DOES THE MARKET UNDERSTAND RATING SHOPPING?
PREDICTING MBS LOSSES WITH INITIAL YIELDS†

Jie (Jack) He
University of Georgia
jiehe@uga.edu

Jun 'QJ' Qian
Boston College
qianju@bc.edu

Philip E. Strahan
Boston College & NBER
strahan@bc.edu

Current version: March 2013

Abstract

We study the effects of rating shopping on the market for MBS. Outside of AAA, realized losses were much higher on single-rated tranches than on those with multiple ratings, and yields predict future losses for single-rated tranches but not for multi-rated ones. These results suggest that single-rated tranches have been 'shopped,' whereby pessimistic ratings never reach the market. In the AAA market, by contrast, most tranches receive two or three ratings and those ratings almost always agree. The convergence in ratings suggests that rating agencies may have 'catered' to investors, who could not purchase a tranche unless it has multiple AAA ratings.

JEL Classifications: G21, G24, G28, G1, L1.

Keywords: Credit ratings, mortgage-backed securities, shopping, loss, yield.

† We appreciate helpful comments from John Griffin. We thank Lei Kong, Ali Ebrahim Nejad, Lin Shen, Yingzhen Li, and Chenying Zhang for excellent research assistance and Boston College and University of Georgia for financial support. The authors are responsible for all the remaining errors.

I. INTRODUCTION

There is growing evidence documenting problems in the practice of credit rating agencies, especially in the structured finance markets including mortgage-backed securities (MBS). The root of the problems stems from the fact that agencies face a potential conflict of interest: instead of being rewarded by "consumers" for high-quality ratings, agencies are paid by issuers. Therefore, critics stipulate that agencies may be under pressure to grant inflated ratings to compete for business despite possible loss of reputation. Moreover, regulations contingent on ratings may further distort the incentives of both issuers and agencies: holding highly rated MBS securities lowers the burden of capital requirements for financial institutions, while other institutional investors (e.g., pension funds) are constrained to hold 'safe' fixed income assets as certified by *multiple* AAA ratings.

The perverse incentives of issuers and rating agencies can affect the quality of ratings through the process of 'rating shopping,' whereby issuers only purchase and report the most favorable rating(s) after receiving preliminary opinions from multiple agencies. Since issuers are not required to disclose their preliminary contacts with rating agencies, shopping tends to be hidden from view; yet, it influences the distribution and information content of ratings that are revealed to investors (and thus observable in our dataset). Shoppers tend to censor out pessimistic ratings, thus reducing the number of ratings observed empirically and, at the same time, reducing the likelihood of observed ratings disagreements. Ratings convergence can also result from the threat of shopping, and may be particularly pronounced in the AAA segment, where investors constrained by regulations or contractual terms cannot purchase a tranche unless it has at least two ratings. Beyond the number of ratings, earlier research (He et al., 2012) suggests that market yields were higher on MBS sold by large issuers, suggesting the investors

'priced' the risk that large issuers sometimes used their bargaining power to receive inflated ratings.

In this paper, we test whether the market goes beyond the credit rating in pricing risks by linking cumulative losses on tranches through 2012 to initial yields on those tranches, conditional on the rating (and other observables). If the market rationally suspects poor-quality ratings – either because deals have been sold by large issuers with substantial bargaining power, or because investors observe just one rating and thus infer that shopping has occurred – then initial yields ought to predict ex post performance. In contrast, if investors trust ratings at issuance, then yields ought to have little incremental power to forecast future outcomes. This idea forms the basis for our empirical tests.

We match a large sample of privately issued (non GSEs) MBS tranches sold between 2000 and 2006 with information on initial yield (at issuance), rating history (from Moody's, S&P and Fitch) and cumulative losses (percentage of principal balance write offs due to default through June 2012). We obtain data on the characteristics of the tranches, including principal amount, weighted average life, geographical distribution of the underlying mortgages, loan to value (LTV) ratio and weighted average credit score of the collateral. We also collect information on the issuers, such as issuer size (the issuing institutions' one-year *lagged* annual market share), type (whether it is a depository institution) and rating at the issuance date.

Not surprisingly, default rates rise dramatically for tranches sold during market boom years (2004-2006) as compared to earlier years (2000-2003). Tranches retaining the highest AAA rating (or equivalent) typically have two or three such ratings. These facts suggest that in the AAA market, rather than drop pessimistic ratings, the threat of ratings shopping leads to convergence. The AAA tranches also have very low default rates: tranches sold in 2006 (2005)

have an average default rate of 5.3% (1%) while in all other years the average default rate is 0. Outside of AAA, however, a much higher percentage of tranches receive just one rating (nearly 1/3), and the default rates of the single-rated tranches exceed those with two- or three-ratings. For example, conditional on ratings we find default rate are 17.2% higher for one-rated tranches compared to similarly-rated tranches with two or three ratings. Thus, in the non-AAA market, shopping seems to lead issuers to drop the more pessimistic rating, perhaps because many of the investors are less likely to require multiple ratings for regulatory or contractual compliance.

To test for the information content in yields, we regress ex post default rates on the log of yield spread at issuance on the pooled sample of all cohorts (2000-2006), comparing the explanatory power of yields based on issuer size and across tranches with one-, two- and three-ratings. Initial yields strongly predict future losses for tranches sold by large issuers during the boom years, and for those with a single rating. These results indicate that when investors are concerned about the integrity of the ratings process - when issuers are large, or when investors infer ratings shopping – pricing embeds information about risk that goes well beyond the credit rating. In contrast, initial yields have no incremental explanatory power over ratings when tranches have multiple ratings or are sold by small issuers.

In our second set of results, we then split the sample into the AAA and non-AAA segments. Shopping's effects are clear in the non-AAA segment: higher initial yield spreads predict greater ex post losses for one-rated tranches, and this relation becomes stronger during the boom period. These results support the hypothesis that tranches with only one reported rating have been shopped, with the more pessimistic ratings never reaching the market. As noted above, however, within the AAA segment almost all tranches have at least two ratings (93%). Unlike the non-AAA market, yields predict future losses *only* when there are exactly two ratings.

This pattern suggests that ratings agencies have catered to investors in the AAA market, who could not purchase a tranche unless it has at least two AAA ratings. These results are also consistent with the findings of Griffin and Tang (2013), who find that one of the rating agencies adjust the ratings on a sample of CDOs from their quantitative models to 'catch up' with more favorable ratings from another competing agency.

In our final set of results, we directly compare the information content in ratings themselves with that of initial yields. To do so, we map the discrete ratings at issuance into the Expected Default Frequency (EDF), equal to the average default frequencies across each rating category provided by S&P's Global Structured Finance five-year cumulative default rates ending in December 1999. We find that EDF's ability to forecast future losses declines with issuer size, whereas the power of yields increases with issuer size. Together these results suggest that the market prices become more important at the margin when ratings themselves are less informative due to perceived compromises in the integrity of the bargaining between large issuers and the ratings agencies. The contrast between the effects of yield and EDF in predicting losses supports the findings of He et al. (2012). They find the market 'prices' the risk of tranches sold by large issuers by demanding higher initial yields, since ratings agencies may have granted more inflated ratings to these tranches.

Our paper extends the recent literature on how incentive and regulatory problems affect the quality of ratings. While Griffin and Tang (2012) and He et al. (2012) examine how incentive problems of rating agencies affect the subordination and pricing of structured finance products, we link ex post losses of MBS to ex ante pricing of these securities. Adelino (2009) also finds that initial yield spreads predict ex post performance of MBS tranches, but he does not examine how this predictability is linked to the market's assessment of rating shopping based on the

number of reported ratings and rating categories. With a sample of CDOs (including MBS) Griffin and Tang (2013) find evidence consistent with catering by rating agencies. Our results in the AAA segment of the MBS market are consistent with their findings, but our results on the differences between single-rated tranches and multi-rated tranches (outside AAA) support the rating shopping hypothesis.

The rest of the paper is organized as follows. In Section II we introduce our data on MBS securities and our empirical methods. In Section III we present results from our empirical tests and some discussions. We conclude in Section IV.

II. DATA AND METHODS

Our MBS sample is obtained by matching data from the *Securities Data Corporation* (SDC) and *Bloomberg*. SDC provides information on issuance date, asset/collateral types (mortgage, credit card, auto loans, bonds, etc), the number of tranches, as well as information on the issuers and bookrunners on a large sample of tranches of privately-issued MBS deals. For other deal, tranche, and collateral characteristics, including cumulative losses (default rates), initial ratings, principal amount, coupon type and rate, deal name and type, maturity (weighted average life), the originator and servicer identities, the geographic distribution of collateral, as well as the loan to value (LTV) ratio and weighted average credit score of the collateral, we manually collect data from *Bloomberg*.

Our sample includes MBS deals originated and issued in 2000 through 2006, and we follow the cumulative losses (percentages of balance write offs due to default) of these deals/tranches through June of 2012. We obtain ratings from the largest three credit rating agencies, Moody's, S&P, and Fitch, and our final sample includes MBS tranches that are rated

by at least one of the agencys at issuance.

II.1 Empirical Models

We estimate OLS models relating initial yield spread and its interactions with various issuer and market characteristics to *Default Rate*, a tranche's cumulative loss rate from the issuance date to June 2012. The key explanatory variables are the natural logarithm of the initial yield spread (*Log Yield*) and its interaction with *Hot,* a dummy indicating that a deal is issued in the hot MBS market from 2004 to 2006, with *Issuer Share*, the lagged MBS market share of the issuer based on the number of deals originated in the previous year, and with *One Rating*, a dummy indicating that a tranche is rated by only one credit rating agency at issuance. To summarize analytically:

$$\begin{aligned} Default\ Rate_{i,j,t} = {} & \beta_1 Log\ Yield_{i,j,t} + \beta_2 Log\ Yield_{i,j,t} \times Hot_t + \beta_3 Log\ Yield_{i,j,t} \times Issuer\ Share_{k,t-1} + \\ & \beta_4 Log\ Yield_{i,j,t} \times One\ Rating_{i,j,t} + Initial\ Rating \times Issuance\ Year\ fixed\ effects + Deal\ ,\ Tranche, \\ & Collateral,\ and\ Issuer\ controls + e_{i,j,t} \end{aligned} \quad (1)$$

The data vary by year (t), issuer (k), deal (i) and tranche (j). In all of our tests, we include initial rating (averaged across all ratings received by a tranche) × cohort (issuance) year fixed effects, separate intercepts for coupon types (such as floating, fixed, etc.) and deal types given by Bloomberg (such as "ABS Home", "CMBS", "Private CMO Float", etc.), and we cluster standard errors by issuers. Note that by including the *Initial Rating* × *Issuance Year* fixed effects, we absorb the direct effect of *Hot*, which has only time variation but no cross-sectional variation; hence, we only report its interaction with issuer size.

II.2 Variable Construction and Summary Statistics

Dependent Variable and Key Explanatory Variable

Table I, Panel A reports summary statistics for the overall sample. We have two sets of variables to measure *ex ante* pricing (yield spread) and *ex post* performance (default rate). The mean default rate for the MBS tranches in our sample is 20% while the median is only 0%, since a large fraction of the tranches are AAA-rated at issuance and have zero losses, whereas a small fraction of the tranches (around 10%) have lost all their balances (i.e., the default rate is 100%).

