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The risk-relevance of securitizations during the recent financial crisis

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ABSTRACT

We investigate the changing risk-relevance of securitized subprime, other non-conforming, and commercial mortgages for sponsor-originators (S-Os) during the recent financial crisis. Using volatility of realized stock returns, option-implied volatility, and credit spreads, we observe a pronounced increase in the risk-relevance for subprime securitizations as early as 2006. Furthermore, reflecting the evolution of the financial crisis in waves, we find that investors recognized the increased credit riskiness of other non-conforming and commercial mortgage securitizations as the financial crisis progressed. Additional analyses show that the risk-relevance results vary cross-sectionally with issue characteristics such as monoline credit-enhancement and the existence of special servicers or B-piece buyers. Our results potentially inform current debates on the opacity of securitization structures, and highlight that the evaluation of risk-relevance of securitized assets should take into account heterogeneity in collateral and structure characteristics, both cross-sectionally and inter-temporally.

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THE RISK RELEVANCE OF SECURITIZATIONS DURING THE RECENT FINANCIAL CRISIS

1. INTRODUCTION

The decade leading up to the recent financial crisis witnessed a rapid growth in asset securitization volumes.[1] Securitization is used by firms to, *inter alia*, transfer credit risk of assets such as mortgages and credit card loans off their balance sheet. However, observers such as Gorton and Souleles (2005) have argued that the securitizers (often referred to as sponsor-originators or S-Os) continue to partly retain the credit risks of securitized assets through retained on-balance sheet interests, explicit contractual agreements, as well as implicit moral recourse.[2]

We investigate the changing risk-relevance of securitized subprime, other non-conforming (Alt-A residential mortgages, loans with high loan-to-value ratios, etc., which we refer to as "other non-conforming") and commercial mortgages, as the financial crisis unfolded, from the point of view of equity and bond investors of sponsor-originators. Consistent with prior literature on risk-relevance of off-balance sheet positions (e.g., Bowman 1980, Dhaliwal 1986, Niu and Richardson 2006, Chen, Liu, and Ryan 2008, and Barth, Ormazabal, and Taylor 2011), we consider securitized assets to be risk-relevant if they are associated with the equity or credit risk of securitizing firms (see also Ryan 2012).[3] We build upon the insights in Chen et al. (2008) and Barth et al. (2011) that the level of credit risk of securitized assets retained by S-Os varies by

[1] For an indication of securitization volumes, see data on US ABS Issuance and Outstanding, compiled by the "Securities Industry and Financial Markets Association (SIFMA)". SIFMA has made this data available at: http://www.sifma.org/research/statistics.aspx

[2] Consistent with these risk-retention arguments, the empirical literature in accounting and finance (e.g., Niu and Richardson 2006, Chen, Liu, and Ryan 2008, Barth, Ormazabal, and Taylor 2011, Dionne and Harchaoui 2003, and Hänsel and Krahnen 2007) has documented that securitized assets are, to varying degrees, relevant to the risk assessment of S-Os by their equity and bond investors.

[3] Specifically, we test whether the equity and/or credit risk of the S-Os is explained by the extent of securitized mortgage assets' credit risk retained by the S-Os.

the type of assets that constitute the collateral and is related to (a) the riskiness of the underlying securitized assets, and (b) specific structural features of the securitization entities (such as credit enhancement and implicit recourse), which determine the level of risk-retention. We extend this literature by examining whether the risk-relevance for a *given level* and *type* of securitized asset changes inter-temporally with changes in the credit riskiness (i.e., the riskiness of cash flows generated by the assets) of the underlying asset class. In our setting, the riskiest type of collateral is subprime mortgage collateral. Prior studies such as Chen et al. (2008) were not able to obtain data on subprime securitizations, and their analysis preceded the financial crisis. Our study is one of the first to examine changing risk-relevance for subprime securitizations as the subprime crisis approached and progressed.

Our identification strategy takes advantage of a unique research setting provided by the recent financial crisis. Observers such as Ryan (2008) and Gorton (2009) have argued that the financial crisis evolved in waves, with the credit riskiness of certain asset classes such as subprime mortgages spiking up before other mortgage classes such as Alt-A and commercial mortgages. Steep declines and increased volatility in the price levels of publicly observable benchmarks such as the ABX index confirmed that investors were aware of the increasing credit risk of subprime mortgage markets by late 2006 / early 2007. Thus, we explore whether the equity and bond investors of S-Os recognized the changing riskiness of securitizations of subprime and other risky mortgages, as the financial crisis evolved.

We infer risk-relevance by examining the association between observed measures of firm risk (volatility of realized stock returns, option-implied volatility, and credit spreads), and mortgage securitization levels. We observe a pronounced increase in risk-relevance for subprime securitizations in 2006. Thus, by as early as 2006, equity and bond investors of sponsor-

originators recognized the increasing credit riskiness of the subprime mortgage collateral, and the retention of that increased credit risk by S-Os. This is consistent with the observation in Ryan (2008, page 1619) that problems with subprime mortgages were apparent to market participants by the middle of 2006. Further, we find that equity and bond investors recognized the increased riskiness of other non-conforming and commercial mortgage securitizations in 2007 and 2008, respectively, as the riskiness of the underlying asset classes became apparent later on during the crisis. Our results reflect that the crisis evolved in waves (see for example, Ryan 2008), with the riskiness of asset classes such as other non-conforming and commercial mortgages becoming apparent later than asset classes such as subprime mortgages.

In additional analyses involving the equity risk of securitizing firms, we show that the risk-relevance results vary in cross-section with issue characteristics such as monoline credit-enhancement and the existence of a special servicer for commercial mortgage securitizations. Our results indicate that the risk-relevance of securitizations depends not only on collateral credit riskiness, but also on the structure of the securitization entity which determines the level of risk-retention by the S-O.

Our study is related to the intense and still ongoing debate on asset securitizations and the recent crisis. In particular, the extent to which the riskiness of mortgage securitizations was assessable by market participants has been an actively debated topic during and after the crisis. Observers (e.g., Gorton 2009) have argued that mortgage securitizations, which often resulted in an off-balance-sheet treatment for the securitized assets, were responsible for exacerbating the effects of the recent financial crisis. The general tenor of this claim is that financial institutions created and spread risk in an opaque manner through the proliferation of off-balance-sheet entities.

The Financial Accounting Standards Board (FASB) has responded to calls for increased transparency (e.g., Ryan 2008; Gorton 2009) by, among other initiatives, promulgating two new sets of accounting guidelines to improve the financial reporting and accounting treatment for off-balance-sheet entities — SFAS 166 and SFAS 167. These guidelines effectively "killed the Q", or eliminated the off-balance-sheet (hereafter, OBS) treatment accorded to Qualified Special Purpose Entities (QSPEs). Our research evidence on the risk-relevance of subprime securitizations as far back as 2006 corroborates this move by FASB, at least as far as subprime securitizations were concerned.

In addition to accounting standard setting, our results have regulatory policy implications. The Dodd-Frank Wall Street Reform Act of 2010 requires Federal banking agencies to promulgate rules that mandate, with some exceptions, credit-risk retention of assets securitized by sponsors/originators. However, the statute offers some flexibility which has been supported by observers such as the Board of Governors of the Federal Reserve System (2010). These observers have questioned the merits of an overarching mandatory risk-retention requirement, arguing that there is considerable heterogeneity among asset classes underlying the securitization structures, and that any mandatory risk-retention requirement be tailored to each major class of securitized assets. Our results indicate cross-sectional and inter-temporal heterogeneity in risk-retention between securitized asset classes such as subprime, other non-conforming, and commercial mortgages, and thus inform the debate surrounding the enactment of this law.

Our study also complements a recent paper by Amiram, Landsman, Peasnell, and Shakespeare (2011). Using value relevance tests, they report results consistent with equity investors valuing S-O equities as if the S-Os exercised their default option, rather than the MBS investors exercising the put option implied by moral recourse. Our study differs from Amiram et

al. (2011) in several aspects. First, Amiram et al. (2011) report on-average results, across all types of collateral. Their evidence may not extend to the specific types of credit-risky mortgage collateral that we examine. In particular, the Y-9C data used by them likely includes prime mortgages guaranteed by government-sponsored entities. These guarantees performed well during the crisis due to U.S. government backing. Opacity problems regarding collateral quality were especially severe for subprime and other non-conforming mortgages. As some recent lawsuits (for example, Bank of America's proposed $8.5 billion settlement with various securitization parties including investors)[4] have shown, the increase in risk relevance could be driven not only by moral recourse but also by the so called "put back" claims based on representations and warranties about underlying asset quality by the S-Os.

Our findings are intuitive, but not tautological. On the contrary, our results may be somewhat surprising in that investors were able to incorporate the credit riskiness of securitized mortgage assets into their risk assessments with the generally poor disclosure environment that preceded the SFAS 166/167 disclosure requirements. Ryan (2008) notes the general opacity that characterized subprime securitization disclosures in the pre-SFAS 166/167 era, and calls for research evidence on "whether and how firms' economic leverage and risk arising from off-balance-sheet subprime positions and on-balance sheet but concentrated-risk subprime positions are assessable from their financial reports and other publicly available information." We use the Asset-Backed Alert's database of securitization issues done between 1995 and 2009. This database has been available for purchase by market observers during our sample period. Data from this and similar databases were in the public domain, and investors were free to calculate cumulative securitizations by sponsor-originators much as we do. Our results imply that

[4] http://newsandinsight.thomsonreuters.com/Legal/News/2011/09_-_September/Banks_beware__Time_is_ripe_for_MBS_breach-of-contract_suits/

investors were, at least to some extent, able to decipher deteriorating housing prices, average interest rate reset propensities, and likely defaults, and incorporate the risk-relevance of all this in equity and debt pricing for the S-Os.[5, 6]

The remainder of our study consists of the following sections. Section 2 reviews the relevant literature and develops the hypotheses; Section 3 describes the empirical models and methodology; Section 4 describes the data and sample; Section 5 discusses the empirical results; Section 6 concludes.

2. BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1. Background on Basic Structural Features of Mortgage Securitizations

Figure 1 describes a basic securitization structure. To keep the discussion brief, we describe subprime mortgage securitizations only, although the arguments apply more generally to other types of collateral. The term subprime refers to home mortgages with low credit (FICO) scores, typically 620 or less (see Hull 2009) and low down payments. Figure 1 illustrates a commonly observed securitization structure where the lender (the originator of the loans) is also the sponsor of the securitization entity (hence the term "sponsor-originator" or "S-O"). The S-O originates the mortgage loans with or without the help of a mortgage broker. To securitize the mortgage loans, the S-O creates a trust which becomes the owner of the loans. The trust is referred to as a Special Purpose Entity (or SPE) and is a bankruptcy-remote passive structure created with the purpose of holding the securitized assets and conveying cash flows to and from the various concerned parties. The loans in the trust could be combined with loans from other sponsor-originators to achieve the benefits of diversification, so several thousand mortgages

[5]See for example, "Citigroup's $1.1 Trillion of Mysterious Assets Shadow Earnings", Bradley Keoun, Bloomberg.com, June 13, 2008.

[6]Note that we do not make any claims or assumptions about the extent of market efficiency. In other words, our results do not speak to whether the capital market assessment of credit-risk retention related to securitized assets was adequate or accurate.

typically reside in one trust. The S-Os often retain servicing rights for the securitized loans. However, in some securitizations, the servicer could be a separate entity. The servicer is usually responsible for collecting loan payments (principal and interests, or P&I in Figure 1) from borrowers and remitting these payments to the issuer for distribution to investors. Mortgage backed securities (MBS) are then created out of various tranches, with the least risky to riskiest tranches typically being the senior (AAA rated), mezzanine (rated AA and below) and equity tranches, respectively. The ratings are generally assigned by one of the major credit rating agencies (Moody's, S&P, or Fitch). The MBS could then be purchased through underwriters or placement agents by investors such as hedge funds and pension funds. The securitization trust or its investors could, at their option, purchase insurance from a third party such as a monoline bond insurer as an external credit enhancement. As explained by Hull (2009, page 5), the senior and mezzanine tranches were in turn often sold to yet another SPE, as part of a second stage securitization in order to create collateralized debt obligations or CDOs.

While the basic structure is similar across securitizations of different asset classes, there are many nuances that distinguish them from each other, often with meaningful economic consequences. We discuss and analyze two such features in later analyses – external credit enhancement by a monoline bond insurer and the possibility of B-piece retention by a special servicer of a commercial mortgage securitization entity.

2.2. Risk-relevance of Mortgage Securitizations during the Financial Crisis

Our main predictions stem from the following key observation in Chen et al. (2008): "*Issuers' reported assets and liabilities concentrate the risk of the off-balance sheet securitized financial assets if and only if two conditions hold: (1) the off-balance sheet securitized financial assets have risk and (2) issuers retain first-loss interests in the securitized assets that they record*

on their balance sheets at relatively small value (contractual interests) or no value (implicit recourse)." Building on this observation, firms' equity and credit risk should be positively related to the credit riskiness of the assets that they hold or are exposed to. Asset securitizations are used to, *inter alia*, transfer credit risky assets off the balance sheet of S-Os to the investors of the asset-backed securities issued by the securitization entity. If the credit risk transfer is incomplete, or in other words, the S-Os continue to retain a portion of the credit risks pertaining to the securitized assets, then it follows that equity and bond investors of the S-O would consider the credit riskiness of the securitized assets in their risk assessment of the S-O.

