday, P.Y., C.S. Liu, and H.F. Mittelstaedt. Recognition and Disclosure Reliability: Evidence from SFAS No. 106. *Contemporary Accounting Research* 21, 399-429.

Espahbodi, H., P. Espahbodi, Z. Rezaee, and H. Tehranian. 2002. Stock Price Reaction and Value Relevance of Recognition versus Disclosure: the Case of Stock-based Compensation. *Journal of Accounting and Economics* 33, 343-373.

Financial Accounting Standards Board (FASB). 1985. *Statements of Financial Accounting Standards (SFAS) No. 87, Employers' Accounting for Pensions.* Connecticut: FASB.

Feldstein, M., and S. Seligman. 1981. Pension Funding, Share Prices and National Saving. *Journal of Finance* 36, 801-824.

Fernandes, F. 2002. There is No Escape from FRS 17. *The Treasurer*, March 2002, 29-30.

Friedman, B.M. 1983. Pension Funding, Pension Asset Allocation, and Corporate Finance: Evidence from Individual Company Data. *Financial Aspects of the United States Pension System,* University of Chicago Press: Chicago.

Harrison, J.M., and W.F. Sharpe. 1983. Optimal Funding and Asset Allocation Rules for Defined Benefit Pension Plans. *Financial Aspects of the United States Pension System*, University of Chicago Press: Chicago.

Healy, P.M., and K.G., Palepu. 2001. Information Asymmetry, Corporate Disclosure, and the Capital Markets: a Review of the Empirical Disclosure Literature. *Journal of Accounting and Economics* 31, 405-440.

Heckman, J. 1979. Sample Selection Bias as a Specification Error. *Econometrica* 47, 153-161.

International Accounting Standards Board (IASB). *International Accounting Standards (IAS) No. 19, Employee Benefits.* London: IASB.

Landsman, W. 1986. An Empirical Investigation of Pension Fund Property Rights. *The Accounting Review* 61, 662-691.

McLeish, N. 2001. Boots Pension Fund Switch Boosts Sterling Capital Markets. *EuroWeek*, November 2.

Petersen, M.A. 2006. Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. Working paper, Northwestern University.

Ralfe, J. 2001. Making the Switch to Bonds. *The Treasurer*, December 2001, 20-23.

Reynolds, B. 2002. FTSE 100 Pension Funds are £25 Billion in Deficit, Leading Actuary Condemns Continued Confusion from FRS 17 Volatility. *Accountancy*, August 5.

Securities and Exchange Commission (SEC). 2005. Beginners' Guide to Asset Allocation, Diversification and Rebalancing. SEC website.

Seib, C. 2006. London Leads Europe in Hedge Fund Investment. *Times Online*, August 1.

Tepper, I. 1981. Taxation and Corporate Pension Policy. *Journal of Finance* 36, 1-14.

Thompson, S. 2006. Simple Formulas for Standard Errors that Cluster by Both Firm and Time. Working Paper, Harvard University.

Wood, A., and J. Tyerman. 2005. Further Pensions Headache for Business. Corporate Finance Supplement of *The Birmingham Post*, September.

Chapter 3: Auditor Independence, Conditional Conservatism, and the Cost of Public Debt

Ahmed, A.S., B.K. Billings, R.M. Morton, and M. Stanford-Harris. 2002. The Role of Accounting Conservatism in Mitigating Bondholder-Shareholder Conflicts over Dividend Policy and in Reducing Debt Costs. *The Accounting Review* 77: 867-890.

Ashbaugh, H., R. LaFond, and B.W. Mayhew. 2003. Do Non-audit Services Compromise Auditor Independence? Further Evidence. *The Accounting Review* 78, 611-639.

Ball, R., A. Robin and G. Sadka. 2006. Is Financial Reporting Shaped by Debt Markets or by Equity Markets? An International Study of Timeliness and Conservatism. Working paper, University of Chicago (September).

Balvers, R. J., B. McDonald, and R. E. Miller. 1988. Under-pricing of New Issues and the Choice of Auditor as a Signal of Investment Banker Reputation. *The Accounting Review* 63, 605-622.

Basu, S. 1997. The Conservatism Principle and Asymmetric Timeliness of Earnings. *Journal of Accounting and Economics* 24, 3-37.

Beatty, A., J. Weber, and J. Yu. 2006. Conservatism and Debt. Working Paper. MIT.

Black, F. 1976. The Dividend Puzzle. *Journal of Portfolio Management* 2, 5-8.

Brandon, D. M., A. D. Crabtree, and J. J. Maher. 2004. Non-Audit Fees, Auditor Independence, and Bond Ratings. *Auditing: A Journal of Practice and Theory* 23, 89-103.

Brown, P.R., J.A. Calderon, and B. Lev, 2000. Administrative and Judicial Approaches to Auditor Independence. *Seton Hall Review* 30, 101-120.