Our key explanatory variable, *Initial Yield Spread,* equals the yield spread of a tranche at issuance. For a tranche with a floating coupon rate, yield spread is defined as the fixed mark-up, in basis points (bps), over the reference rate specified at issuance (e.g. the 1-month LIBOR rate). For a tranche with a fixed or variable coupon rate, yield spread is defined as the difference between the initial coupon rate and the yield on a Treasury security whose maturity is closest to the tranche's weighted-average life. The mean yield spread is 125 bps over the whole sample.

Issuer Characteristics

Issuer Share equals the number of MBS deals sold by an issuer over the total number of deals sold by all issuers in the previous year (using alternative measures of issuer market share based on the principal amounts yields very similar results). We denote market boom years through a dummy variable, *Hot,* which equals one if a deal is issued between 2004 and 2006, and zero otherwise. We are interested in testing whether the predictability of initial yield spreads for future losses changes when the issuers have more market power or when markets boom, so we introduce the interaction variables, *Log Yield* × *Issuer Share* and *Log Yield* × *Hot.*

Since the value of implicit recourse to investors may increase with issuer reputation, we control for *issuer rating,* equal to the numerical score for the rating of the issuer at the issuance date (AAA = 1; AA+ =1.67, AA = 2, AA- = 2.33, and so on); the mean issuer rating is A. In our tests we also differentiate issuer types, and include an indicator equal to one for banks and thrifts,

who face tighter regulatory capital requirements than other MBS issuers such as finance companies (e.g. GMAC) or investment banks (e.g. Bear Stearns, Lehman, etc.). If regulatory arbitrage encourages the regulated banks to securitize their assets more aggressively, then there may be differences in deal structure, collateral quality, pricing, and ex-post loss rates. We also construct *Same Originator Servicer*, an indicator set to 1 if the originator and the servicer of the tranche are the same firm and 0 otherwise. (*Same Originator Servicer* is also only available for a subset of our data; hence we estimate our models with an additional indicator, *Missing Originator Servicer*, equal to one if the information on originator or servicer is not available.)

Relationship is an indicator set to 1 if a tranche is rated by at least one "relationship" agency to the issuer at issuance. For a given issuer-agency pair, the agency is defined as the "relationship" agency for the issuer if in the previous year: (1) this agency rated at least 70% of all the deal amounts issued by this issuer and this agency is the "top" agency, i.e., it rated this issuer's deals more than the other two agencies; or (2) this agency rated at least 60% of all the deals issued by this issuer and it is the "middle" agency (i.e., the second largest agency for this issuer in the previous year) and that the difference between the "middle" and "top" agencies is not larger than 10%; or (3) this agency rated at least 60% of all the deal amounts issued by this issuer and this agency is the "bottom" agency (i.e., the agency with the least market share for this issuer in the previous year) and that the difference between the "middle" and "bottom" agencies is not larger than 10%. For example, if Moody's rated 85% of the deals sold by an issuer, S&P rated 75%, and Fitch rated 58%, then only Moody's and S&P are defined as this particular issuer's "relationship agency" in that year. But if Fitch's share is 65% or higher, then it is also considered a "relationship agency" even if it has the smallest market share. *Relationship* is set to one if the tranche is rated by at least one "relationship" agency. That is why even if a tranche is

rated by all three agencies in a given year, it may still have no relationship agency because none of the agencies rated enough deals (60% or 70%) for this issuer in the previous year.

Deal Structure

Table I, Panel A also reports summary statistics for *Initial Rating*, which equals a numerical score based on the average of the ratings a tranche received at issuance. In the regressions, we control for the interactions of a full set of dummies based on *Initial Rating* and issuance (cohort) years. This non-parametric strategy allows us to avoid imposing any functional relationship between the ratings and ex-post losses. As our main measure of deal structure, we add the *Level of Subordination* (Panel A) for each tranche, defined as the dollar-weighted fraction of tranches in the same deal that have a rating the same as or better than the given tranche. For example, for a hypothetical $100 million deal with $80 million in the AAA tranche, $10 million in the BBB tranche, and another $10 million in the B tranche, the *Level of Subordination* would equal 80% for AAA, 90% for BBB and 100% for B. This variable increases as the amount of protection for a given tranche by lower rated tranches decreases.

Opp, Opp, and Harris (2011) show theoretically and Furfine (2011) empirically that more complex deals may lead to greater ratings inflation. To control for this mechanism, we add the variable *Deal Complexity*, which equals the number of tranches within a deal divided by the total principal amount of the deal. In addition, we control in some models for the number of ratings a tranche receives at issuance, using an indicator equal to 1 for deals with one rating and another equal to 1 for deals with two ratings. The process of shopping implies that deals with just one or two ratings are more likely to have been shopped than those with three. Some deals with two or three ratings may also have been shopped, forcing the ratings to converge, but we do observe some tranches with multiple ratings where the agencies disagree. We control for this effect by

adding another variable, *Rating Disagreement*, an indicator for deals with more than one rating in which the ratings differ.

Collateral

We include a number of control variables to capture characteristics of the underlying collateral. From Panel A, *Principal amount* equals the dollar value of the tranche; its distribution is highly skewed, with the mean $57 million and median only $15 million. *Weighted-average life*, equal to the expected timing of payments of principal of a tranche, is also skewed with the mean 5.6 years.[1] *Fraction of collateral in troubled states* equals the fraction of collateral originated in Arizona, California, Florida, and Nevada. It measures the degree of exposure to areas that experienced the highest house price rise leading up to the crisis followed by the largest drop during the crisis.[2] *Herfindahl Index of Collateral* measures geographical concentration of the collateral pool, equal to the sum of the squared shares of the collateral within a deal across each of the top five states (with the largest amount of mortgages), with the aggregation of all the other states as the sixth category. It controls, admittedly crudely, for the degree of correlation across loans within a given pool. In our regressions, we also control for the *Loan to Value (LTV) Ratio* and the *Weighted Average Credit Score* of the underlying collateral for a given tranche at issuance. Table I, Panel A provides summary statistics for variables used in our regressions.

Sample Description

Panel B of Table I sorts the tranches into cohorts based on issuance year and the number of initial ratings. The mean default rate is much greater during the housing market boom of

[1] Note that this is *not* the same as duration that measures the weighted-average time to maturity based on the relative present values of cash flows as weights (see, e.g., Ch. 27 of Saunders and Cornett, 2008, for more details).

[2] We realize that the importance of this variable may be obvious only in hindsight, although some analysts were concerned about overheated regional markets in real time; nevertheless, all of our key findings are robust to the exclusion of this variable from our models.

2004-2006, regardless of how many initial ratings a tranche receives. Except for years 2000 and 2001, tranches with only one initial rating perform much worse on average than those with two or three ratings, and the gap becomes much wider during the hot years. Hence, in our regressions below, we compare the loss predictability of yield spread for tranches with different number of initial ratings across this boom period vs. the earlier sample period (2000-2003).

Panel C and Panel D of Table I further reveal that the above pattern is mainly driven by non-AAA-rated tranches. From Panel C, AAA-rated tranches have very low default rates on average, and the average defaults do not differ much by the number of initial ratings, except for year 2006. In contrast, non-AAA-rated tranches, as shown in Panel D, have much higher average default rates. While one-rated non-AAA tranches issued in 2000 and 2001 perform better than two- or three-rated non-AAA tranches issued in the same period, this pattern flips when the housing market becomes hotter, especially in 2004 and 2005. In addition, comparing Panels C and D shows that while one-rated tranches only constitute a small proportion of the AAA market across all years, they carry more weight in the non-AAA market. For example, in 2005, one-rated tranches comprise only 9.1% of the AAA market [= 870 / (870 + 7,348 + 1,331)] but 31.4% of the non-AAA market [= 3,025 / (3,025 + 4,679 + 1,944)], and this pattern holds true for most other years in our sample. Together, these simple statistics suggest larger ex-post losses for tranches issued in the market booming period and those with only one initial rating, and show that such differences in credit quality mainly exists in the non-AAA market.

Table II reports further rating and default characteristics sorted by initial rating categories (based on the best rating a tranche receives at issuance) and the number of initial ratings. Panel A analyzes the full sample, and shows that the majority of the AAA tranches (around 93% of them) are rated by two or three rating agencies whereas non-AAA tranches have considerable higher

fractions of one-rated tranches. In particular, more than 60% of the tranches with initial ratings of BB and worse are rated by only one rating agency at issuance, suggesting that lower-rated tranches outside the AAA market are more likely to have been shopped (i.e., having their inferior ratings hidden from the market).

The second column in the table, based only on those tranches with two or three ratings, shows an inverted-U pattern of the disagreement level with regard to initial rating categories. Both the AAA tranches and tranches with "B and worse" have a very low level of rating disagreement (less than 3% of these tranches have different initial ratings from different agencies), which is partly due to the fact that these tranches, with either very high or low credit quality, are easier for the agencies to assign ratings. Tranches with intermediate credit quality and thus middle initial ratings, on the other hand, are harder to evaluate and require more discretion from the agencies, which leads to a much higher rating disagreement level. The evidence here for AAA-rated tranches is also consistent with the findings of Griffin and Tang (2013), who argue that "ratings catering" leads to the low level of disagreement for AAA-rated tranches in their sample of collateralized debt obligations (CDOs).

The last three columns in Table II, Panel A report the average default rates for tranches with one, two, and three initial ratings, respectively. While the average default rates for one-rated AAA tranches are much smaller than two- or three-rated AAA tranches, this pattern is less clear outside the AAA market. In fact, as we go down the rating notches, the average default rates for one-rated tranches tend to match up with the loss rates for two- or three-rated tranches. This pattern is stronger in Panel B of Table II, which only focuses on the market booming period from 2004 to 2006. For tranches whose best initial ratings are "BBB" or worse, their average default rates are higher if these tranches only have one initial rating than if they have two or three

ratings. These univariate comparisons suggest that while one-rated tranches on average perform better than multiple-rated tranches for higher initial rating categories (such as the AAA one), potentially consistent with "ratings catering", one-rated tranches tend to perform worse than multiple-rated ones for lower initial rating categories, indicating a much severer "shopping" effect in the non-AAA market, where inferior initial ratings have been dropped by the issuers.

Fig. 1, Panel A and B make the above comparisons more lucid. Panel C of Fig. 1 examines tranches with identical (non-disagreeing) initial ratings during the hot market period, where potential ratings shopping incentives are the strongest. It is very clear that one-rated tranches have a much higher average default rate than multiple-rated tranches in the non-AAA market, suggesting that lower initial ratings different from the highest rating have been dropped and hidden from the market.

Overall, these simple summary statistics indicate that the credit quality of tranches issued in the market booming period and those with only one rating is lower than those issued during 2000-2003 and those with multiple ratings, especially in the non-AAA market. To the extent that the number of initial ratings a tranche receives signals potential ratings shopping behavior, we next examine whether the market has the ability to detect such adverse incentives and perform more due diligence when the observed (shopped) ratings fail to adequately predict losses.

III. REGRESSIONS RESULTS

Tables III-VI report the estimates of Equation (1) for various subsamples of data. Since most of the securities are priced and sold at par, initial yield spreads gauge the market's assessment of *ex ante* credit quality (i.e., risk). Ideally credit ratings should act as a sufficient

statistic for risk (absent agency problems), so that initial yield spreads should not predict future losses once we adequately control for the ratings. However, if the ratings are inaccurate (due to various reasons including agency problems) and the market produces its own credit quality information beyond that contained in the ratings, then the initial yield spread will have predictive power for future (ex-post) losses.