The financial crisis time period analyzed in this study allows us to examine the change in risk-relevance over time. Observers such as Ryan (2008) and Gorton (2009) highlight the fact that the crisis evolved in waves, with certain collateral types such as subprime mortgages being affected earlier than others such as commercial mortgages.[7] During each successive stage, collateral values declined with increased severity and more asset classes got affected. We explain below the early phases of the subprime crisis during 2006 to 2008 and the subsequent transmission of shocks to non-subprime asset classes during 2008 to 2010.

In particular, Ryan (2008) describes the evolution of the subprime crisis during 2007-2008 in multiple stages. Even before the crisis began, problems with subprime mortgages started becoming evident by the middle of 2006 (see also Demyanyk and Hemert 2011). Ryan (2008) considers the announcement of significant losses on subprime mortgage positions by New Century Financial and HSBC Holdings in February 2007 to be the beginning of the first phase of the crisis. The period between February and July 2007 was marked by further deterioration in subprime mortgage market conditions. Ryan (2008) considers July to October 2007 as the second

[7]Note that we are interested in the waves of the financial crisis as it related to declines in values of asset classes used as collateral in mortgage securitizations. We refer the reader to Gorton and Metrick (2012) for guidance on the more general economy-wide evolution of the crisis.

wave of the subprime crisis. This period witnessed a significant decline in market-based indicators of the health of the subprime mortgage market such as the junior tranches of the ABX index. The third phase of the subprime crisis began in October/November 2007 with the announcement of billions of dollars of write-downs by firms holding hitherto safe "super senior" CDO positions. Notable among write-down announcements were the 8-K and 10-Q filings of Merrill Lynch and Citigroup. The third phase also witnessed further steep declines in the values of junior and senior credit indices such as the ABX index. The next phase of the subprime crisis raised concerns about contagion to non-subprime asset classes. The period from January to March 2008 reflected further deterioration in subprime exposures of a wide array of market participants, including investors and financial guarantors.

Alt-A (or Alternative-A) mortgages are similar to subprime mortgages in that they are "non-conforming" and are not backed by Government Sponsored Enterprises. However, Alt-A borrowers typically had better credit standings compared to subprime, but shared the characteristic of lower documentation of underwriting criteria. The market took cognizance of the rising wave of delinquencies on Alt-A mortgages and the prices of Alt-A mortgage backed securities started declining sharply in early 2008 (IMF Financial Stability Report, October 2008). The prices of securities backed by Jumbo mortgages (grouped with Alt-A as "other non-conforming" in our study) declined in tandem, albeit with a slight lag, with securities backed by Alt-A mortgages.

The deterioration in the Commercial Real Estate (CRE) markets followed subprime and other non-conforming mortgages and continues to date. Reflecting increasing contagion across asset classes, delinquencies on Commercial Real Estate (CRE) also started rising steadily since

2007. By early 2009, observers such as the IMF were pointing towards massive write-downs of CRE-backed assets (IMF Financial Stability Report Market Update, January 2009).

If the credit-riskiness of the collateral changes over time, then it follows that the risk-relevance for a *given level* and *type* of securitized asset will also change inter-temporally with the credit riskiness of the underlying assets. Based on the discussion above, we expect to find an increase in risk-relevance of subprime securitizations earlier than other non-conforming and commercial mortgage-backed securitizations. Thus, we state the following hypotheses (in alternate form):

> *H1 (a): Consistent with the evolution of subprime crisis in waves, we expect to find an increase in risk-relevance of subprime securitizations during 2006-2008.*
>
> *H1 (b): Consistent with the evolution of the financial crisis in waves, we expect to find an increase in risk-relevance of subprime securitizations earlier than other non-conforming and commercial mortgage-backed securitizations.*

2.3. External Credit Enhancement

In addition to credit-enhancement through tranching, securitizations may also include credit enhancement from external parties – often monoline bond insurance companies.[8] Monoline credit enhancements, also referred to as "credit wraps", could either assume the form of a financial guarantee or a written credit derivative. In their simplest form, these monoline credit-wraps guarantee timely payment of interest and ultimate return of principal for a certain class of bonds. The guarantee is typically unconditional and irrevocable. Rating agencies conferred "AAA" rating on these guaranteed bonds based on the financial strength of the monoline guarantor. While the structural form may vary for different securitizations, the guarantees are structured to pay off the investors when notification of a credit event occurs

[8] Monoline insurance companies were traditionally in the business of insuring investors from losses in the municipal bonds market, but forayed into structured credit instruments before the financial crisis. Major monoline insurance companies included MBIA, FSA, FGIC, and AMBAC.

(typically a default by the issuer). We argue that external credit enhancement from monoline bond insurance companies shifts at least a part of the risk away from the sponsor-originator to these third-party guarantors. To the extent that the monoline was perceived by investors to be able to perform on its guarantee, the sponsor-originator was at least partially off the hook for the guaranteed portion of the structure. On an ex ante basis, this assumption seems reasonable as most of the monolines were rated "A" or better prior to the crisis. Problems regarding monoline financial health became apparent later in 2007. Thus, we expect the risk-shifting effect to mitigate as the crisis progressed. We state the following hypothesis:

> *H2: The increase in risk-relevance of mortgage securitizations for sponsor-originators is mitigated by third-party credit enhancement such as a guarantee by a monoline bond insurer for a part of the securitization structure*.

2.4. "B-piece" holder in Commercial Mortgage Securitizations

We focus on a unique institutional feature of commercial mortgage securitizations. Commercial mortgage securitizations are unique in the sense that many of these structures include a risk-retention feature in the form of a B-piece holder (the B-piece is the junior tranche of the securitization). While we do not have access to the exact identity of the B-piece buyer in our dataset, we rely on the institutional fact that in most commercial mortgage securitizations, the B-piece is usually purchased by the so-called "special servicers" (see for example, Board of Governors of the Federal Reserve System, 2010). The special servicers deal with loans that are troubled or face imminent default or other problems for the deal. The Federal Reserve report notes that B-piece buyers may also conduct due diligence on individual loans during the initial structuring of the commercial mortgage securitization, and may have more information than other investors about the quality of the underlying pool of assets. Thus, both due to retained interests and implicit recourse reasons, we expect the risk-relevance of commercial mortgage

securitizations structures to be enhanced for sponsors which are also the special servicers. In other words, a *separate* special servicer is likely to shift the risk away from the sponsor. We state the following hypothesis:

> *H3: The increase in risk-relevance of commercial mortgage securitizations for sponsor-originators is enhanced if the sponsor is also the special servicer*.

3. METHODOLOGY

We develop our empirical tests based on Chen et al. (2008) and Barth et al. (2011). To infer the extent of credit risk of the securitized assets retained by S-Os, we examine the association between the level of securitized assets (by type: subprime, other non-conforming, and commercial) and measures of the S-O's equity and credit risk. Consistent with prior literature on risk-relevance of off-balance sheet positions (e.g., Bowman 1980, Dhaliwal 1986, Ely 1995, Niu and Richardson 2006, Chen et al. 2008, and Barth et al. 2011), we consider securitized assets to be risk-relevant if they are associated with S-Os' measures of equity or credit risk. We initially describe our methodology for measures of the S-O's equity risk, and we later turn to corroborating tests using measures of the S-O's credit risk and equity analysts' earnings forecast dispersion.

For equity risk, we begin with the following basic specification:

$$\sigma_E = \beta_0 + \beta_1 \frac{S}{A} + \varepsilon \qquad (1)$$

In Equation (1), A is the book value of total firm assets, S is the cumulative value of securitized assets, and σ_E is the equity volatility. Thus, S/A represents the extent of securitized assets. Under the null hypothesis of no risk-relevance of securitizations (an implication of true sale accounting), β_1 will be zero. If, however, investors consider the securitized assets as being

risk-relevant, then β_1 will be positive. We utilize the insight that the magnitude of β_1 in Equation (1) is indicative of the extent of credit-riskiness of the underlying collateral (i.e., the level of asset volatility). Accordingly, we expect the economic and statistical significance of β_1 in Equation (1) to vary cross-sectionally with the riskiness of the underlying collateral, and inter-temporally during the course of the crisis as the credit-riskiness of different types of collateral increased.[9] It follows that if we decompose *S* into various sub-components, such as subprime, other non-conforming and commercial mortgage securitizations, the coefficient on each sub-component in Equation (1) should be reflective of the riskiness of the underlying asset classes. Finally, as the riskiness of these asset classes shifts over time, we should observe a corresponding inter-temporal shift in their coefficients.

The methodology followed in this paper closely resembles Chen et al. (2008), who measure a banks' total equity risk using realized stock return volatility over the quarter following the quarter under consideration. In addition to realized stock return volatility, we use implied volatility derived from exchange-traded options prices.[10] Thus, we estimate the following firm-quarter-level panel regression:

$$(STDRET,\ IMPV91)_{i,t+1} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 SPMBS_{i,t} + \sum_{j=2006}^{j=2009} \beta_{3j} SPMBS_{i,t} \times$$

$$YEAR\_j + \beta_4 NCMBS_{i,t} + \sum_{j=2006}^{j=2009} \beta_{5j} NCMBS_{i,t} \times YEAR\_j + \beta_6 CMBS_{i,t} +$$

[9] An alternative method to derive similar predictions appeals to the finance asset pricing literature which documents a positive relation between equity volatility and financial leverage (e.g., Christie 1982, Shwert 1989, and Aydemir et al. 2007). Given that most securitization structures are thinly capitalized, the S/A ratio can be viewed to be analogous to an off-balance sheet leverage ratio. The simplest form of such a specification follows Christie (1982), who documents a positive relation between leverage and equity volatility. With further simplifying assumptions, the coefficient on leverage can be written as a positive function of the underlying asset volatility. Thus, both this approach and our approach lead to the same prediction – that the risk relevance coefficient on S/A increases as the underlying asset volatility (or in other words, the riskiness of the underlying asset collateral) increases.

[10] Implied volatility is a forward-looking measure and reflects investors' *ex ante* perception on equity risk and is documented to be closely related to credit spreads (Hull, Nelken and White 2004). According to Merton (1974) both credit spreads and implied volatility are positively related to financial leverage.

$$\sum_{j=2006}^{j=2009} \beta_{7j} CMBS_{i,t} \times YEAR\_j + \beta_8 OTHBS_{i,t} + \beta_9 DISP_{i,t} + \beta_{10} LOGMV_{i,t} + \beta_{11} STDEPS_{i,t} + \beta_{12} RET0609_i + \beta_{13} RI_{i,t} + \beta_{14} VIX_t + \varepsilon_{i,t} \quad (2)$$

In Equation (2), the subscripts (i, t) indicate firms and quarters, respectively. Appendix A provides key variable definitions as well as the relevant data sources. The main dependent variables, $STDRET_{i,t+1}$ [11] and $IMPV91_{i,t+1}$ are defined as, respectively, the standard deviation of daily stock returns, and the average of the daily option-implied volatility at the quarter-end from standardized at-the-money put and call options with 91 days duration (both measured over the following quarter). Figure 2 depicts the measurement timing for the key variables used in our tests. As seen from the figure, most of our explanatory variables are measured *ex ante* with respect to our dependent variables. In other words, the dependent variables are all measured in the quarter following the quarter under consideration. We measure one important control variable – cumulative stock returns for each firm from 2006 to 2009 ($RET0609_i$) – using *ex post* data due to limited disclosures and the resulting challenges in constructing an *ex ante* measure of on balance sheet exposure to the risky asset classes that were affected during the financial crisis.[12]

$LEV_{i,t}$ is the leverage ratio calculated as total liabilities minus deposits divided by total assets. $SPMBS_{i,t}$, $NCMBS_{i,t}$, $CMBS_{i,t}$, and $OTHBS_{i,t}$ are defined respectively as the amounts of subprime, other non-conforming, commercial mortgage, and other consumer and commercial securitization issues over the prior five years, scaled by total assets. We choose an accumulation period of five years based on Hull and White (2010) and He, Qian and Strahan (2010), who report mean/median weighted average life of mortgages-backed securities as approximately five

[11] The definition of *STDRET* follows Chen et al. (2008). However, the results are robust to scaling the variable by its mean measured over the same time period.
[12] Untabulated analyses indicate that the results are similar if we omit this control variable.

years after taking into account factors such as prepayment.[13] In a sensitivity test, we have repeated the analyses based on the amounts of all the prior securitization issues by asset class and obtained qualitatively similar results. In addition, we follow the previous literature and include several control variables. $DISP_{i,t}$, our proxy for general uncertainty facing investors, is the equity analyst forecast dispersion calculated as the coefficient of variation of analysts' estimates of one year ahead annual earnings measured during the last month of each quarter. $LOGMV_{i,t}$ is the natural logarithm of the firm's market value of equity. $STDEPS_{i,t}$, our proxy for the inherent volatility of the firm's assets on the balance sheet, is the coefficient of variation of earnings per share excluding extraordinary items over the past 5 years. *YEAR_2006*, *YEAR_2007*, *YEAR_2008*, and *YEAR_2009* are indicator variables for the years 2006, 2007, 2008 and 2009. For each of our test variables, we include interaction terms with year indicator variables for 2006 to 2009 to observe the shift in risk-relevance of these collateral types (e.g., $SPMBS_{i,t} \times YEAR\_2006$). In addition to using these year dummies to test for interaction effects, we also include them as main effects to control for fixed effects related to the passage of time. In addition, we use the quarter-end *VIX* index (VIX_t) as a forward-looking macro-economic control variable. Another important control variable is the firm-quarter level of retained interests in securitizations ($RI_{i,t}$). Finally, we also control for industry fixed effects.