Carcello, J.V. and T.L. Neal. 2000. Audit Committee Composition and Auditor Reporting. *The Accounting Review* 75, 453-467.

Carey, M., S. Prowse, J. Rea, and G. Udell. 1993. The Economics of Private Placements: A New Look. *Financial Markets Institutions and Instruments* 2, 1-66.

Datta, S., M. Iskandar-Datta, and A. Patel. 1999. Bank Monitoring and the Pricing of Corporate Public Debt. *Journal of Financial Economics* 51, 435-449.

DeFond, M and J. Jiambalvo. 1994. Debt Covenant Violation and Manipulation of Accruals. *Journal of Accounting and Economics* 17, 145-176.

Dopuch, N., R.R., King and R., Schwartz. 2003. Independence in Appearance and in Fact: An Experimental Investigation. *Contemporary Accounting Research* 20, 79-114.

Fama E.F., and M. Miller. 1972. *The Theory of Finance*, Holt, Rinehart and Winston, New York.

Frankel., R., M. Johnson, and K. Nelson. 2002. The Relation between Auditors' Fees for Non-Audit Services and Earnings Management. *The Accounting Review* 77 (Supplement), 71-105.

Griffin, P.A., and D.H. Lont. 2005. An Analysis of Audit Fees Following the Passage of Sarbanes-Oxley. Working paper, University of California, Davis.

Gwilliam., D. 2005. Auditor Independence. *The Blackwell Encyclopedia of Management* 1, 66-70.

Jensen, M., and W. Meckling. 1976. Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure. *Journal of Financial Economics* 3, 305-360.

Kinney, W. R., Z. Palmrose, and S. Scholz. 2004. Auditor Independence, Non-Audit Services, and Restatements: Was the U.S. Government Right? *Journal of Accounting Research* 42, 561-588.

LaFond, R, and R. L. Watts. 2006. The Information Role of Conservative Financial Statements. Working Paper, MIT.

Lang, M. 1991. Time-Varying Stock Price Response to Earnings Induced by Uncertainty about the Time Series Process of Earnings. *Journal of Accounting Research* 29, 229-257.

Larcker, D., and S. Richardson. 2004. Fees Paid to Audit Firms, Accrual Choices and Corporate Governance. *Journal of Accounting Research* 42, 625-658.

Lennox, C. 2000. Do Companies Successfully Engage in Opinion Shopping? Evidence from the UK. *Journal of Accounting and Economics* 29, 321-339.

Levitt, A. 2000. Renewing the Covenants with Investors. Speech at the New York University Center or Law and Business, New York, May 10.

Mansi, S.A., W.F. Maxwell, and D.P. Miller. 2004. Does Auditor Quality and Tenure Matter to Investors? Evidence from the Bond Market. *Journal of Accounting Research* 42, 755-793.

Mansi, S.A., and D. Reeb. 2002. Corporate Diversification: What Gets Discounted? *Journal of Finance* 57, 2167-2183.

Mayhew, B.W., and J.E. Pike. 2004. Does Investor Selection of Auditors Enhance Auditor Independence? *The Accounting Review* 79, 797-822.

Myers, S.C. 1977. Determinants of Corporate Borrowing. *Journal of Financial Economics* 5, 147-175.

Morgan, D. 2002. Rating Banks: Risk and Uncertainty in An Opaque Industry. *American Economic Review* 92, 874-888.

Ohlson, J.A.1980. Financial Ratios and the Probabilistic Prediction of Bankruptcy. *Journal of Accounting Research* 18, 109-131.

Petersen, M.A. 2006. Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. Working paper, Northwestern University.

Pittman, J.A., and S. Fortin. 2004. Auditor Choice and the Cost of Debt Capital for Newly Public Firms. *Journal of Accounting and Economics* 37, 113-136.

Raghunandan, K., W. Read, and S. Whisenant. 2003. Initial Evidence on the Association between Non-Audit Fees and Restated Financial Statement. *Accounting Horizons* 17, 223-234.

Reiter, S.A. 1991. Pension Obligation and the Determination of Bond Risk Premiums: Evidence from the Electric Industry. *Journal of Business Finance and Accounting* 18, 833-859.

Roychowdhury, S., and R. Watts. 2004. Asymmetric Timeliness of Earnings, Market-to-Book and Conservatism in Financial Reporting. Working Paper, MIT.

Sengupta, P. 1998. Corporate Disclosure Quality and the Cost of Debt. *The Accounting Review* 73, 459-474.

Shi, C. 2003. On the Trade-off between the Future Benefits and Riskiness of R&D: A Bondholders' Perspective. *Journal of Accounting and Economics* 35, 227-254.

Simunic, D. A. 1984. Auditing, Consulting, and Auditor Independence. *Journal of Accounting Research* 22, 679-702.