In Table III, we regress the ex-post default rates on the natural logarithm of initial yield spread and other characteristics of the tranches, deals, the issuer, and the market, after controlling for the full set of interactions between initial average rating categories and the cohort (issuance) year. Table IV performs similar regressions on subsamples split by the number of initial ratings. Both tables look at the full sample as well as the hot period (2004 to 2006) sample. Table V examines the hot-period subsample by looking at the AAA and non-AAA tranches separately. Table VI improves on Equation (1) by adding one more variable: the interaction of issuer market share and the Expected Default Frequency (EDF), or the average of each rating's EDFs provided by the S&P Global Structured Finance 5-year Cumulative Default Rates ending in Dec. 1999.

In doing so, we attempt to answer the following questions. First, does the market price (initial yield spread) predict future losses of MBS tranches beyond what ratings do? Second, if the market price does contain important credit quality information beyond what the ratings imply, when is its predictive power stronger? In particular, does the market understand ratings shopping and perform more due diligence to make initial yield spread more predictive of future losses when certain tranches have been shopped? Further, is initial yield spread more useful in predicting default rates of MBS deals sold in the market booming period when incentive problems are much worse? Lastly, since He et al. (2012) show that MBS tranches sold by larger issuers could suffer more from conflicts of interest on the part of rating agencies, we attempt to

compare the relative predictive power of market price (initial yield spread) and EDFs of initial ratings for deals sold by large vs. small issuers.

Table III tests whether initial yield spreads predict MBS default rates after controlling for the full set of interactions between indicators for each unique value of the average rating and cohort year, i.e., the differential impact of each rating category in each cohort year. We also include dummy variables for coupon types (such as floating, fixed, etc.) and deal types given by Bloomberg (such as "ABS Home", "CMBS", "private CMO Float", etc.), which are not reported. We cluster the standard errors of the coefficients by issuers.

Panel A reports results using the full sample. We find that tranches with only one rating have much higher default rates than multiple-rated tranches, conditional on ratings. The coefficient before *One Rating* in column (1) suggests that conditional on ratings and other observables, the average default rate for a tranche with only one initial rating is 3.44 percentage points higher than a similar tranche with two or three initial ratings. Given that the average default rate in our sample is 20 percent, this represents a 17.2% difference, which is economically large.

While initial yield spread itself does not significantly predict MBS default rates (its coefficient is positive but not significant), its predictive power becomes significantly stronger during hot years. Note that higher initial yield spreads indicate that MBS investors perceive a greater amount of credit risk. Hence, a significantly positive coefficient before *Log Yield * Hot* means the market is better able to correctly infer about future losses during the booming period. In terms of economic significance, the coefficient before *Log Yield * Hot* from column (2) indicates that for tranches issued in the market booming period, doubling the initial yield spread will be associated with a default rate that is 0.88 percentage points higher (Log (2) * 0.0127

*100= 0.88), whereas for tranches issued during 2000-2003, such big differences in initial yield spreads will not be associated with significantly different default rates.

The coefficient of *Log Yield * Issuer Share* is not statistically significant, indicating that over the whole sample period, the market does not possess more credit quality relevant information than rating agencies for MBS deals sold by large vs. small issuers. The coefficient of *Log Yield * One Rating* is, however, significantly positive at 1%, which means that the market produces more credit quality related information than what the ratings contain for tranches with only one initial rating than those with multiple ratings. This result suggests that MBS investors are aware of the potential ratings shopping problem plaguing one-rated tranches. The economic magnitude of the effect is also large: the coefficient before *Log Yield * One Rating* from column (4) indicates that for tranches with only one initial rating, doubling the initial yield spread will be associated with a default rate that is 1.48 percentage points *higher* (Log (2) * (0.0358-0.0144) *100= 1.48). In contrast, for tranches with two or three ratings, doubling the initial yield spread will be associated with a default rate that is 1 percentage points *lower* (Log (2) * (-0.0144) *100= -1).

Other control variables relate to future default rates as expected. Tranche size (the log of principal amount) is negatively associated with future losses, indicating that larger tranches are in general safer. Tranches with a greater fraction of their underlying mortgages originated from 'troubled' states (AZ, CA, FL, and NV) have significantly higher future losses. Interestingly, better-diversified tranches, as measured by a lower cross-state HHI, have higher cumulative losses, consistent with the idea that such tranches act like "economic catastrophe bonds" with a high exposure to systematic risk. Issuer rating has a significantly positive effect on default rates, suggesting that declines in an issuer's credit standing (i.e., a higher "rating score" in our

regressions) decrease its value of implicit recourse (Gorton and Souleles, 2010). Consistent with the univariate results in Table II, tranches with only one initial rating perform much worse than those with three ratings (the omitted category) while there is no statistically significant difference between two-rated and three-rated tranches. Further, tranches with disagreeing initial ratings tend to have higher future default rates, indicating that risky tranches may be harder to evaluate and induce more diverse opinions from the rating agencies. Deal complexity, measured as the number of tranches in a deal per dollar of its total principal amount, is negatively related to future losses, which is mainly due to the high correlation of this variable with other controls. Lastly, the loan to value (LTV) ratio of the underlying collateral supporting a tranche is positively related to its future losses, which is intuitive.

Panel B of Table III reports the same set of models but analyzes tranches issued only during the market booming period. Since *Hot* equals one for all the observations in this subsample, we drop the variable *Log Yield * Hot*. Interestingly, the variable *Log Yield * Issuer Share* now becomes significantly positive, indicating that the market recognizes rating agencies' inherent conflicts of interest for MBS deals sold by larger issuers during the hot market period. Consequently, the MBS investors exert more effort in collecting information about deal quality and risk, which makes the predictive power of initial yield spread much greater for deals sold by larger issuers such as Countrywide and Lehman Brothers. In terms of economic magnitude, the coefficient before *Log Yield * Issuer Share* from column (2) indicates that for tranches sold by a large issuer (with 10% market share), doubling the initial yield spread will be associated with a default rate that is 1.37 percentage points higher (Log (2) * 10%* 0.1975 *100= 1.37), whereas for tranches sold by a small issuer (with market share close to zero), such differences in initial yield spreads will not be associated with significantly different default rates.

Moreover, the coefficient before *Log Yield * One Rating* from column (3) not only is significant at the 1%, but also has a magnitude almost twice as large as that in Column (4) of Panel A, Table III, indicating that initial yield spread is even more powerful in predicting future losses for one-rated tranches during the market booming period when the perverse incentive problems for rating agencies are the greatest. This result is also consistent with our univariate findings in Table II that one-rated tranches have larger default rates than multiple-rated tranches during the hot period.

Table IV repeats the analysis in Table III after splitting the sample based on the number of initial ratings. Panel A examines the whole sample, which includes all private-labeled MBS tranches sold between 2000 and 2006. The results are consistent with those in Table III: while initial yield spread positively predicts future losses for one-rated tranches, it has no statistically significant predictive power for future losses of two- or three-rated tranches. The coefficient before *Log Yield * Hot* is significantly positive for both one- and two-rated tranches but insignificant for three-rated tranches, which makes sense as tranches with three ratings couldn't have been shopped. Moreover, the coefficient before *Log Yield * Hot* is larger in magnitude for one-rated tranches than for two-rated ones, implying that during the market booming period, one initial rating may be a cleaner signal for the tranche to have been shopped than two initial ratings, and thereby induces investors to perform more due diligence.

Panel B of Table IV reports results only for the hot period. Again, initial yield spread has significant predictive power for future losses only for one-rated tranches. Interestingly, we have some weak evidence that the market prices three-rated tranches incorrectly during the market booming period, with higher initial yield spreads predicting lower future losses, but this effect is

weak as the t-stat is only 1.74. *Log Yield * Issuer Share* is positive but not significant for all three groups of tranches, perhaps due to a lack of power.

Table V only analyzes the market booming period between 2004 and 2006, but splits the sample by both the number of initial ratings and the AAA vs. non-AAA category. Panel A examines only AAA-rated tranches in hot years. In this subsample, we find that initial yield spread has predictive power for future losses only for two-rated tranches but not for one-rated or three-rated tranches. *Log Yield * Issuer Share* is not significant either, whether for one-rated, two-rated, or three-rated tranches. These results are consistent with the idea that the market somehow recognizes the "ratings catering" problem for AAA-rated tranches as argued by Griffin and Tang (2013). Regulated entities, as investors in the AAA market, are typically required to obtain at least two ratings before making their investments. Therefore, due to the competition pressure to grab more businesses, the more pessimistic rating agency would scale up their ratings to be consistent with the more optimistic agency's AAA rating, leading to rating convergence and higher covered-up credit risk in the AAA market. However, the market figures out this perverse incentive problem during the market booming period and thus exerts more effort to produce information and make the initial yield spread more predictive of future losses for these two-rated AAA tranches.

Panel B of Table V analyzes only non-AAA rated tranches in the hot period and finds very different results from the AAA market. The loss predictive power of initial yield spread is the strongest for one-rated tranches, weaker but still significant for two-rated tranches, and insignificant for three-rated tranches. This is in sharp contrast to the "ratings catering" effect in the AAA market: most investors in the non-AAA market are not required to obtain two or more ratings so the issuers of such structured finance securities have more freedom to drop the more

pessimistic ratings, leading up to the typical "ratings shopping" problem. Therefore, one-rated non-AAA tranches have the highest covered-up credit risk imbedded in them, relative to two-rated tranches, which are in turn more likely to be shopped than three-rated tranches. Perceiving such ratings shopping behavior, the market performs the most due diligence for one-rated non-AAA tranches to make the initial yield spread the most informative about future losses, conditional on rating times cohort year fixed effects.

Another interesting finding from this panel is that *Log Yield * Issuer Share* is significantly positive only for two-rated non-AAA tranches, which makes sense because although both large and small MBS issuers can engage in ratings shopping (that affects both one-rated and two-rated tranches), ratings catering (that affects only two-rated but not one-rated tranches) could only happen for deals sold by large issuers because these big players on the MBS market have the bargaining power to pressure the more pessimistic agency to revise upward their initial ratings. That's why the market differentiates between non-AAA tranches sold by large vs. small issuers only for two-rated but not one-rated tranches.

Table VI includes the interaction terms between the Expected Default Frequency (EDF) of an average rating category and Hot, issuer market share, as well as the one rating dummy. Since we control for the full set of average rating categories and their interactions with cohort years, we do not include EDF itself in our regressions, as its main effect has been absorbed by the rating times year fixed effects. Panel A shows the results for the pooled sample of AAA- and non-AAA-rated tranches. Consistent with previous tables, initial yield spread during the hot period is the most predictive for future losses if the tranches have one initial rating, weakly predictive if the tranches have two initial ratings, and not predictive at all if the tranches have three initial ratings. Initial yield spread is also more useful in predicting future losses when a

tranche has only one initial rating as opposed to multiple ratings, consistent with the shopping hypothesis. At the same time, the predictive power of EDF does not differ significantly for tranches issued during the hot vs. cold markets, or for tranches with one vs. multiple ratings.

Interestingly, *EDF * Issuer Share* has a significantly negative coefficient for two-rated tranches in the whole sample period and for both two- and three-rated tranches during the market booming period. This result suggests that the predictive power of initial ratings for future losses is much lower if a two- or three-rated tranche is sold by a big MBS issuer than by a smaller issuer, consistent with the argument by He et al. (2012) that rating agencies have the pressure to inflate their ratings for big players in the MBS market due to the latter's enormous bargaining power and the issuer-pay model. The negative sign of *EDF * Issuer Share* is in sharp contrast to the significantly positive sign of *Log Yield * Issuer Share* in Column (7) of Panel A, suggesting that the market is somewhat aware of this incentive problem and thus performs more due diligence to make the MBS pricing informative about the underlying credit risks.