As our primary research question involves testing the changing risk-relevance of mortgage securitizations over time, we provide another approach to validate our methodology. In addition to the use of year indicators in Equation (2), we also employ an alternate methodology which takes advantage of the differential devaluation of various mortgage subclasses during the financial crisis. The basic idea is similar to that in Equation (2) – the risk-relevance of a

[13] Note that this time window already includes the potential effects of prepayments. Accordingly, we have not adjusted for this further.

particular class of mortgage assets is expected to increase as the credit risk of that asset class increases. We measure the increasing credit risk of the mortgage asset classes of interest to us using the Bloomberg 60+ day delinquency indices for subprime, Alt-A, and commercial mortgages, respectively. In other words, instead of analyzing the slope shift coefficients for each year, we analyze the slope shift on one composite dynamic variable – the extent of devaluation of the asset class as implied by increasing delinquencies.[14] Thus, we also estimate the following firm-quarter-level panel regression:

$$(STDRET,\ IMPV91)_{i,t+1} =$$

$$\beta_0 + \beta_1 LEV_{i,t} + \beta_2 SPMBS_{i,t} + \beta_3 SPMBS_{i,t} \times DEV\_SPMBS_{2006,t} + \beta_4 NCMBS_{2006,t} +$$

$$\beta_5 NCMBS_{i,t} \times DEV\_NCMBS_{2006,t} + \beta_6 CMBS_{i,t} + \beta_7 CMBS_{i,t} \times DEV\_CMBS_{2006,t} +$$

$$\beta_8 OTHBS_{i,t} + \beta_9 DISP_{i,t} + \beta_{10} LOGMV_{i,t} + \beta_{11} STDEPS_{i,t} + \beta_{12} RET0609_i + \beta_{13} RI_{i,t} +$$

$$\beta_{14} VIX_t + \varepsilon_{i,t+1} \qquad (3)$$

DEV_SPMBS$_{2006,t}$, *DEV_NCMBS*$_{2006,t}$, and *DEV_CMBS*$_{2006,t}$ are the cumulative devaluations of the Bloomberg 60+ day delinquency indices (for subprime, Alt-A, and commercial mortgages, respectively) from the beginning of 2006 to the end of quarter *t*, as a percentage of their total devaluation over 2006 to 2009. Zeros are assigned to years prior to 2006. Positive and significant coefficients on the interaction terms *SPMBS*×*DEV_SPMBS*$_{2006,t}$, *NCMBS*×*DEV_NCMBS*$_{2006,t}$, and *CMBS*×*DEV_CMBS*$_{2006,t}$ would imply that the risk-relevance of securitizations of a particular asset type increases as the performance indicators of that asset class deteriorate. In other words, the Equation (3) is intended to provide a validation check for the research design in Equation (2).

[14] Devaluation in a particular delinquency index implies increased delinquencies, and accordingly increased credit risk, in the corresponding asset class.

The tests of H2 and H3 build upon Equation (2) and employ a straightforward methodology involving interaction terms to measure the incremental effect of monoline credit enhancement and special servicers, respectively. Accordingly, we discuss the set-up of those regressions when we discuss the empirical results in Section 5.

We provide further corroboration for our risk-relevance findings by using alternative dependent variables. First, following the approach of Barth et al. (2010), we use corporate bond yield spreads from the primary and secondary bond markets as alternative dependent variables. Using the primary bond market data, the dependent variable is $SPREAD_{i,t+1}$, defined as the weighted average yield for new bonds issued during the subsequent quarter, minus the yield on U.S. treasury bills with corresponding closest maturity. The dependent variable using the secondary bond trading data, $SPREAD2_{i,t+1}$, is defined as the weighted average yield for bonds traded during the subsequent quarter, minus the yield on U.S. treasury bills that are closest in maturity. The regression set-up is similar to Equation (2), except that we additionally control for bond characteristics, including amount, maturity, coupon rate, and number of covenants ($LOGAMT_{i,t+1}$, $MATURITY_{i,t+1}$, and $NUMCOV_{i,t+1}$ for the primary bond market tests, and $LOGAMT2_{i,t+1}$, $MATURITY2_{i,t+1}$, $COUPON2_{i,t+1}$ and $NUMCOV2_{i,t+1}$ for the secondary market tests). Thus, our regression model using the primary bond market data is as follows:

$$SPREAD_{i,t+1} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 SPMBS_{i,t} + \sum_{j=2006}^{j=2009} \beta_{3j} SPMBS_{i,t} \times YEAR_j + \beta_4 NCMBS_{i,t} + \sum_{j=2006}^{j=2009} \beta_{5j} NCMBS_{i,t} \times YEAR_j + \beta_6 CMBS_{i,t} + \sum_{j=2006}^{j=2009} \beta_{7j} CMBS_{i,t} \times YEAR_j + \beta_8 OTHBS_{i,t} + \beta_9 DISP_{i,t} + \beta_{10} LOGMV_{i,t} + \beta_{11} STDEPS_{i,t} + \beta_{12} RET0609_i + \beta_{13} RI_{i,t} + \beta_{14} VIX_t + \beta_{15} MATURITY_{i,t+1} + \beta_{16} LOGAMT_{i,t+1} + \beta_{17} NUMCOV_{i,t+1} + \varepsilon_{i,t+1} \quad (4a)$$

Our regression model for tests using the secondary bond market data is as follows:

$$SPREAD2_{i,t+1} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 SPMBS_{i,t} + \sum_{j=2006}^{j=2009} \beta_{3j} SPMBS_{i,t} \times YEAR\_j + \beta_4 NCMBS_{i,t} + \sum_{j=2006}^{j=2009} \beta_{5j} NCMBS_{i,t} \times YEAR\_j + \beta_6 CMBS_{i,t} + \sum_{j=2006}^{j=2009} \beta_{7j} CMBS_{i,t} \times YEAR\_j + \beta_8 OTHBS_{i,t} + \beta_9 DISP_{i,t} + \beta_{10} LOGMV_{i,t} + \beta_{11} STDEPS_{i,t} + \beta_{12} RET0609_i + \beta_{13} RI_{i,t} + \beta_{14} VIX_t + \beta_{15} MATURITY2_{i,t+1} + \beta_{16} LOGAMT2_{i,t+1} + \beta_{17} NUMCOV2_{i,t+1} + \beta_{18} COUPON2_{i,t+1} + \varepsilon_{i,t+1} \quad (4b)$$

Second, we appeal to Cheng et al. (2011) and use equity analysts' earnings forecast dispersion as an alternate dependent variable. To the extent that the increase in perceived riskiness of the underlying securitization collateral increases uncertainty among market participants about firm value, we expect to obtain similar inferences as earlier using analyst dispersion. The research design is otherwise similar to Equation (2), except that we no longer include $DISP_{i,t}$ as a control.

4. DATA AND SAMPLE

The main data source for the securitization issues used in this study is the Asset-Backed Alert (ABS Alert) database compiled by Harrison Scott Publications (HSP). This database comprises all securitization issues from 1985 to date which were rated by at least one major credit rating agency, including securitizations of residential mortgages, credit cards, and other consumer and commercial assets. This database excludes asset-backed commercial paper (ABCP) conduits, Structured Investment Vehicles, and commercial mortgage issues. We use data from the Commercial Mortgage Alert (CM Alert) database, also maintained by Harrison Scott

Publications, to obtain data for commercial mortgage securitization issues.[15] We exclude Collateralized Debt Obligations (CDOs) from our analysis, and note that our dataset excludes asset-backed commercial paper (ABCP) conduits and Structured Investment Vehicles. Our choice of the ABS Alert database, compared with alternate sources, is dictated by our research question. In particular, the ABS Alert database details the securitization issues by type of collateral (e.g., subprime). Further, it also includes a number of other fields of interest used in this study (e.g., monoline guarantees and special servicers).

Table 1 provides the sample selection process. We limit our attention to issuances in the U.S. by U.S.-based sponsors. Our test period is from 2000 to 2009. We begin the test period from 2000 since SFAS 140 became effective from fiscal year 2000 onwards. As the measurement of cumulative securitization exposure requires data on a rolling basis for the previous five years, we include issues from 1995 onwards. We obtain 12,599 issues between 1995 and 2009, for which we could match the sponsoring firm manually to Compustat and obtain firm-quarter level data. This corresponds to 9,098 firm-quarter observations. The sample size for the main regression analyses in this study is lower due to data availability constraints for the dependent and control variables. Data on stock returns and stock return volatility is obtained from CRSP. Options-implied volatility is obtained from OptionMetrics. Secondary bond spreads are calculated using TRACE, while primary bond spreads are obtained from Mergent FISD. Equity analyst forecast dispersion is obtained from I/B/E/S.

An important control variable in our study is the firm-quarter level of retained interests in securitizations (*RI*). We collect the firm-level retained interests amounts from 10Q/10K reports, and where available, Y-9C regulatory reports. For U.S. regulated banks that file regulatory Y-9C

[15] The Asset-Backed Alert database is generally accessible to subscribers of HSP's popular industry newsletter. The data have been used by influential regulatory studies such as the Board of Governors of the Federal Reserve System Report (2010).

reports quarterly with the Federal Reserve, retained interests by type of interest and type of loan are reported in the schedule HC-S. For each firm we measure retained interests as the total of on-balance sheet retained credit-enhancing interest only strips, subordinated securities, and other residual interests. For firms that do not file regulatory Y-9C reports, we hand-collect the retained interests amount from their 10Q/10K reports.[16] However, even after the adoption of SFAS 140, compared to schedule HC-S data, the 10-K/10-Q data are far less standardized and detailed. In particular, the *RI* data are not pro-rated by collateral type, so we can only control for *RI* at the aggregate level for each firm.

Of descriptive interest, Appendix B provides the subprime securitization amounts by sponsors in our sample during 1997 to 2008 (there are no new subprime issues in our sample in 2009). Notice that subprime securitization steadily increases during the period, reaching a peak in 2007, followed by a steep decline in 2008 and 2009. Further, note that certain firms like Apex had non-zero cumulative subprime securitization amounts (*SPMBS*) in the initial years, but have zero amounts subsequently.

Table 2, Panel A provides selected descriptive statistics at the firm-quarter level. Notice that the average firm is highly leveraged (0.625), which is common for financial institutions that constitute a majority of our sample. We also report the summary statistics of the securitization variables by collateral type for those firms which have non-zero values for the particular collateral.[17] The mean values, as a percentage of total assets, are economically significant for all the collateral types — 25%, 29%, 3% and 35% for *SPMBS*, *NCMBS*, *CMBS*, and *OTHBS*,

[16] In our sample, retained interests disclosure could only be found for 1,513 firm-quarters, which account for 41.1% of the total observations. For those interim quarter observations for which we could not find retained interests disclosure in firms' quarterly reports, we assign the value from the most recent annual report.

[17] For *SPMBS, NCMBS, CMBS*, *OTHBS*, and *RI*, the descriptives are provided for firm-quarters that have non-zero values. For the remaining variables, the descriptive are provided for all firm quarters with available data.

respectively.[18] For firms that have non-zero values of retained interests (*RI*), the mean value is economically material (4.7% of total assets). Table 2, Panel B provides the Pearson correlations between the key dependent, explanatory and control variables used for the model reported in Table 3, Panel A.[19, 20] The patterns appear to be plausible and multi-collinearity is not a significant concern.[21] Table 2, Panel C provides the details of our sample by industry. A majority (60%) of our sample comprises of financial institutions (including commercial banks, insurance companies, real estate and other investment firms).

To validate our cumulative securitization measure, we replicate the data collection methodology in Chen et al. (2008) and compare our cumulative securitization measure (before partitioning by type of collateral) to the measure used in their study. Since the related data in Chen et al. (2008) are collected from the Y-9C regulatory reports of U.S. bank holding companies, we take all the firms (i.e., banks) that our dataset has in common with Chen et al. (2008) (438 firm quarters). The correlation between our measure of cumulative securitizations and the values reported in Y-9C is 0.80 (significant at the 1% level).

5. EMPIRICAL RESULTS

Initial Descriptive Analysis

As initial descriptive analysis, Figure 3 plots the variance of our dependent variables for samples partitioned by different collateral types for the years approaching and including the

[18] Further, note that before partitioning by collateral type, the mean of our cumulative securitization measure (*CUMOBS*) is 0.431, or 43% of the total assets of the firm.
[19] The correlations are calculated using all available firm-quarter data. For *SPMBS, NCMBS, CMBS*, *OTHBS,* and *RI*, the correlations are calculated including all the zero values.
[20] We also inspected but do not tabulate the Pearson correlation for all variables used for the model reported in Table 6, Panels A and B. The patterns appear to be plausible and multi-collinearity is not a significant concern.
[21] In Panel B of Table 2, the Pearson correlation coefficient between *STDRET* and *CMBS* is negative, which is opposite to our expected sign. We have confirmed that this is due to the positive correlation between *CMBS* and *LOGMV*. In a simple bi-variate analysis that regresses *STDRET* on *LOGMV* and *CMBS*, we find that the association between *STDRET* and *CMBS* is positive after controlling for *LOGMV*.

financial crisis. Notice that in 2006, the variances are almost identical across collateral types. However, the variances explode in 2008, consistent with severe dislocations in the capital markets during 2008. We observe that the variances in 2009 revert back to the 2007 levels, reflecting the easing of the crisis in 2009.

Further, before we present our main tests, we note that on-balance-sheet financial leverage ($LEV_{i,t}$) is one of the most important and observable measures of the risk of financial institutions. Accordingly, we consider $LEV_{i,t}$ to be a natural benchmark to assess the significance of our risk-relevance results for off-balance-sheet mortgage securitizations. As a validation check for our methodology, we use the research design in Equation (2) to investigate potential shifts in the risk-relevance of $LEV_{i,t}$ as the crisis progressed. Untabulated analyses indicate that, as expected, the main coefficient on $LEV_{i,t}$ is positive and highly significant (p-value <0.001). Further, while we do not observe slope shifts in 2006 and 2007, we observe an increase in risk-relevance for $LEV_{i,t}$ in 2008 and 2009, indicating heightened investor uncertainty and concerns about the financial stability of institutions later during the crisis. For parsimony, we do not include these interaction terms between $LEV_{i,t}$ and year indicators in our tables; however, our results are robust to the inclusion of these additional controls.

