Competition and Credit Ratings After the Fall*

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Abstract

We analyze the entry of new credit rating agencies into structured finance products and its effects on rating levels. Our setting is unique as we study a period in which the incumbents' reputation was extremely poor and the benefit of more fee income from inflating ratings was low. We find entrants cater to issuers by issuing higher ratings than incumbents. The entrant ratings are much higher in interest-only (IO) tranches. Ratings by incumbents become more generous as the entrants increase their market share in a product type. We also exploit a feature of structured finance that identifies undisclosed rating shopping.

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1 Introduction

High quality credit ratings can reduce informational asymmetries and transactions costs in financial markets. Credit ratings provided by a third party can be particularly helpful in encouraging participation in financial market activities among investors that are less likely to collect their own information (see Boot and Thakor (1993) for a discussion of market segmentation by information sensitivity). Conversely, low quality credit ratings can lead to dysfunction in financial markets. Indeed, Mathis, McAndrews, and Rochet (2009), Ashcraft, Goldsmith-Pinkham, and Vickery (2010), and Griffin and Tang (2012) have documented the role of the credit rating agencies (CRAs) in the dysfunction that led to a collapse in structured finance products in the 2007-2009 period. A large literature from other asset classes has also shown that credit ratings have meaningful effects on real economic outcomes.[1] Given the central role that CRAs play in financial markets, several entities including the SEC (2011, 2012) have suggested that one way to improve credit ratings is to enable greater competition. Indeed, the Credit Rating Agency Reform Act of 2006 required the SEC to increase competition among CRAs (SEC 2013). In the spring of 2012, European regulators also implemented a framework to increase competition between CRAs (Kanter 2012).

To further our understanding of how rating agencies compete and the effects of competition on ratings, we study the entry of two firms into the CRA market. The entrants compete in ratings for a particular structured finance product, commercial mortgage-backed securities (CMBS); the entrants did not initially rate corporate, municipal, or sovereign bonds.[2] Given the upheaval in the structured finance market in recent years, and the significant loss of reputation incumbent CRAs suffered in the structured finance market, ours is a unique setting. We find that the entrants issue systematically higher ratings, often by several notches,

[1] See, for example, Alp (2013), Baghai, Servaes, and Tamayo (2014), Adelino and Ferreira (2014), Almeida, Cunha, Ferreira, and Restrepo (2014), and Cornaggia, Cornaggia, and Israelson (2014). See Cornaggia, Cornaggia, and Israelson (2014) for a review of the extensive earlier literature on the real effects of credit ratings.

[2] See Dierker, Quan, and Torous (2005) for a description of the CMBS market. One of the entrants intends to rate corporate bonds and has very recently begun rating public finance bonds, but over our sample period was primarily active in CMBS. The other entrant rates only structured finance.

than established CRAs. The entrants' average ratings are higher than those of each of the three main incumbents, and this phenomenon is not due to unobserved heterogeneity in the quality of the securities. The difference between entrant and incumbent ratings is especially pronounced in interest-only (IO) tranches, which the entrants rate AAA almost uniformly. While the entrants' ratings are still significantly higher in the non-IO sample, the economic magnitude of the difference is much smaller for these securities.[3]

Overall, our evidence suggests that higher entrant ratings are part of a strategy to win business from the incumbents. Because there are several potential alternative explanations for systematically higher entrant ratings, we conduct a series of exercises to rule these out. First, we test whether entrants only rate securities that the incumbents rate low, but the data do not support this explanation. Second, we do not find that the entrants' ratings are noisier than the incumbents in the sense of security and collateral characteristics explaining a smaller portion of the variation in ratings. Finally, we do not find that entrants are more likely to rate securities from less reputable deal underwriters. Thus, it appears issuers only solicit entrant ratings when they expect the entrants to rate higher than or equivalent to the incumbents, which is consistent with the entrants issuing higher ratings in order to win business. While assessing performance in structured finance takes much longer than other asset classes, coupons on non-IO CMBS that incumbents rate below AAA are about 100 basis points higher than yields on like-rated corporate bonds. As such, the market does not appear to believe that the incumbents are being excessively conservative in their ratings of non-IO tranches.