Panel B of Table VI shows that the above pattern in Panel A is mainly driven by the non-AAA market. During the market booming period (2004-2006), ratings (and thus their EDFs) are less predictive of future losses when a tranche is issued by a large issuer than by a smaller issuer, regardless of its number of ratings. In contrast, initial yield spread has a stronger predictive power of future losses when a two-rated tranche is issued by a large issuer than by a smaller issuer. The opposite signs of *EDF * Issuer Share* and *Log Yield * Issuer Share* are clear evidence of conflict of interest on the non-AAA ratings market, especially during the market booming years.

IV. CONCLUSIONS

With growing evidence revealing problems in the rating process, researchers, practitioners and regulators have recently focused on 'rating shopping,' whereby issuers only purchase and report the most favorable rating(s) after receiving preliminary opinions from multiple agencies. In this paper, we study the effects of shopping in the MBS markets by linking cumulative losses on tranches to the yield spreads at issuance. Our hypothesis is that if the market is suspicious of the quality of the ratings, then initial yield spreads, which reflect the market's assessment of the quality of the tranches, should predict ex post performance conditional on the ratings.

With a large sample of MBS sold between 2000 and 2006, we find that default rates rise dramatically for tranches sold during market boom years (2004-2006), and tranches with a single rating (below AAA) have much greater losses than tranches with multiple ratings. We also find that among non-AAA rated tranches, initial yield spreads predict future losses for single-rated tranches but not for multi-rated ones. These results suggest that these single-rated tranches have been 'shopped' so that pessimistic ratings never reach the market. In the AAA market (each reported rating is AAA or equivalent), by contrast, most tranches receive two or three ratings and those ratings almost always agree. Moreover, initial yield spreads predict future losses for AAA-rated tranches with two ratings. These patterns suggest that rating agencies may have 'catered' to (constrained) investors in the AAA market, who could not purchase a tranche unless it has multiple AAA ratings. Overall, our results show that rating shopping adversely affects the quality of ratings in the MBS market, and that investors in the riskier segment of the market (below AAA) price this risk through higher initial yields.

References:

1. Adelino, Manuel, 2009, How much do investors rely on ratings? The case of mortgage-backed securities, Working paper, Duke University.
2. Furfine, Craig, 2010, Deal complexity, loan performance and the pricing of commercial mortgage-backed securities, Working paper, Northwestern University.
3. Gorton, Gary, and Nick Souleles, 2006, Special purpose vehicles and securitization, in Mark Carey and Rene Stulz ed.: The Risks of Financial Institutions (University of Chicago Press).
4. Griffin, John, and Dragon Tang, 2012, Did subjectivity play a role in CDO credit ratings?" *Journal of Finance* 67, 1293-1328.
5. Griffin, John, and Dragon Tang, 2013, Rating shopping or catering? An examination of the response to competitive pressure for CDO credit ratings, Working paper, the University of Texas at Austin and the University of Hong Kong.
6. He, Jie, Jun Qian, and Philip Strahan, 2012, Are all ratings created equal? The impact of issuer size on the pricing of mortgage-backed securities, *Journal of Finance* 67, 2097-2137.
7. Opp, Christian, Marcus Opp, and Milton Harris, 2011, Rating agencies in the face of regulation: Rating inflation and regulation arbitrage, *Journal of Financial Economics*, forthcoming.
8. Saunders, Anthony, and Marcia M. Cornett, 2007, Financial Institutions Management, 6th Edition.

Table I
Summary Statistics of the Mortgage-Backed Securities Sample

This table reports summary statistics of privately-issued mortgage-backed securities (MBS) sold between 2000 and 2006 and whose tranches are rated by at least one credit rating agency at issuance. "Default Rate" is the cumulative loss rate of an MBS tranche (i.e. the percentage of its balance that has been written off due to default) from its issuance date up to June 2012. For a tranche with floating coupon, "Initial Yield Spread" is the fixed markup over the reference rate specified at issuance (e.g. the 1-month LIBOR rate). For a tranche with fixed or variable coupon, "Initial Yield Spread" is the difference between the initial coupon rate and the yield of a Treasury security whose maturity is the closest to the tranche's weighted average life. "Issuer market share" is calculated as the number of deals originated by an issuer in the previous year divided by the total number of deals in the same year. "Hot MBS Market" is a dummy that equals 1 if a tranche is issued between 2004 and 2006, and equals 0 otherwise. "Principal Amount" is the principal amount of a tranche at issuance. "Weighted Average Life" is the weighted average life of a tranche at issuance. "Fra. of Colla. in Troubled States" is the fraction of underlying collateral of each tranche originated in the states of Arizona, California, Florida, or Nevada. "Herfindahl Index of Collateral" is the sum of the squared shares of the collateral within a deal across each of the top five states (with the largest amount of mortgages), with the aggregation of all the other states as the sixth category. "Initial Rating" is the average of the ratings a tranche received at issuance, after we convert the ratings into a numerical value by setting AAA = 1, AA+ = 1.67, AA = 2, AA– = 2.33, and so on. "Issuer Rating" is the average of the ratings the issuer itself has at issuance after converting the ratings into a numerical value using the same schedule. "Number of Initial Ratings" is the number of different ratings a tranche received at issuance, which can equal one (if only one of Moody's, S&P, and Fitch rated the tranche), two, or three. "Rating Disagreement" is a dummy that equals 1 if a tranche receives at least two ratings at issuance and the ratings are different from each other, and equals 0 otherwise (i.e., if all the ratings are the same or there is only one rating). "Relationship" is a dummy that equals 1 if a tranche is rated by a relationship agency at issuance where the definition of relationship is given in the paper, and equals 0 otherwise. "Deal Complexity" is the number of tranches in an MBS deal divided by the total principal amount of the deal. "Bank Thrift" is a dummy that equals 1 if the issuer is a commercial bank or thrift, and equals 0 otherwise. "Same Originator Servicer" is a dummy that equals 1 if the originator and the servicer of the deal are the same, and equals 0 otherwise. "Missing Originator Servicer" is a dummy that equals 1 if the information about either the originator or the servicer of the deal is missing, and equals 0 otherwise. "Level of Subordination" is the fraction of tranches in the same MBS deal that have a rating the same as or better than a given tranche based on their principal amount. "Loan to Value (LTV) Ratio" is the LTV of the underlying collateral for a given tranche at issuance. "Weighted Average Credit Score" is the weighted average credit score of the underlying collateral for a given tranche at issuance. Panel A provides summary statistics for variables used in our regressions. Panel B summarizes default rates by the number of initial ratings and issuance year. Panel C and D summarizes default rates by the number of initial ratings and issuance year for AAA-rated and non-AAA-rated tranches, respectively.

Panel A: Sample statistics for regression variables

Variable	Mean	Median	Std	p25	p75	N
Default Rate (in %)	20.00	0.00	38.00	0.00	6.00	73329
Initial Yield Spread (in Basis Points)	125.30	118.25	83.02	53.00	175.00	63349
Issuer Market Share (in %)	5.00	4.00	4.00	3.00	7.00	73329
Hot MBS Market	0.70	1.00	0.46	0.00	1.00	73329
Principal Amount (in Millions)	57.19	15.00	124.38	4.19	50.72	73322
Weighted Average Life (in years)	5.64	4.91	3.35	3.29	7.23	65622
Fra. of Colla. in Troubled States (in %)	45.33	45.60	16.47	34.60	54.70	68109
Herfindahl Index of Collateral	0.34	0.33	0.09	0.29	0.36	68109
Initial Rating	2.08	1.00	1.44	1.00	3.00	73329
Issuer Rating	2.90	2.67	0.94	2.33	3.11	65909
Number of Initial ratings	1.97	2.00	0.58	2.00	2.00	73329
Rating Disagreement	0.11	0.00	0.32	0.00	0.00	73329
Relationship	0.86	1.00	0.35	1.00	1.00	69700
Deal Complexity	0.03	0.02	0.02	0.01	0.04	73329
Bank Thrift	0.59	1.00	0.49	0.00	1.00	73329
Same Originator and Servicer	0.31	0.00	0.46	0.00	1.00	73329
Missing Originator or Servicer	0.51	1.00	0.50	0.00	1.00	73329
Level of Subordination (in %)	92.00	96.00	13.00	92.00	98.00	73311
Loan to Value (LTV) Ratio (in %)	69.56	71.13	14.77	63.80	77.44	71027
Weighted Average Credit Score	703	714	235	672	736	44553

Panel B: Default rates (in %) by number of initial ratings and issuance year

		Issuance Year						
Number of Initial Ratings		2000	2001	2002	2003	2004	2005	2006
1	Mean	1.5	1.2	2.7	3.0	24.0	54.1	70.8
	Median	0.0	0.0	0.0	0.0	0.0	82.4	97.3
	Std	10.4	9.4	13.8	12.4	34.1	45.5	42.2
	N	565	892	921	2,073	2,536	3,895	2,590
2	Mean	1.4	1.1	0.8	0.7	3.2	18.0	40.7
	Median	0.0	0.0	0.0	0.0	0.0	0.0	5.2
	Std	10.6	9.1	6.8	6.0	14.1	35.9	46.5
	N	1,693	3,192	4,727	6,032	8,463	12,027	12,360
3	Mean	5.2	1.4	1.2	1.1	2.8	21.4	41.3
	Median	0.0	0.0	0.0	0.0	0.0	0.0	3.9
	Std	22.3	10.4	5.7	5.8	10.7	39.1	47.4
	N	229	489	693	772	1,863	3,275	4,042

Panel C: Default rates (in %) by number of initial ratings and issuance year for AAA-rated tranches

		Issuance Year						
Number of Initial Ratings		2000	2001	2002	2003	2004	2005	2006
1	Mean	0.0	0.0	0.0	0.0	0.2	1.1	3.6
	Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Std	0.0	0.3	0.0	0.1	4.6	7.0	12.0
	N	130	187	116	646	475	870	499
2	Mean	0.0	0.1	0.0	0.0	0.0	1.1	6.2
	Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Std	0.3	2.0	0.1	1.5	1.3	6.9	16.6
	N	1371	2646	3703	4483	5420	7348	6477
3	Mean	0.0	0.0	0.0	0.0	0.0	1.0	2.9
	Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Std	0.1	0.3	0.2	0.2	0.1	9.1	11.4
	N	162	327	372	376	754	1331	2033

Panel D: Default rates (in %) by number of initial ratings and issuance year for non-AAA-rated tranches

		Issuance Year						
Number of Initial Ratings		2000	2001	2002	2003	2004	2005	2006
1	Mean	1.9	1.5	3.1	4.3	29.5	69.4	86.9
	Median	0.0	0.0	0.0	0.0	1.7	93.9	98.1
	Std	11.8	10.6	14.7	14.8	35.6	40.2	28.8
	N	435	705	805	1,427	2,061	3,025	2,091
2	Mean	7.3	5.9	3.7	2.6	9.0	44.4	78.7
	Median	0.0	0.0	0.0	0.0	0.0	23.6	100.0
	Std	23.5	20.8	14.3	11.3	22.3	45.8	38.6
	N	322	546	1,024	1,549	3,043	4,679	5,883
3	Mean	17.9	4.2	2.5	2.1	4.7	35.4	80.2
	Median	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Std	38.6	17.8	8.2	8.0	13.6	45.1	37.3
	N	67	162	321	396	1,109	1,944	2,009

Table II
Rating and Default Characteristics by Initial Rating Categories and Number of Initial Ratings

This table reports rating and default characteristics by initial rating categories and the number of initial ratings. We first classify each MBS tranche into a separate rating category based on the best rating it has at issuance and then report the average rating and default characteristics for tranches in each category. Panel A uses the whole sample, which includes all private-labeled MBS deals issued between 2000 and 2006 and rated by at least one credit rating agency at issuance. Panel B uses rated MBS deals that are issued only during the hot market period, i.e., from 2004 to 2006. For each rating category, "Fraction of 1-rated" is the percentage of tranches that got only one rating at issuance; "Fraction Disagreement" is the percentage of two- or three-rated tranches whose initial ratings disagree with each other; "Loss of X-rated" (X=1, 2, and 3, respectively) is the average default rate over tranches that got X ratings at issuance. Every item in the table is expressed in percentages.