Tests of H1

Table 3 presents the results of our main regression analysis. In Panel A, the dependent variables in Columns I and II are $STDRET_{i,t+1}$ and $IMPV91_{i,t+1}$, and we use year indicators to detect shifts in risk-relevance. We discuss the results of the $STDRET_{i,t+1}$ model. The results using $IMPV91_{i,t+1}$, while similar, are statistically weaker. First, as expected, we observe a positive and significant relation between on-balance-sheet leverage ($LEV_{i,t}$) and the dependent variables. Turning to the cumulative securitization test variables, we observe that $SPMBS_{i,t}$ is positively and

significantly (at the 1% level) related to $STDRET_{i,t+1}$, reflected by the coefficient of 0.019. This captures the risk-relevance of $SPMBS_{i,t}$ for the years 2005 and prior. Further, as predicted by H1a and evidenced by the positive and significant coefficients (at 1%, 5%, 10%, and 1% levels respectively) on $SPMBS_{i,t}$×*YEAR_2006*, $SPMBS_{i,t}$×*YEAR_2007*, $SPMBS_{i,t}$×*YEAR_2008* and $SPMBS_{i,t}$×*YEAR_2009*, we note that the risk-relevance of subprime securitizations increased during the years 2006 to 2009. The results pertaining to subprime securitizations are economically significant as well. Notice that as early as 2006, the risk-relevance of subprime securitizations is 0.074 (0.019+0.055). An inter-quartile range movement (from the first quartile to the third quartile) of 0.224 in $SPMBS_{i,t}$ in 2006 is associated with an increase in stock return volatility of 0.017 (0.074×0.224). Relative to mean equity volatility of 0.252 in 2006, the inter-quartile range difference in $SPMBS_{i,t}$ leads to a 6.6% change in equity volatility in that year, which is comparable to the average impact of the on-balance-sheet leverage (7.1%). Similarly, the risk–relevance coefficients for subprime securitizations are 0.196, 0.307, and 0.695, respectively, for 2007, 2008, and 2009. Risk-relevance coefficients for $SPMBS_{i,t}$ equal to or higher than the corresponding coefficients for other predictors such as leverage are plausible as they reflect the risk of credit losses associated with the underlying collateral as the crisis approached.[22]

The evidence on non-subprime backed securitizations is consistent with the notion that the financial crisis evolved in waves (H1b). Thus, while we notice a shift in risk-relevance of issues backed by subprime collateral as early as 2006, we do not expect to observe increased

[22] Further, we have evaluated the plausibility of the regression coefficients if one were to assume the relation between leverage and equity volatility in Christie (1982, equation (5)). We find that coefficient estimates are plausible given the empirical parameters observed in our sample. In particular, we find that substituting our regression coefficients and sample bond spreads in the Christie (1982) model provides estimates of asset volatility that are quite comparable to our sample equity volatility. The calculations are available from the authors upon request.

risk-relevance for the other types of collateral studied in this paper until later during the crisis. Consistent with our predictions, for other non-conforming mortgage-backed securitizations, we observe a positive shift in risk-relevance during 2007, 2008, and 2009, reflected by the coefficients of 0.073, 0.385, and 0.110, respectively. As far as commercial mortgage securitizations are concerned, we observe significant positive shifts of risk-relevance coefficients during 2008 and 2009 ($CMBS_{i,t}$×*YEAR_2008*, and $CMBS_{i,t}$×*YEAR_2009*), reflected by the coefficients of 0.201 and 0.313, respectively. Regarding all other types of asset-backed issues (*OTHBS*), consistent with prior research (e.g., Niu and Richardson 2006), we observe a general positive risk-relevance during our sample period.

The positive shift in risk-relevance during 2006 for *SPMBS* in Table 3, Panel A combined with the observation that the variances of *STDRET* and *IMPV91* are rather well behaved in 2006 in Figure 2, provides confidence that we are capturing the effect of securitization issues, and not merely some other correlated omitted variable. Nonetheless, we explicitly control for exposures other than securitizations which could lead to the same effects on the dependent variables, such as the firm's aggregate financial-crisis-related risk — proxied by total stock return over 2006 and 2009 ($RET0609_i$). While, as expected, $RET0609_i$ loads negatively and significantly, our key inferences pertaining to the risk-relevance of mortgage securitizations are unaltered. Regarding retained interests, we observe that $RI_{i,t}$ loads positively and significantly. Further, despite our control for year fixed effects, we allow for inter-temporal changes in macro-level uncertainty by employing an additional control for the quarter-end value of the VIX index. While we note that, as expected, VIX_t is positively related to our dependent variables, its inclusion does not affect the main results documented in this table. To summarize, the evidence in Table 3, Panel A provides

support for our hypothesis that investors recognized the risk-relevance of subprime and other crisis-related positions as the crisis evolved.[23]

In Panel B of Table 3, we replace the year dummies by delinquency indices for the respective mortgage collateral types and estimate the panel regression in Equation (3). We observe, as expected, positive and significant coefficients on the interaction terms $SPMBS_{i,t}\times DEV\_SPMBS_{2006,t}$, $NCMBS_{i,t}\times DEV\_NCMBS_{2006,t}$, and $CMBS_{i,t}\times DEV\_CMBS_{2006,t}$, reflected by coefficients for the $STDRET_{i,t}$ model of 0.829, 0.358 and 5.215, respectively. The results in Panel B reconfirm the results in Panel A and suggest (consistent with H1) that the risk-relevance of mortgage securitizations increased as the credit performance indicators of specific mortgage subclasses deteriorated during the crisis.

Tests of H2 and H3

In Table 4, we account for another characteristic of securitizations — whether the bonds issued by the SPE are credit-enhanced (or guaranteed) by monoline bond insurance companies. As predicted in H2, the existence of a monoline guarantee can shift risk away from the S-O towards the monoline guarantor. We construct two firm-quarter level indicator variables, $MNLSP_{i,t}$ and $MNLNC_{i,t}$, indicating if the majority (at least 50%) of the outstanding subprime and other non-confirming issues (issued during the 20 quarters prior to and including the current quarter), respectively, were credit-enhanced by a guarantee from a monoline bond insurance company.[24] Consistent with our prediction in H2, we find that the risk-relevance coefficients are lower when issues are backed by monoline guarantees. Focusing on the $STDRET_{i,t+1}$ model, we observe that the coefficients on the interaction terms $SPMBS_{i,t}\times YEAR\_2006\times MNLSP_{i,t}$, $SPMBS_{i,t}\times YEAR\_2007\times MNLSP_{i,t}$, and $NCMBS_{i,t}\times YEAR\_2007\times MNLNC_{i,t}$ of -0.086, -0.399, and

[23] The Variance Inflation Factors for Table 3 are less than 4, mitigating concerns about multi-collinearity.
[24] Note that it is uncommon for CMBS issues to have monoline credit enhancement.

-0.126, respectively, are negative and significant. The coefficients on $SPMBS_{i,t} \times YEAR\_2008 \times MNLSP_{i,t}$, $SPMBS_{i,t} \times YEAR\_2009 \times MNLSP_{i,t}$, $NCMBS_{i,t} \times YEAR\_2008 \times MNLNC_{i,t}$, and $NCMBS_{i,t} \times YEAR\_2009 \times MNLNC_{i,t}$ are insignificant, indicating that the risk-shifting effect of the monoline guarantee declined as the credit ratings of the monoline insurers deteriorated during the crisis. We can view this differential effectiveness of monoline guarantees during the crisis as yet another reflection of the dynamic evolution of collateral and structural characteristics of securitizations.

In Table 5, we focus on commercial mortgage securitizations. Recall that as per H3, we expect the shift in risk-relevance of commercial mortgage securitizations to be enhanced for sponsors which are also the special servicers. A separate special servicer is likely to shift the risk away from the sponsor. In Table 6, $SPSERV_{i,t}$ is a firm-quarter level variable indicating that the sponsor is the special servicer for at least 50% of outstanding commercial mortgage securitizations (issued during the 20 quarters prior to and including the current quarter). Focusing on the $STDRET_{i,t+1}$ model, we observe, as predicted by H3, that the coefficients on $CMBS_{i,t} \times SPSERV_{i,t} \times YEAR\_2008$ and $CMBS_{i,t} \times SPSERV_{i,t} \times YEAR\_2009$ of 0.616 and 1.492 respectively, are positive and significant at the 10% two-tailed level.

Alternative dependent variables

In Table 6, we turn our attention to the bond markets. The regression analysis in Panel A of Table 6 is similar to Table 3, Panel A, except that the dependent variable is the primary bond spread (i.e., the average yield spread of new bond issues issued during the subsequent quarter), and that we control for bond characteristics (the total amount, average maturity, and average number of covenants for new bond issues issued during the subsequent quarter). In Panel B, the dependent variable is the yield spread computed using secondary trading data from TRACE

(measured over the subsequent quarter). The explanatory variables are the similar to those in Panel A, except that they pertain to bonds traded in the secondary market. In the secondary market tests, we additional control for the original bond coupon rate ($COUPON2_{i,t+1}$) In both Panels A and B, we find a pronounced increase in the risk-relevance of subprime securitizations in 2006, followed by further incremental risk-relevance in the following years. The risk-relevance coefficients for other non-conforming and commercial mortgage securitizations reflect the pattern seen in Panel A that the crisis evolved in waves. The results pertaining to subprime securitizations are economically significant as well – as early as 2006, the risk-relevance of subprime securitizations is comparable to or exceeds that of the on-balance sheet leverage. In additional specification checks, we have also tested H2 and H3 by using primary and secondary bond market spreads as dependent variables. The results (untabulated) are similar to those presented in Tables 4 and 5.

In Panel C of Table 6, the main dependent variable, $DISPERSION_{i,t+1}$, is equity analysts' earnings forecast dispersion, calculated as the coefficient of variation of analysts' estimates of one year ahead annual earnings during the subsequent quarter's last month. To the extent that the increase in perceived riskiness of the underlying securitization collateral increases uncertainty among market participants about firm value, we expect to obtain similar inferences using dispersion of equity analyst forecasts. The results in Panel C of Table 6 exhibit patterns similar to Table 3, Panel A. Thus, collectively, Tables 3 and 6 provide a nice cross-validation of our main predictions across different markets and settings.

Robustness Checks

We conduct a number of robustness checks. First, we repeat the Table 3 analysis after deleting non-financial firms. Note that despite focusing on mortgage securitizations in this study,

our main specification includes securitizations of non-mortgage assets as well to provide contrast between securitizations of various types of collateral, and to control for other potentially important sources of off-balance-sheet risk. To alleviate concerns that our results are driven by a stark contrast between financial and non-financial firms during the crisis, we repeat our analyses after deleting non-financial firms. The results (untabulated) are very similar to those reported in Tables 3 to 6.

Second, we address concerns that early (2006) risk-relevance results for subprime securitizations are driven by mortgage banks whose business model was rendered unviable much earlier during the crisis. These banks were among the first to fail during the financial crisis. Accordingly, we repeat our analysis after deleting the three major mortgage banks in our sample (Countrywide, New Century, and Indymac). The results (untabulated) are very similar to those reported in Tables 3 to 6.

Third, as seen in Figure 3, the variances of our dependent variables explode in 2008. Hence, we repeat the analyses using issues only up to 2007. Our inferences from Tables 3 to 6 hold in this truncated sample as well. Further, the main analyses in this paper use a 91 days option maturity period to compute option-implied volatilities. However, our results are robust if we use 152 days maturity.

In addition, although the VIX index is included as a control in the main analyses, we re-estimate Equations (2) and (3) using alternative specifications for inter-temporal changes in macro-level uncertainty: (i) using idiosyncratic volatility as an alternative dependent variable[25]; and (ii) using residualized option-implied volatility (from a regression of option-implied

[25] Idiosyncratic volatility is calculated as the standard deviation of the residuals from a regression of stock returns on value-weighted market returns for each subsequent firm-quarter.

volatility on the VIX index). The results (untabulated) are very similar to those reported in Tables 3 to 6.

6. CONCLUSIONS

This study investigates the inter-temporal patterns in the risk-relevance of subprime, other non-conforming and commercial mortgage securitizations to equity and bond investors during the recent financial crisis. We observe a pronounced increase in risk-relevance for subprime securitizations as early as 2006. In other words, investors of subprime mortgage securitizers recognized the unfolding subprime risk and its impact on securitizers as early as 2006.

Consistent with the evolution of the financial crisis in waves, we find that the risk-relevance of securitization issues with subprime collateral began to increase earlier during the crisis than the risk-relevance of other non-conforming mortgage and commercial mortgage securitizations. The results are robust to controlling for aggregate firm-level credit-crisis related risk, and on-balance sheet retained interests. Our finding that securitizations with different types of collateral became risk-relevant at different times as their default risk increased during the crisis supports the requirement of SFAS 167 to consider the former QSPEs as candidates for consolidation on a case by case basis, depending on the degree of risk-retention and control. More generally, our results inform the current debate surrounding the credit risk-retention requirements outlined in the Dodd Frank Wall Street Reform Act of 2010. Our results corroborate proposals that contend that these mandatory risk-retention requirements need to be calibrated taking into account the inherent heterogeneity in the securitized asset classes. Our results indicate that the risk-relevance of mortgage securitizations depends, *inter alia*, on characteristics of the collateral, the structure of the securitization entity (e.g., credit enhancement

through monoline guarantees, or retention of a junior tranche by a special servicer), and that these features evolve inter-temporally.