Smith C. W., and J. B. Warner. 1979. On Financial Contracting: An Analysis of Bond Covenants. *Journal of Financial Economics* 7, 117-161.

Watts, R.L. 2002. Conservatism in Accounting. Working paper, University of Rochester, Simon School (December).

Ziebart, D.A., and S.A. Reiter. 1992. Bond Ratings, Bond Yields and Financial Information. *Contemporary Accounting Research* 9, 252-282.

Chapter 4: Continuous Default Risks versus Categorical Bond Ratings: The Effects of Analysts' Forecasts on Bond Pricing

Altman, E. I. 1968. Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy. *The Journal of Finance* 4, 589-609.

Amir, E., B. Lev, and T. Sougiannis. 2003. Do Financial Analysts Get Intangibles? *European Accounting Review* 12, 635-659.

Barron, O.E., D. Byard, C. Kile, and E.J. Riedl. 2002. High-technology Intangibles and Analysts' Forecasts. *Journal of Accounting Research* 40, 289-312.

Barth, M.E., R. Kasznik, and M.F. McNichols. 2001. Analyst Coverage and Intangible Assets. *Journal of Accounting Research* 39, 1-34.

Bhushan, R. 1989. Firm Characteristics and Analyst Following. *Journal of Accounting and Economics* 11, 255-274.

Brown, L.D., and D.M. Chen. 1990. Composite Analyst Earnings Forecast: the Next Generation. *The Journal of Business Forecasting Methods & Systems* 9, 11-37.

Brown, L.D., and M.S. Rozeff. 1978. The Superiority of Analysts Forecasts as Measure of Expectations: Evidence from Earnings. *Journal of Finance* 33, 1-24.

Carey, M., S. Prowse, J. Rea, and G. Udell. 1993. The Economics of Private Placements: a New Look. *Financial Markets Institutions and Instruments* 2, 1-66.

Das, S., C.B. Levine, and K. Sivaramakrishnan. 1998. Earnings Predictability and Bias in Analysts' Earnings Forecasts. *The Accounting Review* 73, 277-294.

Datta, S., M. Iskandar-Datta, and A. Patel. 1999. Bank Monitoring and the Pricing of Corporate Public Debt. *Journal of Financial Economics* 51, 435-449.

DeFond, M.L., and M. Hung. 2003. An Empirical Analysis of Analysts' Cash Flow Forecasts. *Journal of Accounting and Economics* 35, 73-100.

Fisher, L. 1959. Determinants of Risk Premiums on Corporate Bonds. *The Journal of Political Economy* 67, 217-237.

Graves, J.A., C. M. Callahan, and N. Chipalkatti. 2002. Earnings Predictability, Information Asymmetry and Market Liquidity. *Journal of Accounting Research* 40, 561-583.

Heckman, J. 1979. Sample Selection Bias as a Specification Error. *Econometrica* 47, 153-161.

Khurana, I.K., and K.K. Raman. 2003. Are Fundamentals Priced in the Bond Market? *Contemporary Accounting Research* 20, 465-494.

Mansi, S.A., W.F. Maxwell, and D.P. Miller. 2004. Does Auditor Quality and Tenure Matter to Investors? Evidence from the Bond Market. *Journal of Accounting Research* 42, 755-793

Mansi, S.A., and D. Reeb. 2002. Corporate Diversification: What Gets Discounted? *Journal of Finance* 57, 2167-2183.

Mishkin, F. 1998. *Financial Markets and Institutions*. Addison-Wesley.

Moody's KMV. 2004. Accurate Ratings Begin with Consistent Data Collection and Sound Analysis. *Risk Analyst* 3.0.

Morgan, D. 2002. Rating Banks: Risk and Uncertainty in An Opaque Industry. *American Economic Review* 92, 874-888.

Reiter, S. 1991. Pension Obligation and the Determination of Bond Risk Premiums: Evidence from Electric Industry. *Journal of Business Finance and Accounting* 18, 833-859.

Rogers, W.H. 1993. Regression Standard Errors in the Clustered Samples. *Stata Technical Bulletin* 3, 88-94.

Sengupta, P. 1998. Corporate Disclosure Quality and the Cost of Debt. *The Accounting Review* 73, 459-474.

Schipper, K. 1991. Analysts' Forecasts. *Accounting Horizons* 5, 105-119.

Shi, C. 2003. On the Trade-off between the Future Benefits and Riskiness of R&D: a Bondholders' Perspective. *Journal of Accounting and Economics* 35, 227-254.

The Bond Market Association. 2002. SEC Hearing on Credit Rating Agencies. The Bond Market Association.

White, H. 1980b. A Heteroscedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroscedasticity. *Econometrica* 48, 817-838.

Ziebart, D., and S. Reiter. 1992. Bond Rating, Bond Yields and Financial Information. *Contemporary Accounting Research* 9, 252-282.