Panel A: Full sample (2000-2006)

	Fraction of 1-rated	Fraction Disagreement	Loss of 1-rated	Loss of 2-rated	Loss of 3-rated
AAA	7.16	2.90	0.97	1.99	2.22
AA	23.38	35.90	20.14	35.53	25.83
A	25.46	37.34	31.09	42.27	40.36
BBB	27.96	30.57	42.70	49.77	49.41
BB and worse	66.96	14.90	67.02	54.45	68.74

Panel B: Hot-period sample (2004-2006)

	Fraction of 1-rated	Fraction Disagreement	Loss of 1-rated	Loss of 2-rated	Loss of 3-rated
AAA	7.04	4.08	1.53	3.19	2.86
AA	17.89	40.18	34.01	43.46	29.64
A	20.24	43.43	52.44	53.85	47.89
BBB	24.15	34.88	65.36	62.41	60.47
BB and worse	66.10	15.33	79.21	62.93	71.36

Table III
Regression of MBS Default Rates on Initial Yields

This table reports OLS regressions of the MBS default rates on the natural logarithm of initial yield spread (Log Yield) and other tranche-level, deal-level, and issuer-level characteristics. "One Rating" is a dummy that equals 1 if a tranche is rated by one credit rating agency at issuance, and equals 0 otherwise. "Two Rating" is a dummy that equals 1 if a tranche is rated by two credit rating agencies at issuance, and equals 0 otherwise. "Size" is the natural logarithm of the principal amount at issuance. "Missing Credit Score" is a dummy that equals 1 if the weighted average credit score at issuance is missing, and equals 0 otherwise. "Rating * Cohort Year" is the full set of dummies that indicate each average initial rating category in each cohort (issuance) year. The average initial rating category refers to each level of the average ratings a given tranche received at issuance, after we convert the individual ratings into a numerical value by setting AAA = 1, AA+ = 1.67, AA = 2, AA– = 2.33, and so on, and then take the arithmetic averages of all the ratings this tranche receives. Other variables are defined in Table I. Each regression includes separate intercepts for coupon types (such as floating, fixed, etc.) and deal types given by Bloomberg (such as "ABS Home", "CMBS", "Private CMO Float", etc.). Standard errors are clustered by issuers. T-statistics are in parentheses. Panel A uses the whole sample, i.e., from 2000 to 2006. Panel B uses only the hot market subsample, i.e., from 2004 to 2006. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Full sample (2000-2006)

VARIABLES	(1)	(2)	(3)	(4)
Log Yield	0.0034	-0.0058	-0.0105	-0.0144*
	(0.77)	(-1.23)	(-1.30)	(-1.74)
Log Yield * Hot		0.0127***	0.0135***	0.0148***
		(3.80)	(3.93)	(4.01)
Log Yield * Issuer Share			0.0734	0.0680
			(1.00)	(0.91)
Log Yield * One Rating				0.0358***
				(2.94)
Issuer Share	-0.0628	-0.0667	-0.4015	-0.3807
	(-0.65)	(-0.69)	(-1.20)	(-1.11)
Size	-0.0083***	-0.0082***	-0.0082***	-0.0083***
	(-2.84)	(-2.85)	(-2.85)	(-2.90)
Log Weighted Average Life	-0.0014	-0.0021	-0.0021	-0.0017
	(-0.56)	(-0.86)	(-0.85)	(-0.69)
Fra. of Colla. in Troubled States	0.0022***	0.0022***	0.0022***	0.0022***
	(6.43)	(6.47)	(6.43)	(6.44)
Herfindahl Index of Collateral	-0.2090***	-0.2091***	-0.2090***	-0.2073***
	(-5.64)	(-5.66)	(-5.70)	(-5.66)
Same Originator and Servicer	-0.0055	-0.0059	-0.0056	-0.0051
	(-0.46)	(-0.50)	(-0.48)	(-0.44)
Missing Originator or Servicer	-0.0076	-0.0080	-0.0077	-0.0075
	(-0.79)	(-0.84)	(-0.83)	(-0.80)
Issuer Rating	0.0161**	0.0161**	0.0162**	0.0161***
	(2.68)	(2.69)	(2.69)	(2.71)
Level of Subordination	0.0444	0.0419	0.0411	0.0436
	(1.29)	(1.23)	(1.22)	(1.29)
Relationship	-0.0015	-0.0013	-0.0015	-0.0018

	(-0.28)	(-0.24)	(-0.28)	(-0.32)
One Rating	0.0344**	0.0343**	0.0346**	-0.1377**
	(2.57)	(2.58)	(2.63)	(-2.16)
Two Rating	0.0079	0.0080	0.0086	0.0092
	(0.74)	(0.76)	(0.85)	(0.91)
Rating Disagreement	0.0412*	0.0406*	0.0405*	0.0410*
	(1.89)	(1.87)	(1.87)	(1.88)
Deal Complexity	-0.8121***	-0.8096***	-0.8037***	-0.8160***
	(-3.48)	(-3.48)	(-3.49)	(-3.55)
Bank Thrift	-0.0006	-0.0006	-0.0004	-0.0002
	(-0.04)	(-0.05)	(-0.03)	(-0.02)
Loan to Value (LTV) Ratio	0.0015***	0.0015***	0.0015***	0.0015***
	(3.74)	(3.76)	(3.76)	(3.78)
Weighted Average Credit Score	0.0000	0.0000	0.0000	0.0000
	(0.96)	(0.93)	(0.92)	(0.93)
Missing Credit Score	0.0066	0.0067	0.0064	0.0062
	(0.61)	(0.63)	(0.60)	(0.58)
Rating * Cohort Year	Yes	Yes	Yes	Yes
Observations	47,652	47,652	47,652	47,652
R-squared	0.736	0.737	0.737	0.737

Panel B: Hot-period sample (2004-2006)

VARIABLES	(1)	(2)	(3)
Log Yield	-0.0046	-0.0150	-0.0208**
	(-0.67)	(-1.50)	(-2.09)
Log Yield * Issuer Share		0.1975***	0.1912**
		(2.76)	(2.62)
Log Yield * One Rating			0.0692***
			(3.43)
Issuer Share	-0.0138	-0.8804***	-0.8620**
	(-0.09)	(-2.87)	(-2.71)
Size	-0.0146***	-0.0145***	-0.0147***
	(-3.61)	(-3.62)	(-3.67)
Log Weighted Average Life	-0.0021	-0.0019	-0.0009
	(-0.64)	(-0.60)	(-0.27)
Fra. of Colla. in Troubled States	0.0029***	0.0029***	0.0029***
	(6.93)	(6.87)	(6.96)
Herfindahl Index of Collateral	-0.2530***	-0.2539***	-0.2483***
	(-4.94)	(-5.05)	(-4.96)
Same Originator and Servicer	-0.0138	-0.0135	-0.0126
	(-0.93)	(-0.93)	(-0.87)
Missing Originator or Servicer	-0.0121	-0.0114	-0.0106
	(-1.15)	(-1.14)	(-1.05)
Issuer Rating	0.0165**	0.0167**	0.0166**
	(2.25)	(2.25)	(2.27)
Level of Subordination	0.0543	0.0525	0.0559
	(1.35)	(1.32)	(1.40)
Relationship	0.0075	0.0071	0.0075

	(1.18)	(1.10)	(1.17)
One Rating	0.0522***	0.0532***	-0.2720***
	(3.10)	(3.19)	(-2.81)
Two Rating	0.0086	0.0102	0.0115
	(0.73)	(0.93)	(1.05)
Rating Disagreement	0.0520**	0.0517**	0.0551**
	(2.09)	(2.09)	(2.20)
Deal Complexity	-1.0835***	-1.0614***	-1.0938***
	(-3.63)	(-3.61)	(-3.78)
Bank Thrift	0.0002	0.0003	0.0004
	(0.01)	(0.02)	(0.03)
Loan to Value (LTV) Ratio	0.0022***	0.0022***	0.0021***
	(3.16)	(3.15)	(3.15)
Weighted Average Credit Score	0.0000	0.0000	0.0000
	(0.67)	(0.67)	(0.68)
Missing Credit Score	0.0167	0.0158	0.0155
	(1.36)	(1.29)	(1.26)
Rating * Cohort Year	Yes	Yes	Yes
Observations	34,017	34,017	34,017
R-squared	0.718	0.719	0.720

Table IV
Regression of MBS Default Rates on Initial Yields for Subsamples Split by Number of Initial Ratings

This table reports OLS regressions of the MBS default rates on the natural logarithm of initial yield spread (Log Yield) for tranches rated by one, two, and three credit rating agencies, respectively. All variables are defined in previous tables. Each regression includes separate intercepts for coupon types (such as floating, fixed, etc.) and deal types given by Bloomberg (such as "ABS Home", "CMBS", "Private CMO Float", etc.). Standard errors are clustered by issuers. T-statistics are in parentheses. Panel A uses the whole sample, i.e., from 2000 to 2006. Panel B uses only the hot market subsample, i.e., from 2004 to 2006. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Full sample (2000-2006)