As mentioned in the introduction, we resorted to quasi-publicly available information (Asset-Backed Alert's database of securitization issues, 1995-2009) since disclosure in annual financial reports for firms other than bank holding companies was rather sparse. Our cumulative securitization proxies are undoubtedly imprecise relative to the true end-of period cumulative securitized assets of these firms; and we lack retained interests disclosures split out by collateral type. Nevertheless, with the measures we use, we are able to establish the risk-relevance of mortgage securitizations that varies inter-temporally by type of collateral, and with structural characteristics of the issues. Establishing the usefulness of such information supports recent standard-setting initiatives to expand disclosures in financial reports. These disclosures of securitizations and the nature of retained risks and rewards will be more precise than the measures we use in this study, enhancing the risk-relevance assessment by investors.

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APPENDIX A: KEY VARIABLE DEFINITIONS

Variable	Definition (Compustat data items in parentheses)	Data Source
$STDRET_{i,t+1}$	Standard deviation of daily stock returns measured over the subsequent quarter.	CRSP
$IMPV91_{i,t+1}$	The average daily option-implied volatility of daily returns measured over the subsequent quarter (calculated using standardized at-the-money puts and calls options with 91 days duration).	OptionMetrics
$SPREAD_{i,t+1}$	The weighted average yield for new bonds issued during the subsequent quarter, minus the yield on U.S. treasury bills with closest corresponding maturity. If a firm has multiple bonds, we calculate the average yield weighted by principal amount.	Mergent FISD
$SPREAD2_{i,t+1}$	The weighted average yield for bonds traded in the secondary market during the subsequent quarter, minus the yield on U.S. treasury bills with closest corresponding maturity. If a firm has multiple bonds, we calculate the average yield weighted by principal amount.	TRACE
$DISPERSION_{i,t+1}$	Equity analysts' earnings forecast dispersion, calculated as the coefficient of variation of analysts' estimates of one year ahead annual earnings during the subsequent quarter's last month.	I/B/E/S
$DISP_{i,t}$	Equity analysts' earnings forecast dispersion, calculated as the coefficient of variation of analysts' estimates of one year ahead annual earnings during each quarter's last month.	I/B/E/S
$LOGMV_{i,t}$	The natural logarithm of the firm's market value of equity (PRCCQ×CSHOQ).	Compustat
$STDEPS_{i,t}$	The standard deviation of earnings per share excluding extraordinary items (EPSPXQ) over the 20 quarters prior to and including the current quarter.	Compustat
$LEV_{i,t}$	The leverage ratio, calculated as total liabilities (LTQ) divided by total assets (ATQ). For banks, we deduct deposits (DPTCQ) from total liabilities to calculate *LEV*.	Compustat
VIX_t	The Chicago Board Options Exchange S&P 500 Volatility Index at each quarter end.	Datastream
$RET0609_i$	Cumulative stock returns for each firm from 2006 to 2009.	CRSP
$RI_{i,t}$	Retained interests, deflated by total assets (ATQ) at the fiscal-quarter end.	SEC Filings
$(DEV\_SPMBS, DEV\_NCMBS, DEV\_CMBS)_{2006,t}$	The cumulative devaluations of the Bloomberg 60+ day delinquency indices (for subprime, Alt-A, and commercial mortgages, respectively) from the beginning of 2006 to the end of quarter *t*, as a percentage of their total devaluation over 2006 to 2009. Zeros are assigned to quarters prior to 2006.	Bloomberg

$SPMBS_{i,t}$	The total dollar amount of subprime mortgage-backed securities issued over the 20 quarters prior to and including the current quarter, scaled by total assets (ATQ).	Asset-Backed Alert
$NCMBS_{i,t}$	The total dollar amount of other non-conforming mortgage-backed securities issued over the 20 quarters prior to and including the current quarter, scaled by total assets (ATQ). Other non-conforming mortgage includes non-agency residential mortgages (including Alt-A), high loan-to-value loans, non-performing mortgages, home-equity loans, home-improvement loans, and home-equity lines of credit.	Asset-Backed Alert
$CMBS_{i,t}$	The total dollar amount of commercial mortgage-backed securities issued over the 20 quarters prior to and including the current quarter, scaled by total assets (ATQ).	Commercial Mortgage Alert
$OTHBS_{i,t}$	The total dollar amount of other assets-backed securities issued over the 20 quarters prior to and including the current quarter, scaled by total assets (ATQ). Other assets include credit card receivables, aircraft-lease receivables, auto loans, boat loans, equipment loans, etc.	Asset-Backed Alert
$CUMOBS_{i,t}$	The sum of $SPMBS_{i,t,}$ $NCMBS_{i,t,}$ $CMBS_{i,t}$, *and* $OTHBS_{i,t}$	
$MNLSP_{i,t}$	Variable indicating if the majority (at least 50%) of the outstanding subprime issues (issued during the 20 quarters prior to and including the current quarter) were credit-enhanced by a guarantee from a monoline bond insurance company.	Asset-Backed Alert
$MNLNC_{i,t}$	Variable indicating if the majority (at least 50%) of the outstanding other non-conforming issues (issued during the 20 quarters prior to and including the current quarter) were credit-enhanced by a guarantee from a monoline bond insurance company.	Asset-Backed Alert
$SPSERV_{i,t}$	Variable indicating if for the majority (at least 50%) of the outstanding commercial mortgage issues (issued during the 20 quarters prior to and including the current quarter), the sponsor and the special servicer were the same entity.	Commercial Mortgage Alert
$MATURITY_{i,t+1}$	The number of years to maturity for new bonds issued during the subsequent quarter. If a firm has multiple bonds, we calculate the average maturity weighted by principal amount.	Mergent FISD
$LOGAMT_{i,t+1}$	The natural log of the total principal amount of new bonds issued during the subsequent quarter.	Mergent FISD
$NUMCOV_{i,t+1}$	The weighted average number of covenants for new bonds issued during the subsequent quarter. We calculate the average number of covenants weighted by principal	Mergent FISD

	amount.	
$MATURITY2_{i,t+1}$	The number of years to maturity for bonds traded in the secondary market during the subsequent quarter. If a firm has multiple bonds, we calculate the average maturity weighted by principal amount.	Mergent FISD
$LOGAMT2_{i,t+1}$	The natural log of the total principal amount of bonds traded in the secondary market during the subsequent quarter.	Mergent FISD
$COUPON2_{i,t+1}$	The weighted average coupon rate of the bonds traded in the secondary market during the subsequent quarter. We calculate the average coupon rate weighted by principal amount.	Mergent FISD
$NUMCOV2_{i,t+1}$	The weighted average number of covenants of the bonds traded in the secondary market during the subsequent quarter. We calculate the average number of covenants weighted by principal amount.	Mergent FISD
Industry indicators	Based on industry classification in Barth et al. (2008).	

APPENDIX B: SUBPRIME MORTGAGE SECURITIZATION (IN $ MILLIONS)

SPONSOR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Countrywide	0.0	4,281.2	2,214.8	3,933.0	3,233.1	4,938.8	4,424.6	37,992.8	34,966.5	26,344.9	17,401.0	171.2	139,902.0
Lehman Brothers	0.0	0.0	3,574.6	5,382.9	1,282.4	5,793.3	4,055.5	5,882.7	10,219.1	13,742.4	13,088.4	3,439.9	66,461.2
Washington Mutual	1,233.1	0.0	0.0	1,490.6	10,838.0	3,078.5	900.0	10,201.3	12,476.3	6,552.5	5,877.0	0.0	52,647.3
Merrill Lynch	0.0	0.0	0.0	0.0	648.6	199.6	544.0	1,838.0	7,667.6	10,830.4	19,564.8	0.0	41,293.1
Bear Stearns	459.4	114.5	600.4	1,084.2	1,340.2	2,035.8	4,416.0	4,796.5	6,373.3	6,495.1	8,576.0	0.0	36,291.6
Goldman Sachs	0.0	0.0	0.0	0.0	0.0	4,313.7	2,538.4	8,096.2	7,179.0	7,470.3	6,459.9	0.0	36,057.6
Morgan Stanley	0.0	0.0	0.0	0.0	1,458.6	5,432.5	1,605.3	5,250.0	0.0	4,290.9	13,862.8	0.0	31,900.1
Citigroup	0.0	0.0	0.0	0.0	0.0	1,002.8	5,175.4	519.5	1,255.1	5,507.4	10,778.5	0.0	24,238.6
J.P. Morgan Chase	0.0	0.0	0.0	0.0	0.0	433.0	6,334.7	2,453.5	1,435.4	5,976.8	6,465.3	0.0	23,098.7
New Century Financial	0.0	3,167.3	2,340.2	1,006.2	3,940.6	1,781.6	1,566.1	0.0	6,442.2	312.6	0.0	0.0	20,556.8
Bank of America	0.0	0.0	0.0	0.0	0.0	1,381.2	662.0	5,979.3	7,862.6	2,682.5	1,838.3	0.0	20,405.8
Deutsche Bank	0.0	0.0	0.0	0.0	1,048.2	1,871.1	295.0	1,752.4	1,393.5	3,062.0	6,895.0	0.0	16,317.1
Impac	0.0	0.0	252.3	943.6	1,158.3	2,675.6	5,372.3	5,887.0	0.0	0.0	0.0	0.0	16,289.1
Wells Fargo	0.0	0.0	0.0	132.8	0.0	342.0	0.0	6,270.9	4,686.1	2,755.3	983.5	0.0	15,170.5
Barclays	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,386.8	527.9	3,442.6	7,583.4	0.0	12,940.6
IndyMac	0.0	0.0	0.0	0.0	0.0	135.0	0.0	2,316.3	3,784.5	1,664.6	2,244.3	0.0	10,144.6
Banco Popular	0.0	125.0	195.0	190.0	672.3	0.0	0.0	1,320.9	3,701.5	1,578.4	0.0	0.0	7,783.2
Novastar Financial	264.3	0.0	0.0	0.0	1,196.8	1,224.4	0.0	0.0	0.0	1,233.8	3,185.9	0.0	7,105.1
CIT Group	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,644.2	0.0	6,644.2
Fieldstone Investment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,296.4	750.0	1,010.9	358.2	0.0	6,415.6
ECC Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,029.3	0.0	0.0	0.0	5,029.3
American Home Mortgage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,731.4	1,753.7	0.0	3,485.1
Advanta	0.0	375.5	1,242.5	1,049.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,667.7
WMC Finance	0.0	1,896.0	236.3	405.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,538.1
Norwest Bank	0.0	102.2	422.5	1,896.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,421.2
Ocwen Financial	0.0	1,617.8	398.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	81.1	0.0	2,097.6
Dynex Capital	0.0	1,574.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,574.2
Thornburg Mortgage	0.0	1,144.4	0.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,294.4
East West Bank	0.0	0.0	0.0	0.0	0.0	159.7	0.0	0.0	0.0	513.0	386.4	0.0	1,059.2
Ryland	0.0	0.0	1,047.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,047.0
Newcastle Investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,036.3	0.0	1,036.3
PNC	967.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	967.6
Equity One	0.0	0.0	0.0	0.0	0.0	426.9	0.0	0.0	0.0	0.0	454.2	0.0	881.1
Superior Bank	0.0	750.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	750.0
Republic Leasing	190.8	170.0	250.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	610.9
Compass Bank	0.0	0.0	0.0	0.0	0.0	0.0	0.0	591.0	0.0	0.0	0.0	0.0	591.0
40/86 Advisors	0.0	0.0	0.0	0.0	236.3	344.9	0.0	0.0	0.0	0.0	0.0	0.0	581.2
Centex	0.0	0.0	572.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	572.0
Radian	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	98.5	280.7	0.0	0.0	379.2
SunTrust	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	370.8	0.0	370.8
Hanover Capital Mortgage	0.0	102.2	238.8	18.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	359.9
Provident Bank	0.0	350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	350.0
Capstead	73.1	0.0	0.0	230.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	303.5
Flagstar Bank	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	302.2	0.0	0.0	302.2
Zions First National	0.0	0.0	0.0	0.0	277.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	277.4
Union Planters	0.0	0.0	132.5	127.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	259.8
Ocean Bank	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	190.0	0.0	0.0	190.0
Donaldson, Lufkin & Jenrette	22.1	0.0	96.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	118.3
ITLA Capital	0.0	0.0	0.0	0.0	0.0	86.3	0.0	0.0	0.0	0.0	0.0	0.0	86.3
Apex Mortgage	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.0
Total	3,238.4	15,770.4	13,813.8	18,041.9	27,331.0	37,656.9	37,889.3	106,831.2	115,848.4	107,970.7	135,888.9	3,611.1	623,892.0

Figure 1: Illustration of a Basic Mortgage Securitization Structure

This figure illustrates a basic mortgage securitization structure. It is a modified version of Figure 3 (page 5) of Sabry and Schopflocher (2007). MBS stands for mortgage-backed securities. P&I stands for principal and interest payments.