VARIABLES	One Rated			Two Rated			Three Rated		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Log Yield	0.0307**	-0.0065	-0.0111	0.0006	-0.0075	-0.0106	-0.0074	-0.0110	-0.0068
	(2.46)	(-0.81)	(-0.59)	(0.12)	(-1.38)	(-1.23)	(-1.10)	(-1.30)	(-0.56)
Log Yield * Hot		0.0564**	0.0576**		0.0113***	0.0117***		0.0044	0.0029
		(2.23)	(2.30)		(3.05)	(3.00)		(0.48)	(0.31)
Log Yield * Issuer Share			0.0667			0.0494			-0.0711
			(0.23)			(0.73)			(-0.59)
Issuer Share	0.3173	0.3033	-0.0215	-0.1821*	-0.1848*	-0.4089	0.1577	0.1552	0.4672
	(1.54)	(1.46)	(-0.01)	(-1.88)	(-1.92)	(-1.27)	(1.03)	(1.00)	(0.81)
Size	0.0031	0.0042	0.0042	-0.0111***	-0.0110***	-0.0110***	-0.0034	-0.0034	-0.0035
	(0.54)	(0.73)	(0.73)	(-3.32)	(-3.34)	(-3.35)	(-0.54)	(-0.54)	(-0.55)
Log Weighted Average Life	0.0001	-0.0024	-0.0023	-0.0035	-0.0042*	-0.0042*	0.0063	0.0061	0.0061
	(0.02)	(-0.24)	(-0.23)	(-1.62)	(-1.95)	(-1.94)	(1.38)	(1.34)	(1.35)
Fra. of Colla. in Troubled States	0.0026***	0.0026***	0.0026***	0.0021***	0.0022***	0.0022***	0.0023***	0.0023***	0.0023***
	(3.19)	(3.23)	(3.23)	(7.48)	(7.51)	(7.51)	(3.46)	(3.47)	(3.44)
Herfindahl Index of Collateral	-0.2662***	-0.2598***	-0.2597***	-0.1942***	-0.1947***	-0.1950***	-0.2473*	-0.2457*	-0.2468*
	(-2.96)	(-2.91)	(-2.91)	(-5.94)	(-5.98)	(-6.06)	(-1.74)	(-1.70)	(-1.71)
Same Originator and Servicer	0.0046	0.0054	0.0055	-0.0079	-0.0084	-0.0082	-0.0012	-0.0013	-0.0015
	(0.23)	(0.27)	(0.28)	(-1.00)	(-1.07)	(-1.05)	(-0.05)	(-0.05)	(-0.06)
Missing Originator or Servicer	-0.0046	-0.0030	-0.0031	-0.0122	-0.0127	-0.0124	0.0069	0.0070	0.0069
	(-0.24)	(-0.16)	(-0.16)	(-1.60)	(-1.68)	(-1.68)	(0.35)	(0.35)	(0.35)
Issuer Rating	0.0114	0.0111	0.0112	0.0178***	0.0178***	0.0179***	0.0114*	0.0114*	0.0113*
	(0.97)	(0.96)	(0.96)	(3.21)	(3.25)	(3.27)	(1.82)	(1.82)	(1.83)
Level of Subordination	0.0473	0.0427	0.0426	0.0538*	0.0517	0.0509	-0.0092	-0.0097	-0.0091

	(0.71)	(0.65)	(0.65)	(1.69)	(1.64)	(1.64)	(-0.09)	(-0.10)	(-0.09)
Relationship	0.0053	0.0060	0.0058	-0.0063	-0.0060	-0.0062	0.0385**	0.0386**	0.0389**
	(0.51)	(0.56)	(0.53)	(-0.80)	(-0.77)	(-0.80)	(2.06)	(2.06)	(2.04)
Rating Disagreement				0.0493**	0.0487**	0.0487**	0.0810	0.0808	0.0811
				(2.06)	(2.03)	(2.03)	(1.15)	(1.15)	(1.15)
Deal Complexity	-1.2619***	-1.2707***	-1.2688***	-0.7164***	-0.7148***	-0.7101***	-0.5179	-0.5189	-0.5206
	(-3.68)	(-3.72)	(-3.72)	(-2.97)	(-2.98)	(-3.00)	(-1.11)	(-1.11)	(-1.11)
Bank Thrift	0.0010	0.0002	0.0004	0.0016	0.0015	0.0017	-0.0041	-0.0040	-0.0036
	(0.06)	(0.01)	(0.03)	(0.13)	(0.12)	(0.14)	(-0.30)	(-0.30)	(-0.27)
Loan to Value (LTV) Ratio	0.0039***	0.0040***	0.0040***	0.0012***	0.0012***	0.0012***	-0.0001	-0.0001	-0.0001
	(5.97)	(5.95)	(5.85)	(3.98)	(4.01)	(4.00)	(-0.06)	(-0.06)	(-0.05)
Weighted Average Credit Score	-0.0000***	-0.0000***	-0.0000***	0.0000	0.0000	0.0000	0.0002	0.0002	0.0002
	(-3.54)	(-3.54)	(-3.51)	(1.63)	(1.60)	(1.60)	(0.71)	(0.65)	(0.66)
Missing Credit Score	0.0040	0.0050	0.0052	0.0147	0.0149	0.0147	0.1001	0.0947	0.0974
	(0.45)	(0.53)	(0.56)	(1.37)	(1.38)	(1.37)	(0.61)	(0.55)	(0.56)
Rating * Cohort Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,196	7,196	7,196	33,214	33,214	33,214	7,242	7,242	7,242
R-squared	0.761	0.762	0.762	0.741	0.741	0.741	0.731	0.731	0.731

Panel B: Hot-period sample (2004-2006)

VARIABLES	One Rated		Two Rated		Three Rated	
	(1)	(2)	(1)	(2)	(1)	(2)
Log Yield	0.0393**	0.0194	-0.0058	-0.0118	-0.0164*	-0.0178
	(2.09)	(0.64)	(-0.76)	(-1.16)	(-1.74)	(-1.47)
Log Yield * Issuer Share		0.3779		0.1056		0.0346
		(0.66)		(1.38)		(0.21)
Issuer Share	0.5489*	-1.2417	-0.1903	-0.6502*	0.3381	0.1911
	(1.96)	(-0.46)	(-1.42)	(-1.94)	(1.28)	(0.27)
Size	0.0051	0.0050	-0.0207***	-0.0207***	-0.0050	-0.0049
	(0.66)	(0.65)	(-4.72)	(-4.74)	(-0.61)	(-0.60)
Log Weighted Average Life	0.0044	0.0047	-0.0054*	-0.0054*	0.0088	0.0089
	(0.32)	(0.34)	(-1.94)	(-1.97)	(1.45)	(1.44)
Fra. of Colla. in Troubled States	0.0037***	0.0036***	0.0028***	0.0028***	0.0029***	0.0029***
	(3.39)	(3.39)	(8.26)	(8.25)	(3.72)	(3.69)
Herfindahl Index of Collateral	-0.3430**	-0.3426**	-0.2432***	-0.2441***	-0.2751	-0.2754
	(-2.60)	(-2.56)	(-5.33)	(-5.45)	(-1.50)	(-1.50)
Same Originator and Servicer	-0.0069	-0.0072	-0.0164*	-0.0164*	-0.0009	-0.0008
	(-0.27)	(-0.28)	(-1.70)	(-1.71)	(-0.03)	(-0.03)
Missing Originator or Servicer	-0.0046	-0.0052	-0.0195**	-0.0191**	0.0097	0.0097
	(-0.19)	(-0.21)	(-2.36)	(-2.40)	(0.45)	(0.45)
Issuer Rating	0.0089	0.0093	0.0187***	0.0188***	0.0123*	0.0123*
	(0.66)	(0.68)	(3.00)	(3.00)	(1.78)	(1.77)
Level of Subordination	0.0769	0.0776	0.0721**	0.0708**	-0.0070	-0.0074
	(0.65)	(0.66)	(2.17)	(2.15)	(-0.07)	(-0.07)
Relationship	0.0199	0.0195	-0.0053	-0.0056	0.0543**	0.0542**
	(1.49)	(1.44)	(-0.54)	(-0.58)	(2.38)	(2.37)
Rating Disagreement			0.0544**	0.0543**	0.0747	0.0747
			(2.16)	(2.16)	(1.05)	(1.05)
Deal Complexity	-1.3429**	-1.3236**	-0.9561***	-0.9432***	-0.5547	-0.5486
	(-2.62)	(-2.61)	(-3.12)	(-3.11)	(-0.94)	(-0.91)
Bank Thrift	-0.0066	-0.0064	0.0067	0.0069	0.0004	0.0002
	(-0.29)	(-0.28)	(0.43)	(0.45)	(0.02)	(0.01)
Loan to Value (LTV) Ratio	0.0073***	0.0072***	0.0018***	0.0018***	-0.0002	-0.0002
	(4.52)	(4.30)	(3.69)	(3.69)	(-0.13)	(-0.12)
Weighted Average Credit Score	-0.0000***	-0.0000***	0.0000	0.0000	0.0004	0.0004
	(-3.71)	(-3.70)	(1.40)	(1.41)	(1.17)	(1.18)
Missing Credit Score	-0.0014	-0.0005	0.0318**	0.0314**	0.2309	0.2314
	(-0.10)	(-0.03)	(2.57)	(2.53)	(1.07)	(1.07)
Rating * Cohort Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,559	4,559	23,434	23,434	6,024	6,024
R-squared	0.706	0.706	0.728	0.728	0.719	0.719

Table V
Regression of MBS Default Rates on Initial Yields for the Hot-period Subsample Split by Number of Initial Ratings

This table reports OLS regressions of the MBS default rates on the natural logarithm of initial yield spread (Log Yield) for tranches rated by one, two, and three credit rating agencies, respectively, by using only the hot-period subsample (from 2004 to 2006). All variables are defined in previous tables. Each regression includes separate intercepts for coupon types (such as floating, fixed, etc.) and deal types given by Bloomberg (such as "ABS Home", "CMBS", "Private CMO Float", etc.). Standard errors are clustered by issuers. T-statistics are in parentheses. Panel A uses only tranches whose initial ratings are all AAA (or Aaa for Moody's). Panel B uses tranches with at least one non-AAA rating at issuance. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: AAA only

VARIABLES	One Rated		Two Rated		Three Rated	
	(1)	(2)	(1)	(2)	(1)	(2)
Log Yield	-0.0045	-0.0152**	0.0120***	0.0082	0.0022	0.0010
	(-0.77)	(-2.10)	(3.39)	(1.56)	(0.53)	(0.16)
Log Yield * Issuer Share		0.1866		0.0654		0.0284
		(1.57)		(1.36)		(0.19)
Issuer Share	0.4943***	-0.3306	0.0610	-0.2173	-0.1321	-0.2460
	(4.80)	(-0.61)	(1.16)	(-0.94)	(-0.92)	(-0.40)
Size	-0.0106*	-0.0105**	-0.0193***	-0.0193***	-0.0123	-0.0122
	(-2.06)	(-2.09)	(-4.79)	(-4.80)	(-1.51)	(-1.53)
Log Weighted Average Life	0.0074	0.0077	-0.0047	-0.0046	0.0021	0.0022
	(0.81)	(0.84)	(-1.65)	(-1.63)	(0.48)	(0.52)
Fra. of Colla. in Troubled States	-0.0001	-0.0000	0.0008***	0.0008***	0.0002	0.0002
	(-0.12)	(-0.09)	(4.24)	(4.25)	(0.75)	(0.75)
Herfindahl Index of Collateral	-0.0635	-0.0658	-0.0295**	-0.0300**	0.1289**	0.1285**
	(-1.09)	(-1.11)	(-2.17)	(-2.16)	(2.17)	(2.18)
Same Originator and Servicer	-0.0123	-0.0110	-0.0015	-0.0014	0.0040	0.0042
	(-1.00)	(-0.87)	(-0.28)	(-0.25)	(0.49)	(0.50)
Missing Originator or Servicer	-0.0044	-0.0035	-0.0090	-0.0085	0.0061	0.0063
	(-0.27)	(-0.21)	(-1.16)	(-1.10)	(1.23)	(1.26)
Issuer Rating	0.0164***	0.0163***	0.0093**	0.0093**	0.0081**	0.0081**
	(3.35)	(3.31)	(2.37)	(2.37)	(2.44)	(2.44)
Level of Subordination	-0.0641	-0.0627	0.0208	0.0187	0.0226	0.0217
	(-1.16)	(-1.12)	(1.39)	(1.20)	(1.22)	(1.21)
Relationship	-0.0150	-0.0157	-0.0034	-0.0035	-0.0070	-0.0070
	(-0.92)	(-0.97)	(-0.67)	(-0.70)	(-1.07)	(-1.05)
Deal Complexity	-0.5855*	-0.5485*	-0.5137***	-0.5026***	-0.6699	-0.6585
	(-1.91)	(-1.80)	(-3.22)	(-3.28)	(-1.59)	(-1.67)
Bank Thrift	0.0277***	0.0282***	-0.0019	-0.0018	-0.0075*	-0.0079
	(3.93)	(3.64)	(-0.22)	(-0.22)	(-1.72)	(-1.70)
Loan to Value (LTV) Ratio	0.0003	0.0002	0.0006***	0.0006***	-0.0004	-0.0004
	(1.04)	(0.82)	(3.07)	(3.08)	(-0.81)	(-0.84)
Weighted Average Credit Score	-0.0001	-0.0002	0.0000	0.0000	-0.0004	-0.0004
	(-0.66)	(-0.76)	(1.19)	(1.19)	(-1.54)	(-1.54)
Missing Credit Score	-0.1101	-0.1254	0.0089*	0.0084	-0.2315	-0.2324
	(-0.74)	(-0.83)	(1.74)	(1.59)	(-1.55)	(-1.55)
Cohort Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Observations	966	966	14,084	14,084	2,826	2,826
R-squared	0.179	0.181	0.168	0.169	0.101	0.102

Panel B: Non-AAA only

VARIABLES	One Rated		Two Rated		Three Rated	
	(1)	(2)	(1)	(2)	(1)	(2)
Log Yield	0.0780***	0.0554	0.0287*	0.0012	0.0152	0.0464
	(3.32)	(1.29)	(1.75)	(0.04)	(0.44)	(1.20)
Log Yield * Issuer Share		0.4421		0.4921*		-0.7785
		(0.46)		(1.70)		(-1.20)
Issuer Share	0.5133	-1.6170	-0.1717	-2.3945*	1.0673*	4.6013
	(1.60)	(-0.35)	(-0.60)	(-1.84)	(1.94)	(1.49)
Size	0.0006	0.0006	-0.0043	-0.0051	0.0338	0.0340
	(0.04)	(0.04)	(-0.54)	(-0.64)	(1.56)	(1.57)
Log Weighted Average Life	0.0179	0.0184	0.0628*	0.0618*	-0.0111	-0.0166
	(0.46)	(0.47)	(1.97)	(1.91)	(-0.15)	(-0.23)
Fra. of Colla. in Troubled States	0.0047***	0.0047***	0.0052***	0.0052***	0.0054***	0.0055***
	(3.73)	(3.76)	(8.14)	(8.18)	(3.51)	(3.46)
Herfindahl Index of Collateral	-0.4076***	-0.4073***	-0.6180***	-0.6198***	-0.7103*	-0.7165*
	(-2.81)	(-2.80)	(-5.29)	(-5.36)	(-2.03)	(-2.05)
Same Originator and Servicer	-0.0036	-0.0044	-0.0444*	-0.0456*	-0.0115	-0.0119
	(-0.12)	(-0.15)	(-1.96)	(-2.00)	(-0.28)	(-0.28)
Missing Originator or Servicer	-0.0039	-0.0050	-0.0366*	-0.0357*	0.0163	0.0175
	(-0.15)	(-0.19)	(-1.89)	(-1.92)	(0.46)	(0.49)
Issuer Rating	0.0100	0.0109	0.0311**	0.0321**	0.0145	0.0133
	(0.60)	(0.63)	(2.41)	(2.46)	(1.22)	(1.16)
Level of Subordination	0.0782	0.0786	0.1303**	0.1310**	-0.0148	-0.0112
	(0.60)	(0.60)	(2.21)	(2.22)	(-0.10)	(-0.07)
Relationship	0.0253	0.0250	-0.0024	-0.0032	0.0908**	0.0916**
	(1.56)	(1.51)	(-0.08)	(-0.11)	(2.13)	(2.13)
Rating Disagreement			0.0525**	0.0516*	0.0767	0.0791
			(2.05)	(2.03)	(1.11)	(1.17)
Deal Complexity	-1.9746***	-1.9644***	-1.1057	-1.0919	0.8703	0.9082
	(-3.10)	(-3.10)	(-1.50)	(-1.49)	(0.71)	(0.74)
Bank Thrift	-0.0126	-0.0128	0.0262	0.0273	0.0134	0.0150
	(-0.48)	(-0.49)	(0.92)	(0.96)	(0.50)	(0.56)
Loan to Value (LTV) Ratio	0.0096***	0.0095***	0.0028***	0.0028***	0.0002	0.0000
	(3.80)	(3.64)	(3.55)	(3.49)	(0.07)	(0.02)
Weighted Average Credit Score	-0.0000***	-0.0000***	0.0016***	0.0016***	0.0020**	0.0020**
	(-3.66)	(-3.68)	(3.88)	(3.87)	(2.59)	(2.60)
Missing Credit Score	0.0005	0.0009	1.1187***	1.0980***	1.2218**	1.2388**
	(0.03)	(0.06)	(3.98)	(3.98)	(2.52)	(2.53)
Rating * Cohort Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,593	3,593	9,350	9,350	3,198	3,198
R-squared	0.646	0.646	0.611	0.612	0.637	0.638

Table VI
Regression of MBS Default Rates on Initial Yields for Subsamples Split by Number of Initial Ratings, with EDF Interactions

This table reports OLS regressions of the MBS default rates on the natural logarithm of initial yield spread (Log Yield) together with the interaction terms involving the Expected Default Frequency (EDF) for tranches rated by one, two, and three credit rating agencies, respectively. For each tranche, we first find out the EDF for each of its initial ratings by using the mapping provided by the S&P Global Structured Finance 5-year Cumulative Default Rates ending in Dec. 1999. Then we average over these individual EDFs for each tranche. All other variables are defined in previous tables. Each regression includes separate intercepts for coupon types (such as floating, fixed, etc.) and deal types given by Bloomberg (such as "ABS Home", "CMBS", "Private CMO Float", etc.). Standard errors are clustered by issuers. T-statistics are in parentheses. Panel A uses the whole sample, including both AAA-rated and non-AAA-rated tranches. Panel B uses only the non-AAA-rated tranches. The first four columns in each panel look at the entire sample period from 2000 to 2006, while the latter four look at only the subsample of hot market years from 2004 to 2006. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Full sample (both AAA and non-AAA)

	Whole Sample (2000-2006)				Hot Period (2004-2006)			
VARIABLES	One/Two/Three	One Rated	Two Rated	Three Rated	One/Two/Three	One Rated	Two Rated	Three Rated
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Yield	-0.0154*	-0.0109	-0.0138	-0.0130	-0.0245**	0.0164	-0.0167	-0.0263*
	(-1.74)	(-0.61)	(-1.54)	(-1.06)	(-2.30)	(0.53)	(-1.53)	(-2.01)
Log Yield * Hot	0.0151***	0.0575**	0.0120***	0.0045				
	(4.03)	(2.32)	(2.99)	(0.50)				
Log Yield * Issuer Share	0.0878	0.0625	0.0989	0.0125	0.2472***	0.4360	0.1904**	0.1887
	(1.03)	(0.22)	(1.39)	(0.10)	(3.35)	(0.77)	(2.75)	(1.07)
Log Yield * One Rating	0.0348***				0.0716***			
	(2.90)				(3.42)			
EDF * Hot	-0.0390							
	(-0.91)							
EDF * Issuer Share	-0.0660	0.0090	-0.2081**	-0.2133	-0.1360*	-0.0738	-0.2458**	-0.3368*
	(-1.00)	(0.15)	(-2.17)	(-1.52)	(-2.01)	(-1.40)	(-2.54)	(-1.91)
EDF * One Rating	0.0035				-0.0033			
	(0.80)				(-0.50)			
One Rating	-0.1344**				-0.2804***			
	(-2.13)				(-2.84)			
Two Rating	0.0094				0.0121			
	(0.95)				(1.13)			

Issuer Share	-0.4505	-0.0066	-0.5844	0.1643	-1.0612***	-1.4656	-0.9505***	-0.3535
	(-1.18)	(-0.00)	(-1.68)	(0.29)	(-3.24)	(-0.55)	(-2.92)	(-0.49)
Size	-0.0083***	0.0042	-0.0109***	-0.0034	-0.0146***	0.0051	-0.0205***	-0.0047
	(-2.90)	(0.73)	(-3.34)	(-0.53)	(-3.66)	(0.67)	(-4.73)	(-0.57)
Log Weighted Average Life	-0.0017	-0.0024	-0.0041*	0.0063	-0.0007	0.0050	-0.0053*	0.0099
	(-0.69)	(-0.24)	(-1.91)	(1.37)	(-0.21)	(0.36)	(-1.93)	(1.58)
Fra. of Colla. in Troubled States	0.0022***	0.0026***	0.0022***	0.0023***	0.0029***	0.0037***	0.0028***	0.0029***
	(6.45)	(3.24)	(7.47)	(3.42)	(6.94)	(3.40)	(8.19)	(3.68)
Herfindahl Index of Collateral	-0.2076***	-0.2597***	-0.1952***	-0.2464	-0.2484***	-0.3428**	-0.2446***	-0.2801
	(-5.69)	(-2.91)	(-6.15)	(-1.69)	(-5.00)	(-2.57)	(-5.53)	(-1.50)
Same Originator and Servicer	-0.0049	0.0055	-0.0075	-0.0008	-0.0123	-0.0066	-0.0160	0.0003
	(-0.42)	(0.27)	(-0.97)	(-0.03)	(-0.85)	(-0.25)	(-1.69)	(0.01)
Missing Originator or Servicer	-0.0073	-0.0031	-0.0119	0.0074	-0.0101	-0.0046	-0.0184**	0.0105
	(-0.79)	(-0.16)	(-1.64)	(0.38)	(-1.02)	(-0.19)	(-2.37)	(0.49)
Issuer Rating	0.0161***	0.0112	0.0180***	0.0112*	0.0166**	0.0093	0.0188***	0.0118
	(2.70)	(0.96)	(3.28)	(1.75)	(2.25)	(0.69)	(2.97)	(1.64)
Level of Subordination	0.0426	0.0427	0.0470	-0.0115	0.0537	0.0774	0.0660*	-0.0118
	(1.27)	(0.65)	(1.54)	(-0.12)	(1.36)	(0.66)	(2.02)	(-0.12)
Relationship	-0.0019	0.0059	-0.0067	0.0390**	0.0073	0.0191	-0.0061	0.0542**
	(-0.36)	(0.54)	(-0.86)	(2.05)	(1.14)	(1.42)	(-0.64)	(2.37)
Rating Disagreement	0.0566*		0.0539**	0.0830	0.0583**		0.0604**	0.0776
	(1.95)		(2.14)	(1.18)	(2.25)		(2.29)	(1.10)
Deal Complexity	-0.8087***	-1.2701***	-0.6948***	-0.4994	-1.0816***	-1.3083**	-0.9205***	-0.4736
	(-3.57)	(-3.74)	(-2.99)	(-1.06)	(-3.82)	(-2.58)	(-3.09)	(-0.79)
Bank Thrift	-0.0002	0.0004	0.0021	-0.0045	-0.0000	-0.0068	0.0066	-0.0020
	(-0.02)	(0.03)	(0.17)	(-0.33)	(-0.00)	(-0.30)	(0.43)	(-0.12)
Loan to Value (LTV) Ratio	0.0015***	0.0040***	0.0012***	-0.0001	0.0021***	0.0072***	0.0018***	-0.0002
	(3.76)	(5.84)	(3.97)	(-0.07)	(3.15)	(4.30)	(3.69)	(-0.14)
Weighted Average Credit Score	0.0000	-0.0000***	0.0000	0.0002	0.0000	-0.0000***	0.0000	0.0004
	(0.93)	(-3.49)	(1.62)	(0.62)	(0.69)	(-3.65)	(1.43)	(1.15)
Missing Credit Score	0.0059	0.0052	0.0140	0.0878	0.0150	-0.0006	0.0303**	0.2191
	(0.55)	(0.56)	(1.30)	(0.51)	(1.22)	(-0.04)	(2.43)	(1.03)
Rating * Cohort Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	47,652	7,196	33,214	7,242	34,017	4,559	23,434	6,024
R-squared	0.737	0.762	0.741	0.731	0.720	0.706	0.728	0.719