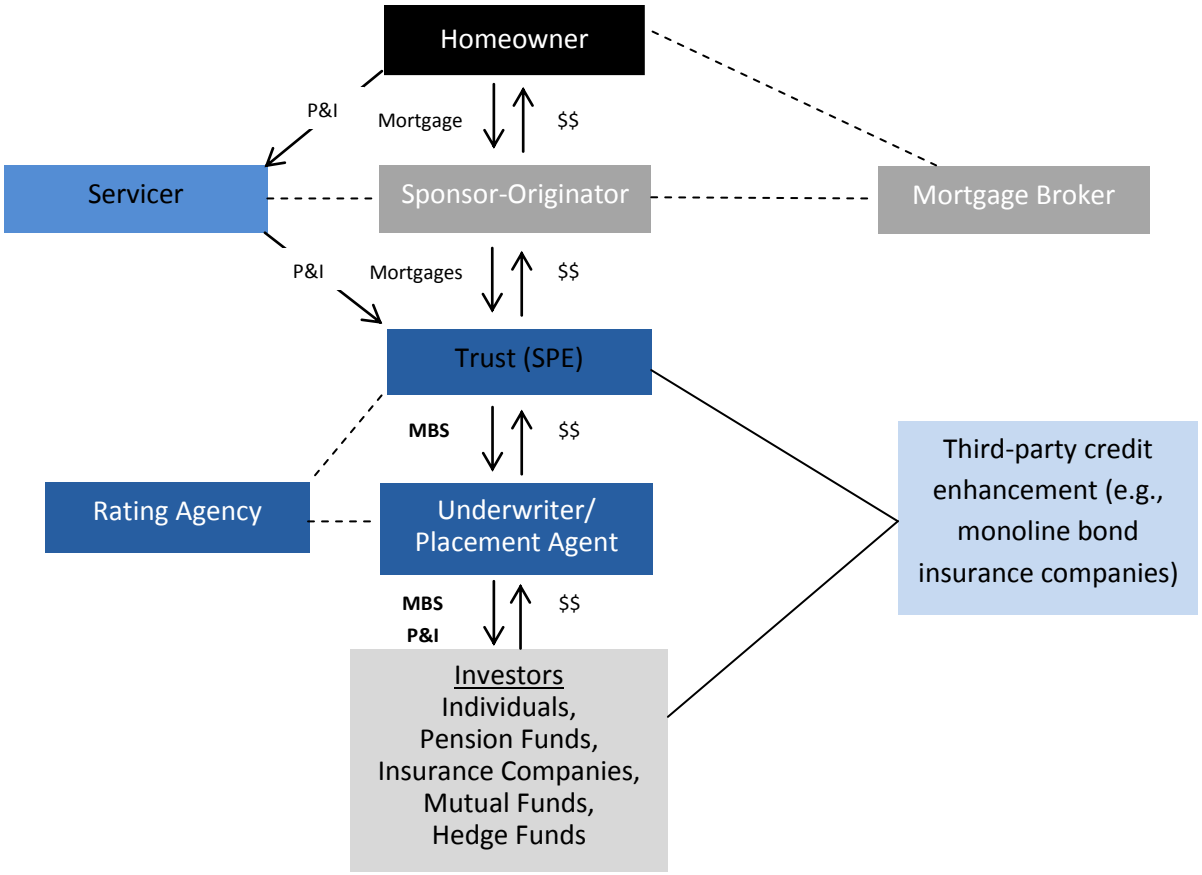


Figure 2: Variable Measurement Timeline

This figure illustrates when each variable is measured relative to each quarter end. All variable definitions are provided in Appendix A.

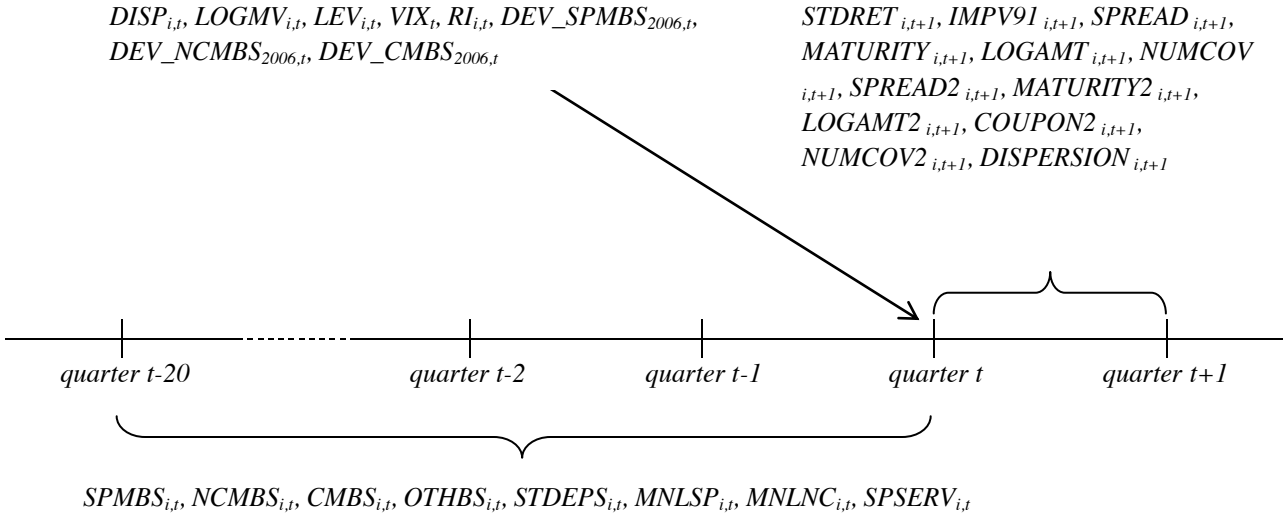
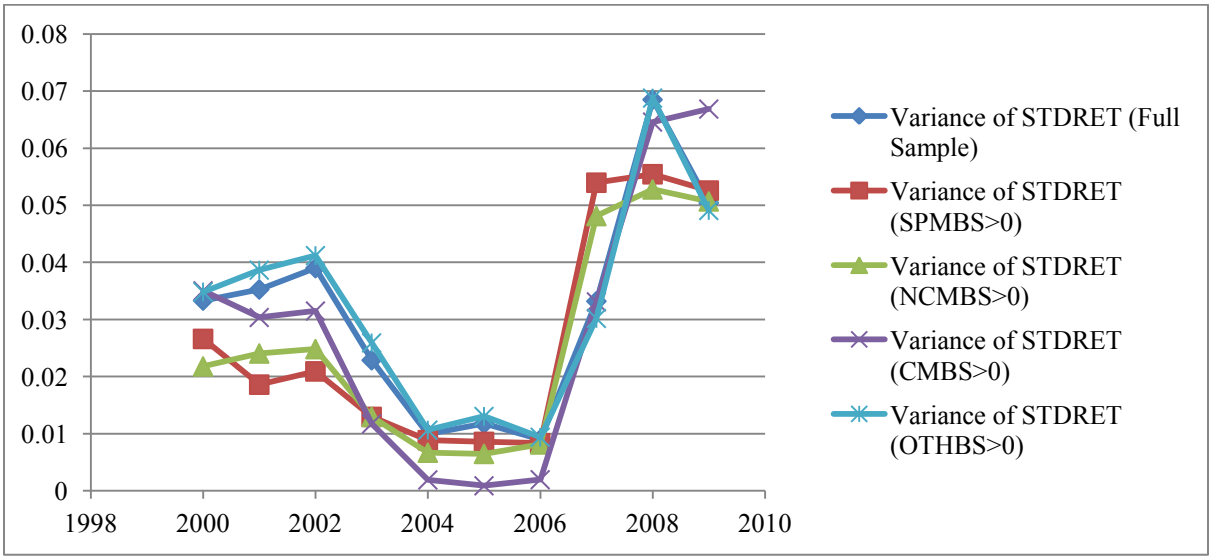


Figure 3: Plot of Variance of Dependent Variables from 2000 to 2009

This figure plots the variances of the dependent variables ($STDRET_{i,t+1}$) and ($IMPV91_{i,t+1}$) during 2000-2009, by type of collateral. The plot includes only those firm-years which have non-zero securitization deal values for the particular collateral type, and excludes firm-years data in the year of bankruptcy or merger.



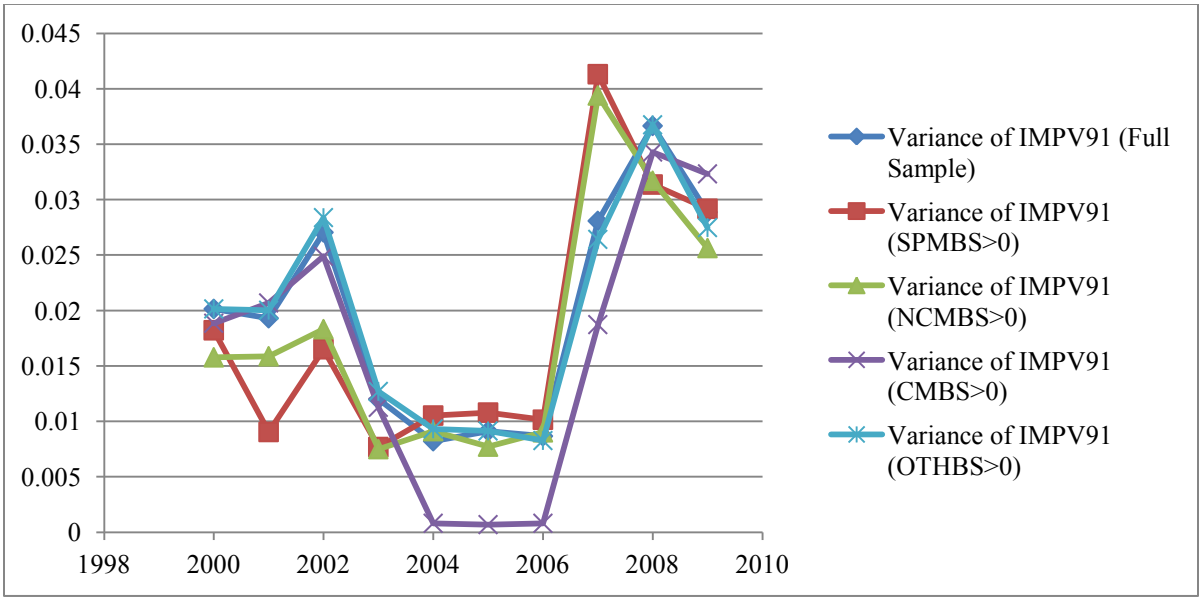


Table 1: Sample Selection

	# of Issues	# of Firm-Quarters
Issues from 1995 to 2009 from ABS Alert (excluding CDOs)	17,315	-
Sample for which Compustat GVKEYs are available for the sponsoring firms	12,599	9,098
Sample with control variables from Compustat and IBES	8,989	3,687
Sample with standard deviation of daily stock returns from CRSP	8,989	3,683
Sample with option-implied volatilities from OptionMetrics	8,528	2,914

Table 2, Panel A: Descriptive Statistics

Variable	# of obs.	# of firms	Mean	Std	25%	Median	75%
$STDRET_{i,t+1}$	3,683	217	0.407	0.226	0.228	0.34	0.511
$IMPV91_{i,t+1}$	2,914	171	0.400	0.187	0.248	0.350	0.495
$DISP_{i,t}$	3,683	217	0.073	0.131	0.013	0.028	0.072
$LOGMV_{i,t}$	3,683	217	8.332	1.914	7.025	8.303	9.726
$STDEPS_{i,t}$	3,683	217	1.186	1.773	0.377	0.675	1.256
$LEV_{i,t}$	3,683	217	0.625	0.167	0.387	0.677	0.849
VIX_t	3,683	217	20.510	5.887	14.020	19.540	26.350
$RET0609_i$	3,683	217	-0.308	0.516	-0.753	-0.405	0.089
$SPMBS_{i,t}$	784	45	0.247	0.599	0.011	0.034	0.165
$NCMBS_{i,t}$	1,178	63	0.288	0.368	0.019	0.093	0.552
$CMBS_{i,t}$	381	23	0.028	0.016	0.015	0.027	0.042
$OTHBS_{i,t}$	2,965	175	0.352	0.769	0.019	0.081	0.304
$CUMOBS_{i,t}$	3,683	217	0.431	0.816	0.033	0.125	0.518
$RI_{i,t}$	1,513	89	0.047	0.052	0.003	0.010	0.043
$SPREAD_{i,t+1}$	756	104	2.243	3.168	0.626	1.268	2.887
$MATURITY_{i,t+1}$	756	104	7.972	5.353	4.464	7.000	10.000
$LOGAMT_{i,t+1}$	756	104	11.858	1.811	10.820	12.420	13.122
$NUMCOV_{i,t+1}$	756	104	2.295	3.607	0.000	0.000	4.000
$SPREAD2_{i,t+1}$	1,279	93	4.821	6.366	1.604	2.811	5.579
$MATURITY2_{i,t+1}$	1,279	93	11.526	5.843	8.000	10.000	13.750
$LOGAMT2_{i,t+1}$	1,279	93	12.932	1.185	12.525	12.899	13.385
$COUPON2_{i,t+1}$	1,279	93	7.282	1.943	5.896	7.026	8.306
$NUMCOV2_{i,t+1}$	1,279	93	4.797	3.965	2.000	4.000	7.000
$DISPERSION_{i,t+1}$	3,604	212	0.089	0.175	0.014	0.029	0.079

For $SPMBS_{i,t}$, $NCMBS_{i,t}$, $CMBS_{i,t}$, $OTHBS_{i,t}$, and $RI_{i,t}$, the descriptives are provided for firm-quarters that have non-zero values. For the remaining variables, the descriptives are provided for all firm quarters with available data.