Panel B: non-AAA only

VARIABLES	Whole Sample (2000-2006)				Hot Period (2004-2006)			
	One/Two/Three	One Rated	Two Rated	Three Rated	One/Two/Three	One Rated	Two Rated	Three Rated
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Yield	-0.0056	-0.0127	0.0000	0.0681*	-0.0382	0.0489	-0.0273	0.0102
	(-0.21)	(-0.36)	(0.00)	(1.74)	(-1.49)	(1.13)	(-0.89)	(0.22)
Log Yield * Hot	0.0370*	0.0979**	0.0067	-0.0016				
	(1.87)	(2.46)	(0.23)	(-0.04)				
Log Yield * Issuer Share	0.3931	0.0570	0.5631*	-0.8151	0.9926***	0.5708	0.9999***	-0.1039
	(1.47)	(0.10)	(1.69)	(-1.36)	(4.34)	(0.59)	(3.62)	(-0.13)
Log Yield * One Rating	0.0206				0.0891***			
	(0.99)				(3.31)			
EDF * Hot	-0.0638							
	(-1.39)							
EDF * Issuer Share	-0.1672*	-0.0307	-0.2623**	-0.1898	-0.3665***	-0.1206*	-0.4166***	-0.5152*
	(-1.84)	(-0.53)	(-2.23)	(-0.82)	(-4.95)	(-1.88)	(-3.53)	(-1.81)
EDF * One Rating	0.0054				-0.0064			
	(1.05)				(-0.90)			
One Rating	-0.0600				-0.3478**			
	(-0.58)				(-2.60)			
Two Rating	0.0214				0.0327			
	(0.85)				(1.18)			
Issuer Share	-1.8717	0.0757	-2.7180*	4.4310	-4.2606***	-2.1354	-4.3663***	1.9477
	(-1.49)	(0.03)	(-1.84)	(1.53)	(-3.92)	(-0.46)	(-3.48)	(0.55)
Size	0.0014	0.0033	0.0008	0.0274	-0.0003	0.0008	-0.0047	0.0341
	(0.20)	(0.29)	(0.11)	(1.52)	(-0.04)	(0.05)	(-0.58)	(1.58)
Log Weighted Average Life	0.0469**	-0.0205	0.0625**	-0.0087	0.0447	0.0195	0.0613*	-0.0214
	(2.07)	(-0.57)	(2.14)	(-0.16)	(1.62)	(0.50)	(1.87)	(-0.30)
Fra. of Colla. in Troubled States	0.0041***	0.0033***	0.0043***	0.0046***	0.0052***	0.0047***	0.0052***	0.0054***
	(6.66)	(3.36)	(7.76)	(3.26)	(7.19)	(3.76)	(8.18)	(3.45)
Herfindahl Index of Collateral	-0.4512***	-0.3099***	-0.5817***	-0.6391**	-0.4984***	-0.4077***	-0.6223***	-0.7193*
	(-5.40)	(-3.08)	(-5.67)	(-2.12)	(-4.50)	(-2.82)	(-5.41)	(-2.05)
Same Originator and Servicer	-0.0133	0.0080	-0.0243	-0.0059	-0.0306	-0.0033	-0.0464**	-0.0114
	(-0.60)	(0.33)	(-1.21)	(-0.14)	(-1.13)	(-0.11)	(-2.05)	(-0.27)
Missing Originator or Servicer	-0.0072	-0.0048	-0.0222	0.0153	-0.0136	-0.0041	-0.0348*	0.0173

	(-0.41)	(-0.22)	(-1.38)	(0.47)	(-0.72)	(-0.15)	(-1.92)	(0.48)
Issuer Rating	0.0252**	0.0118	0.0344***	0.0125	0.0248*	0.0110	0.0328**	0.0138
	(2.09)	(0.84)	(2.79)	(1.12)	(1.78)	(0.64)	(2.47)	(1.16)
Level of Subordination	0.1022	0.0477	0.1153*	-0.0278	0.1099	0.0784	0.1288**	-0.0168
	(1.29)	(0.70)	(1.88)	(-0.18)	(1.27)	(0.61)	(2.19)	(-0.11)
Relationship	0.0065	0.0080	0.0086	0.0800**	0.0257*	0.0244	-0.0047	0.0903**
	(0.59)	(0.58)	(0.37)	(2.39)	(1.99)	(1.50)	(-0.16)	(2.13)
Rating Disagreement	0.0650**		0.0542**	0.0824	0.0658**		0.0603**	0.0847
	(2.40)		(2.28)	(1.19)	(2.49)		(2.31)	(1.26)
Deal Complexity	-1.2261**	-1.6737***	-0.7705	0.6971	-1.4836**	-1.9428***	-1.0564	0.9294
	(-2.23)	(-3.71)	(-1.17)	(0.69)	(-2.33)	(-3.06)	(-1.45)	(0.75)
Bank Thrift	0.0021	-0.0032	0.0218	0.0048	0.0011	-0.0137	0.0272	0.0117
	(0.09)	(-0.18)	(0.80)	(0.21)	(0.04)	(-0.53)	(0.96)	(0.43)
Loan to Value (LTV) Ratio	0.0024***	0.0053***	0.0024***	0.0001	0.0030***	0.0095***	0.0027***	0.0001
	(3.17)	(5.52)	(3.83)	(0.05)	(2.93)	(3.64)	(3.46)	(0.05)
Weighted Average Credit Score	0.0000	-0.0000***	0.0014***	0.0011	0.0000	-0.0000***	0.0016***	0.0020**
	(0.54)	(-3.02)	(4.50)	(1.58)	(0.33)	(-3.60)	(3.83)	(2.58)
Missing Credit Score	0.0105	0.0021	0.9683***	0.6709	0.0224	0.0003	1.0690***	1.2110**
	(0.33)	(0.19)	(4.49)	(1.51)	(0.75)	(0.02)	(3.93)	(2.51)
Rating * Cohort Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,675	5,670	11,245	3,760	16,141	3,593	9,350	3,198
R-squared	0.671	0.747	0.663	0.673	0.605	0.647	0.613	0.638

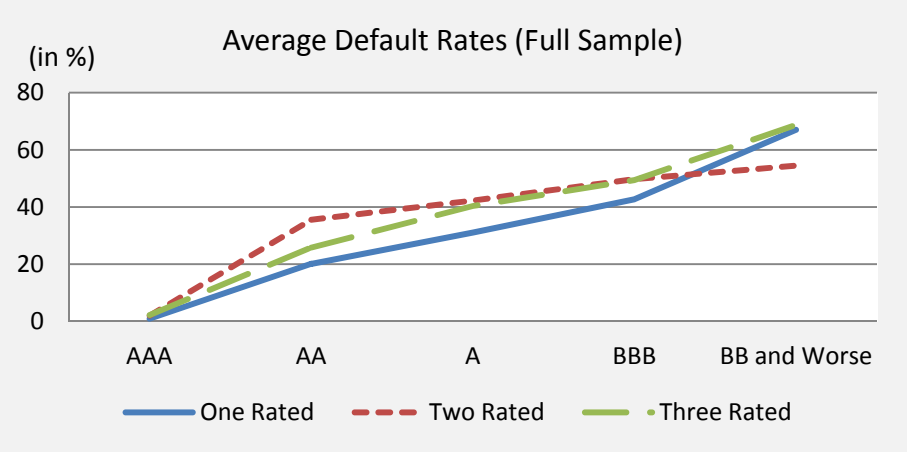

Fig. 1 (A)

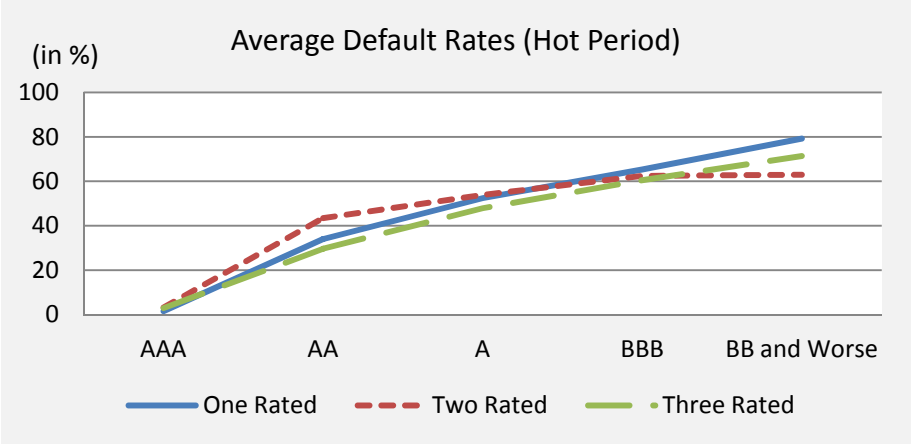

Fig. 1 (B)

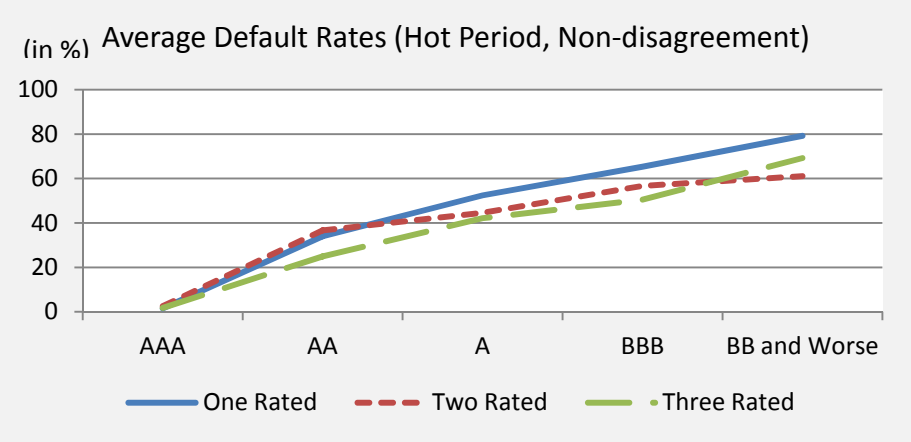

Fig. 1 (C)

Fig. 1 Average default rates for different rating categories by the number of initial ratings. This figure shows the average default rates for tranches with different rating categories by their number of initial ratings. Fig. 1 (A) gives the results for the whole sample from 2000 to 2006. Fig. 1 (B) gives the results for the hot years from 2004 to 2006. Fig. 1 (C) examines tranches with identical (non-disagreeing) initial ratings during the hot market period.