Table 2, Panel B: Pearson Correlations

	$STDRET_{i,t+1}$	$IMPV91_{i,t+1}$	$DISP_{i,t}$	$LOGMV_{i,t}$	$STDEPS_{i,t}$	$LEV_{i,t}$	VIX_t	$RET0609_i$	$RI_{i,t}$	$SPMBS_{i,t}$	$NCMBS_{i,t}$	$CMMBS_{i,t}$
$IMPV91_{i,t+1}$	0.9003*											
$DISP_{i,t}$	0.3481*	0.3336*										
$LOGMV_{i,t}$	-0.3683*	-0.4376*	-0.0631*									
$STDEPS_{i,t}$	0.2865*	0.2902*	0.4556*	-0.1373*								
$LEV_{i,t}$	0.2088*	0.2039*	0.2449*	-0.0715*	0.2858*							
VIX_t	0.5683*	0.5841*	0.1197*	-0.1230*	0.1034*	0.0152						
$RET0609_i$	-0.0944*	-0.1258*	-0.0460*	0.1737*	-0.0056	0.0700*	0.0630*					
$RI_{i,t}$	0.1035*	0.1431*	-0.0464*	-0.0628*	-0.0116	-0.0453*	-0.0145	-0.1166*				
$SPMBS_{i,t}$	0.0538*	0.0961*	0.0349	-0.1661*	0.0442*	0.0489*	-0.0093	-0.1281*	0.0046			
$NCMBS_{i,t}$	0.0518*	0.0727*	0.1524*	-0.1523*	0.0989*	0.1561*	-0.0767*	-0.2929*	0.0195	0.4461*		
$CMMBS_{i,t}$	-0.1145*	-0.1199*	-0.0225	0.1575*	-0.0245	0.0982*	-0.0456*	0.0412	-0.0708*	-0.0403	-0.0258	
$OTHBS_{i,t}$	0.1960*	0.1787*	-0.0206	-0.2511*	-0.0235	0.0653*	-0.0013	-0.0931*	0.4202*	-0.0157	-0.0824*	-0.1086*

The correlations are calculated using all available firm-quarter data. For *SPMBS*, *NCMBS*, *CMBS*, *OTHBS*, and *RI*, the correlations are calculated including all the zero values. * indicates statistical significance at the 1 percent level (two-tailed).

Table 2, Panel C: Industry Distribution

Industry	# of Firm-Quarters	Percent	# of Firms	Percent
Transportation & utilities	376	10.2	22	10.1
Retail and wholesale trade	381	10.3	24	11.1
Financial institutions	2,185	59.3	130	59.9
Others	741	20.1	41	18.9
Total	**3,683**	**100.0**	**217**	**100.0**

Table 3: Risk-Relevance of Mortgage Securitizations – Realized and Option-Implied Volatilities as Dependent Variables

Panel A: Using year indicators to examine changing risk-relevance

This table presents multivariate OLS regression tests of Equation (2) to analyze the risk-relevance of mortgage securitizations (with subprime and other collateral). The dependent variables in Models I and II are realized ($STDRET_{i,t+1}$) and option-implied volatilities ($IMPV91_{i,t+1}$), respectively. The main test variables are $SPMBS_{i,t}$, $NCMBS_{i,t}$, and $CMBS_{it}$, along-with their interaction terms with indicators for the years 2006 to 2009. All variables are defined in Appendix A. A positive coefficient on the test variables is considered to be indicative of risk-relevance of a particular type of securitization for a given time period. T-statistics are based on standard errors clustered by both firm and quarter. ***, **, and * indicate statistical significance at the 1 percent, 5 percent and 10 percent levels (two-tailed) respectively.

Dependent variable =	I. $STDRET_{i,t+1}$			II. $IMPV91_{i,t+1}$		
	Coefficients		t-statistics	Coefficients		t-statistics
$DISP_{i,t}$	0.267	***	6.811	0.195	***	4.823
$LOGMV_{i,t}$	-0.024	***	-7.505	-0.024	***	-5.680
$STDEPS_{i,t}$	0.008	***	2.889	0.006	*	1.894
$LEV_{i,t}$	0.071	***	3.622	0.065	***	2.997
VIX_t	0.015	***	4.961	0.013	***	5.233
$RET0609_i$	-0.027	**	-2.102	-0.035	**	-2.433
$RI_{i,t}$	0.534	***	2.938	0.498	***	2.697
$SPMBS_{i,t}$	0.019	***	2.783	0.028	***	3.462
$SPMBS_{i,t} \times YEAR\_2006$	0.055	***	2.922	0.098	***	2.883
$SPMBS_{i,t} \times YEAR\_2007$	0.177	**	1.983	0.112		1.239
$SPMBS_{i,t} \times YEAR\_2008$	0.288	*	1.686	0.237	**	2.299
$SPMBS_{i,t} \times YEAR\_2009$	0.676	***	7.735	0.763	***	12.064
$NCMBS_{i,t}$	-0.015		-0.956	-0.016		-0.657
$NCMBS_{i,t} \times YEAR\_2006$	-0.002		-0.099	0.018		1.252
$NCMBS_{i,t} \times YEAR\_2007$	0.073	***	2.641	0.083	***	2.976
$NCMBS_{i,t} \times YEAR\_2008$	0.385	*	1.685	0.002		0.019
$NCMBS_{i,t} \times YEAR\_2009$	0.110	***	3.034	0.092	*	1.916
$CMBS_{i,t}$	-0.231		-0.450	-0.162		-0.290
$CMBS_{i,t} \times YEAR\_2006$	0.094		0.645	-0.120		-0.976
$CMBS_{i,t} \times YEAR\_2007$	0.215		1.614	-0.180		-1.233
$CMBS_{i,t} \times YEAR\_2008$	0.201	***	3.814	0.092		1.159
$CMBS_{i,t} \times YEAR\_2009$	0.313	**	2.528	0.190	**	2.006
$OTHBS_{i,t}$	0.024	***	2.850	0.018	*	1.747
Intercept	0.498	***	7.290	0.329	***	6.061
Industry Indicators	YES			YES		
Year Indicators	YES			YES		
N	3,683			2,914		
Adj. R^2	0.638			0.693		

Table 3 (continued):

Panel B: Using change in mortgage delinquency indices to examine changing risk-relevance

This table presents multivariate OLS regression tests of Equation (3) to analyze the risk-relevance of mortgage securitizations (with subprime and other collateral). The dependent variables in Models I and II are realized ($STDRET_{i,t+1}$) and option-implied volatilities ($IMPV91_{i,t+1}$), respectively. The main test variables are $SPMBS_{i,t}$, $NCMBS_{i,t}$, and $CMBS_{i,t}$, along-with their interaction terms with Indices. $DEV\_SPMBS_{2006,t}$, $DEV\_NCMBS_{2006,t}$, and $DEV\_CMBS_{2006,t}$ are devaluation percentages starting from 2006, calculated using the Bloomberg 60+day delinquency indices for subprime and Alt-A mortgages, and the Federal Reserve delinquency rates data for commercial mortgages. All variables are defined in Appendix A. T-statistics are based on standard errors clustered by both firm and quarter. ***, **, and * indicate statistical significance at the 1 percent, 5 percent and 10 percent levels (two-tailed) respectively.

Dependent variable =	I. $STDRET_{i,t+1}$			II. $IMPV91_{i,t+1}$		
	Coefficients		t-statistics	Coefficients		t-statistics
$DISP_{i,t}$	0.230	***	6.206	0.141	***	3.196
$LOGMV_{i,t}$	-0.028	***	-6.040	-0.023	***	-5.388
$STDEPS_{i,t}$	0.006	*	1.928	0.004		1.250
$LEV_{i,t}$	0.075	***	3.601	0.072	***	3.130
VIX_t	0.015	***	6.903	0.013	***	6.602
$RET0609_i$	-0.021		-1.638	-0.032	**	-2.254
$RI_{i,t}$	0.450	**	2.379	0.467	**	2.538
$SPMBS_{i,t}$	0.017	**	2.113	0.024	***	3.313
$SPMBS_{i,t} \times DEV\_SPMBS_{2006,t}$	0.829	***	3.542	0.766	*	1.834
$DEV\_SPMBS_{2006,t}$	0.345	*	1.843	0.416	**	2.488
$NCMBS_{i,t}$	-0.015		-0.881	-0.004		-0.176
$NCMBS_{i,t} \times DEV\_NCMBS_{2006,t}$	0.358	***	2.995	0.478	**	2.248
$DEV\_NCMBS_{2006,t}$	0.885	*	1.661	0.105		0.166
$CMBS_{i,t}$	-0.457		-0.809	-0.436		-0.743
$CMBS_{i,t} \times DEV\_CMBS_{2006,t}$	5.215	***	2.799	2.524	*	1.869
$DEV\_CMBS_{2006,t}$	0.544	*	1.936	0.217		0.797
$OTHBS_{i,t}$	0.026	***	2.901	0.019	*	1.824
Intercept	0.461	***	8.247	0.281	***	4.426
Industry Indicators	YES			YES		
N	3,683			2,914		
Adj. R^2	0.619			0.658		

Table 4: Risk-Relevance of Mortgage Securitizations: Monoline Credit-Enhancement

This table presents multivariate OLS regressions to analyze the risk-relevance of mortgage securitizations. The regressions test a version of Equation (2) that is modified by the inclusion of interaction terms to study the effect of monoline credit enhancement. The table is similar to Table 3 Panel A, except that it provides partition results for issues with and without monoline bond insurance guarantees. $MNLSP_{i,t}$ and $MNLNC_{i,t}$ are firm-quarter level indicator variables, indicating if the majority (at least 50%) of the outstanding subprime and other non-conforming issues were credit-enhanced by a guarantee from a monoline bond insurance company. All variables are defined in Appendix A. T-statistics are based on standard errors clustered by both firm and quarter. ***, **, and * indicate statistical significance at the 1 percent, 5 percent and 10 percent levels (two-tailed) respectively.

Dependent variable =	I. $STDRET_{i,t+1}$			II. $IMPV91_{i,t+1}$		
	Coefficients		t-statistics	Coefficients		t-statistics
$DISP_{i,t}$	0.251	***	5.968	0.174	***	4.574
$LOGMV_{i,t}$	-0.023	***	-6.144	-0.022	***	-5.468
$STDEPS_{i,t}$	0.007	**	2.271	0.006		1.507
$LEV_{i,t}$	0.073	***	3.554	0.070	***	3.121
VIX_t	0.015	***	4.840	0.012	***	5.384
$RET0609_i$	-0.027	**	-2.124	-0.034	**	-2.526
$RI_{i,t}$	0.527	***	3.023	0.480	***	2.691
$SPMBS_{i,t}$	0.038	***	4.487	0.028	**	2.500
$SPMBS_{i,t} \times YEAR\_2006$	0.048	**	2.360	0.125	***	3.155
$SPMBS_{i,t} \times YEAR\_2007$	0.301	***	2.672	0.283	***	3.569
$SPMBS_{i,t} \times YEAR\_2008$	0.208	**	2.412	0.206	*	1.825
$SPMBS_{i,t} \times YEAR\_2009$	0.631	***	5.374	0.615	***	5.805
$MNLSP_{i,t}$	-0.032	*	-1.779	-0.033	**	-2.063
$SPMBS_{i,t} \times MNLSP_{i,t}$	-0.020	*	-1.742	0.006		0.238
$SPMBS_{i,t} \times YEAR\_2006 \times MNLSP_{i,t}$	-0.086	***	-2.974	-0.102	***	-3.872
$SPMBS_{i,t} \times YEAR\_2007 \times MNLSP_{i,t}$	-0.399	***	-7.955	-0.060		-0.531
$SPMBS_{i,t} \times YEAR\_2008 \times MNLSP_{i,t}$	0.007		0.106	0.017		0.460
$SPMBS_{i,t} \times YEAR\_2009 \times MNLSP_{i,t}$	-0.177		-1.354	0.012		0.146
$YEAR\_2006 \times MNLSP_{i,t}$	0.062	**	2.559	0.052	***	2.887
$YEAR\_2007 \times MNLSP_{i,t}$	0.058	**	2.367	0.036		1.454
$YEAR\_2008 \times MNLSP_{i,t}$	0.025		0.380	0.032		0.644
$YEAR\_2009 \times MNLSP_{i,t}$	0.146	**	2.213	0.062		0.860
$NCMBS_{i,t}$	-0.030		-1.334	-0.036		-0.987
$NCMBS_{i,t} \times YEAR\_2006$	0.038		0.906	0.059		1.582
$NCMBS_{i,t} \times YEAR\_2007$	0.114	***	4.074	0.125	***	3.393
$NCMBS_{i,t} \times YEAR\_2008$	0.384	***	4.026	0.133	*	1.850
$NCMBS_{i,t} \times YEAR\_2009$	0.186	***	3.313	0.126	***	3.084
$MNLNC_{i,t}$	0.016		0.871	0.014		0.729
$NCMBS_{i,t} \times MNLNC_{i,t}$	0.011		0.441	0.028		0.757
$NCMBS_{i,t} \times YEAR\_2006 \times MNLNC_{i,t}$	-0.048		-0.915	-0.055		-1.292
$NCMBS_{i,t} \times YEAR\_2007 \times MNLNC_{i,t}$	-0.126	**	-2.550	-0.191	***	-2.677
$NCMBS_{i,t} \times YEAR\_2008 \times MNLNC_{i,t}$	-0.015		-0.461	-0.102		-0.741
$NCMBS_{i,t} \times YEAR\_2009 \times MNLNC_{i,t}$	0.031		1.324	0.595	***	2.917
$YEAR\_2006 \times MNLNC_{i,t}$	-0.001		-0.020	-0.007		-0.348
$YEAR\_2007 \times MNLNC_{i,t}$	0.032		1.218	0.071	**	2.217
$YEAR\_2008 \times MNLNC_{i,t}$	-0.027		-0.395	-0.016		-0.196
$YEAR\_2009 \times MNLNC_{i,t}$	-0.307	***	-3.877	-0.212	***	-3.106
$CMBS_{i,t}$	-0.172		-0.351	-0.129		-0.239
$CMBS_{i,t} \times YEAR\_2006$	0.032		0.226	-0.152		-1.321
$CMBS_{i,t} \times YEAR\_2007$	-0.058		-0.211	-0.444		-1.586
$CMBS_{i,t} \times YEAR\_2008$	0.161	***	3.124	0.100	**	2.064
$CMBS_{i,t} \times YEAR\_2009$	0.234	**	2.418	0.094		1.391

$OTHBS_{i,t}$	0.024	***	2.877	0.018	*	1.820
Intercept	0.494	***	7.632	0.331	***	6.167
Industry Indicators	YES			YES		
Year Indicators	YES			YES		
N	3,683			2,914		
Adj. R^2	0.646			0.706		

Table 5: Risk-Relevance of Commercial Mortgage Securitizations when the Sponsor is also the Special Servicer

This table presents multivariate OLS regressions to analyze the risk-relevance of commercial mortgage securitizations. The regressions test a version of Equation (2) that is modified by the inclusion of interaction terms to study the effect of retention of a junior tranche (B piece) by the sponsor, typically observed when the sponsor is also the special servicer. The table is similar to Table 3 Panel A, except that it provides partition results for *CMBS* issues for which the sponsor was (was not) the special servicer. $SPSERV_{i,t}$ is a firm-quarter level variable indicating that the sponsor is the special servicer for at least 50% of outstanding commercial mortgage securitizations for that firm quarter. All variables are defined in Appendix A. T-statistics are based on standard errors clustered by both firm and quarter. ***, **, and * indicate statistical significance at the 1 percent, 5 percent and 10 percent levels (two-tailed) respectively.

Dependent variable =	I. $STDRET_{i,t+1}$			II. $IMPV91_{i,t+1}$		
	Coefficients		t-statistics	Coefficients		t-statistics
$DISP_{i,t}$	0.259	***	6.596	0.188	***	4.930
$LOGMV_{i,t}$	-0.025	***	-7.119	-0.025	***	-5.727
$STDEPS_{i,t}$	0.007	***	2.709	0.006	*	1.899
$LEV_{i,t}$	0.067	***	3.374	0.062	***	2.613
VIX_t	0.015	***	4.859	0.013	***	5.189
$RET0609_i$	-0.025	*	-1.771	-0.033	**	-2.204
$RI_{i,t}$	0.532	***	2.925	0.492	***	2.665
$SPMBS_{i,t}$	0.021	***	2.952	0.027	***	3.264
$SPMBS_{i,t} \times YEAR\_2006$	0.055	**	2.416	0.099	**	2.520
$SPMBS_{i,t} \times YEAR\_2007$	0.170	*	1.885	0.105		1.002
$SPMBS_{i,t} \times YEAR\_2008$	0.233	*	1.759	0.205	*	1.953
$SPMBS_{i,t} \times YEAR\_2009$	0.630	***	5.747	0.727	***	9.790
$NCMBS_{i,t}$	-0.016		-0.953	-0.014		-0.530
$NCMBS_{i,t} \times YEAR\_2006$	0.001		0.047	0.018		1.031
$NCMBS_{i,t} \times YEAR\_2007$	0.075	***	2.587	0.083	***	2.860
$NCMBS_{i,t} \times YEAR\_2008$	0.458	***	2.963	-0.006		-0.047
$NCMBS_{i,t} \times YEAR\_2009$	0.104	***	2.760	0.082		1.630
$CMBS_{i,t}$	0.061		1.020	0.038		0.419
$CMBS_{i,t} \times YEAR\_2006$	0.117		0.659	-0.105		-0.654
$CMBS_{i,t} \times YEAR\_2007$	0.095		0.416	-0.212		-1.513
$CMBS_{i,t} \times YEAR\_2008$	-0.546		-1.107	-0.389		-1.466
$CMBS_{i,t} \times YEAR\_2009$	-0.715		-1.559	-0.505		-1.418
$SPSERV_{i,t}$	0.050	*	1.774	0.028		1.012
$CMBS_{i,t} \times SPSERV_{i,t}$	-0.046		-0.350	-0.035		-0.269
$CMBS_{i,t} \times YEAR\_2006 \times SPSERV_{i,t}$	-0.158		-0.637	-0.191		-0.977
$CMBS_{i,t} \times YEAR\_2007 \times SPSERV_{i,t}$	0.109		0.731	0.150		1.248
$CMBS_{i,t} \times YEAR\_2008 \times SPSERV_{i,t}$	0.616	*	1.660	0.252		1.072
$CMBS_{i,t} \times YEAR\_2009 \times SPSERV_{i,t}$	1.492	*	1.814	1.083	*	1.702
$YEAR\_2006 \times SPSERV_{i,t}$	0.012		0.353	0.024		0.765
$YEAR\_2007 \times SPSERV_{i,t}$	-0.016		-0.955	-0.009		-0.387
$YEAR\_2008 \times SPSERV_{i,t}$	0.013		0.298	0.088	*	1.893
$YEAR\_2009 \times SPSERV_{i,t}$	-0.072		-0.958	-0.067		-1.012
$OTHBS_{i,t}$	0.023	***	2.666	0.018	*	1.837
Intercept	0.512	***	7.259	0.342	***	6.237
Industry Indicators	YES			YES		
Year Indicators	YES			YES		
N	3,683			2,914		
Adj. R^2	0.641			0.695		

Table 6: Risk-Relevance of Mortgage Securitizations – Alternate Dependent Variables
Panel A: Primary Bond Market Spreads as Dependent Variable

This table presents multivariate OLS regression tests of Equation (4a) to analyze the impact of mortgage securitizations (with subprime and other collateral) on credit spreads. The dependent variable is the weighted average yield spread of new bonds issued during the subsequent quarter. The main test variables are $SPMBS_{i,t}$, $NCMBS_{i,t}$, and $CMBS_{i,t}$, along-with their interaction terms with indicators for the years 2006 to 2009. All variables are defined in Appendix A. A positive coefficient on the test variables is considered to be indicative of risk-relevance of a particular type of securitization for a given time period. T-statistics are based on standard errors clustered by both firm and quarter. ***, **, and * indicate statistical significance at the 1 percent, 5 percent and 10 percent levels (two-tailed) respectively.

Dependent variable =	*Dep Var = $SPREAD_{i,t+1}$*		
	Coefficients		t-statistics
$MATURITY_{i,t+1}$	0.112	***	2.677
$LOGAMT_{i,t+1}$	0.234	*	1.712
$NUMCOV_{i,t+1}$	0.000		-0.009
$DISP_{i,t}$	-2.900		-1.385
$LOGMV_{i,t}$	-0.340	***	-2.721
$STDEPS_{i,t}$	0.410	**	2.312
$LEV_{i,t}$	1.425	*	1.855
VIX_t	0.037		1.272
$RET0609_i$	0.847		1.027
$RI_{i,t}$	4.616	**	2.213
$SPMBS_{i,t}$	5.473	*	1.707
$SPMBS_{i,t} \times YEAR\_2006$	7.527	**	2.069
$SPMBS_{i,t} \times YEAR\_2007$	22.208	**	2.437
$SPMBS_{i,t} \times YEAR\_2008$	8.789	***	3.896
$SPMBS_{i,t} \times YEAR\_2009$	17.235	***	2.747
$NCMBS_{i,t}$	-1.265		-1.204
$NCMBS_{i,t} \times YEAR\_2006$	-0.952		-1.293
$NCMBS_{i,t} \times YEAR\_2007$	3.970	*	1.725
$NCMBS_{i,t} \times YEAR\_2008$	6.176	***	4.874
$NCMBS_{i,t} \times YEAR\_2009$	5.630	***	2.724
$CMBS_{i,t}$	-2.484		-0.238
$CMBS_{i,t} \times YEAR\_2006$	11.436		0.804
$CMBS_{i,t} \times YEAR\_2007$	22.657		1.246
$CMBS_{i,t} \times YEAR\_2008$	2.492		0.695
$CMBS_{i,t} \times YEAR\_2009$	3.054		1.391
$OTHBS_{i,t}$	0.394	**	2.267
Intercept	6.786	***	3.187
Industry Indicators		YES	
Year Indicators		YES	
N		756	
Adj. R^2		0.496	

Table 6 (continued): Panel B: Secondary Bond Market Spread as Dependent Variable

This table presents multivariate OLS regression tests of Equation (4b) to analyze the impact of mortgage securitizations (with subprime and other collateral) on credit spreads. The dependent variable is the weighted average yield spread of bonds traded in the secondary market during the subsequent quarter. The main test variables are $SPMBS_{i,t}$, $NCMBS_{i,t}$, and $CMBS_{i,t}$, along-with their interaction terms with indicators for the years 2006 to 2009. A positive coefficient on the test variables is considered to be indicative of risk-relevance of a particular type of securitization for a given time period. All variables are defined in Appendix A. T-statistics are based on standard errors clustered by both firm and quarter. ***, **, and * indicate statistical significance at the 1 , 5 and 10 percent levels (two-tailed) respectively.

Dependent variable =	*Dep var = $SPREAD2_{i,t+1}$*		
	Coefficients		t-statistics
$MATURITY2_{i,t+1}$	0.108	**	2.433
$LOGAMT2_{i,t+1}$	0.191		1.391
$COUPON2_{i,t+1}$	0.237	**	1.973
$NUMCOV2_{i,t+1}$	-0.096		-0.866
$DISP_{i,t}$	1.002		0.375
$LOGMV_{i,t}$	-0.510		-1.491
$STDEPS_{i,t}$	0.462	**	2.169
$LEV_{i,t}$	2.429	**	2.070
VIX_t	0.279	**	2.301
$RET0609_i$	-1.111		-1.243
$RI_{i,t}$	7.103	**	2.000
$SPMBS_{i,t}$	12.265	**	2.254
$SPMBS_{i,t} \times YEAR\_2006$	20.282	*	1.824
$SPMBS_{i,t} \times YEAR\_2007$	8.771	*	1.775
$SPMBS_{i,t} \times YEAR\_2008$	12.851		1.610
$SPMBS_{i,t} \times YEAR\_2009$	37.043	***	2.822
$NCMBS_{i,t}$	-1.644		-0.892
$NCMBS_{i,t} \times YEAR\_2006$	-1.821		-0.724
$NCMBS_{i,t} \times YEAR\_2007$	2.353		1.495
$NCMBS_{i,t} \times YEAR\_2008$	32.483	*	1.668
$NCMBS_{i,t} \times YEAR\_2009$	9.246	***	3.268
$CMBS_{i,t}$	-5.488		-0.309
$CMBS_{i,t} \times YEAR\_2006$	-2.910		-0.491
$CMBS_{i,t} \times YEAR\_2007$	11.394		0.428
$CMBS_{i,t} \times YEAR\_2008$	5.944	*	1.733
$CMBS_{i,t} \times YEAR\_2009$	12.004	**	2.391
$OTHBS_{i,t}$	3.084	***	4.063
Intercept	-5.264	*	-1.681
Industry Indicators		YES	
Year Indicators		YES	
N		1,279	
Adj. R^2		0.524	

Table 6 (continued):

Panel C: Analysts' Earnings Forecast Dispersion as Dependent Variable

This table presents multivariate OLS regression tests of a modified version of Equation (3) to analyze the impact of mortgage securitizations (with subprime and other collateral) on equity analysts' forecast dispersion ($DISPERSION_{i,t+1}$), calculated as standard deviation of analyst estimates of one year ahead annual earnings during next quarter's last month. The main test variables are $SPMBS_{i,t}$, $NCMBS_{i,t}$, and $CMBS_{i,t}$, along-with their interaction terms with indicators for the years 2006 to 2009. All variables are defined in Appendix A. A positive coefficient on the test variables is considered to be indicative of impact of a particular type of securitization for a given time period on analysts' information environment. T-statistics are based on standard errors clustered by both firm and quarter. ***, **, and * indicate statistical significance at the 1 percent, 5 percent and 10 percent levels (two-tailed) respectively.

Dependent variable =	*Dep Var = $DISPERSION_{i,t+1}$*		
	Coefficients		t-statistics
$LOGMV_{i,t}$	0.002		0.276
$STDEPS_{i,t}$	0.020	**	2.420
$LEV_{i,t}$	0.090	***	2.926
VIX_t	0.003	**	2.188
$RET0609_i$	-0.032	*	-1.852
$RI_{i,t}$	-0.119		-0.857
$SPMBS_{i,t}$	0.001		1.462
$SPMBS_{i,t} \times YEAR\_2006$	0.234	*	1.768
$SPMBS_{i,t} \times YEAR\_2007$	0.136	**	1.997
$SPMBS_{i,t} \times YEAR\_2008$	0.165	**	2.432
$SPMBS_{i,t} \times YEAR\_2009$	0.776	***	6.399
$NCMBS_{i,t}$	0.016		0.424
$NCMBS_{i,t} \times YEAR\_2006$	0.055		0.829
$NCMBS_{i,t} \times YEAR\_2007$	0.160	***	4.124
$NCMBS_{i,t} \times YEAR\_2008$	0.706	***	8.747
$NCMBS_{i,t} \times YEAR\_2009$	0.394	***	6.388
$CMBS_{i,t}$	-0.188		-0.457
$CMBS_{i,t} \times YEAR\_2006$	-0.052		-0.339
$CMBS_{i,t} \times YEAR\_2007$	-0.348		-0.943
$CMBS_{i,t} \times YEAR\_2008$	0.203		1.300
$CMBS_{i,t} \times YEAR\_2009$	0.238	*	1.840
$OTHBS_{i,t}$	0.003		0.364
Intercept	-0.027		-0.442
Industry Indicators	YES		
Year Indicators	YES		
N	3,604		
Adj. R^2	0.318		