By the end of our sample (June 2014), more than half of CMBS issued since 2009 are rated by at least one entrant. The entrant that gains significant market share rates 40% of

[3]IO tranches are created by stripping off the spread between the weighted average collateral coupon and the coupon on the securities with principal balances. Securitizing this spread allows the issuer to immediately monetize the profit from deal issuance, rather than waiting to accumulate the profits over the life of the deal. IO tranches represent 20% of the number of tranches in our sample, and 38% of the dollar amount of trading volume (primary and secondary market) in CMBS is in IO and Principal Only (PO) tranches during our sample period. We calculate the share of IOs and POs in CMBS trading using FINRA aggregate trading volume data for structured products for 2011-2014 as tabulated by SIFMA (2014a).

these issues, which is more than incumbent S&P. The other, more generous entrant's market share stagnates at around 15% of new issues, however. The entrants' ratings are, in general, supplemental to those of the incumbents as the total number of ratings is higher when an entrant rates an issue. The market share of the most conservative incumbent, S&P, declines substantially however: it rates less than 25% of securities the year the entrants enter. While this is due in part to the fact that it voluntarily stopped rating a certain type of CMBS for several months beginning in July 2011 (Bloomberg 2014), it is also the case that S&P has the largest gap between its ratings and those of the entrants on issues rated by both. This suggests there may be some displacement of S&P by the entrants.

We further find that the entrants' more generous ratings affect the level of the incumbents' ratings. Our main variable of interest is the entrants' yearly share of security ratings in CMBS deal types. By simultaneously controlling for the year of issuance and the type, we are not capturing merely that CMBS ratings became more lax over time, or that some deal types are rated more leniently. We find that as the entrants' market share increases, the ratings assigned by incumbents are more favorable from the perspective of the issuer. A 10 percentage point increase in the share of securities rated by an entrant raises the average incumbent rating by between 0.3 and 0.5 grades. As the entrants' total combined market share is 52% by the end of our sample period, this represents an economically meaningful increase in the favorability of ratings by incumbents. The increase in incumbent ratings from competition that we document for structured finance is larger than what Becker and Milbourn (2011) report for corporate bonds. Consistent with more generous incumbent ratings, we also find that an increase in the entrants' share lowers the level of subordination for securities rated AAA by at least one incumbent.

In contrast to the corporate bond market that Becker and Milbourn (2011) study, the finding that the ratings of the incumbents increase in the entrants' market share could be due to rating shopping on the part of issuers, rating catering on the part of the CRAs, or a combination of both. Rating shopping occurs when issuers seek multiple ratings in an

attempt to find the most favorable ones. Rating catering refers to the CRAs courting business by using laxer standards. Theoretical work shows that competition always exacerbates shopping and often exacerbates catering. As Becker and Milbourn (2011) emphasize, in the corporate bond market incumbents S&P and Moody's had virtually 100% market share, implying little room for shopping. We show that no one agency had close to 100% market share in the CMBS market, thus leaving scope for issuers to shop.

Rating shopping is never explicitly disclosed, so we exploit a unique feature of the structured finance market - the interdependence of securities within a given deal - and create two measures of *undisclosed*, deal-level shopping. Our more conservative measure considers a deal to be "shopped" when alternate tranches are missing ratings from different CRAs, with no change in the total number of ratings, a structure which 6% of the deals in our sample exhibit. Our second measure takes advantage of a deal's waterfall structure. In particular, if a given security is missing a rating from a particular CRA, but a tranche below it in the capital structure has a rating from that CRA, we know that the CRA conducted analysis sufficient to rate the tranche with a missing rating. We consider deals with such a structure to have been shopped.[4] While undisclosed shopping is not usually statistically significantly related to the increase in incumbent ratings in our benchmark empirical specification, both our measures increase following the entry of the incumbents. Additionally, undisclosed shopping is more common in more complex deal types, consistent with the theoretical prediction of Skreta and Veldkamp (2009).

We also measure the amount of *disclosed* shopping at the security level, based on the number of ratings a tranche receives. While this may at first seem to contradict our deal-level measures of shopping, the nature of the rating process in the structured finance market combined with the threat of unsolicited ratings makes it likely that some of the search for higher ratings must be disclosed. When added to the regressions, we find that the number of ratings has a positive and strongly significant effect on the average incumbent rating,

[4]Post entry, 3% of S&P deal ratings, 10% of Moody's deal ratings, and 24% of Fitch deal ratings exhibit such a structure.

and it causes the coefficients on the entrants' shares to decline in magnitude and become insignificant in the IO sample. As such, although we find the strongest evidence of catering by the *entrants* in the IO subsample, there is little evidence of catering by the *incumbents* in this subsample. The IOs have noisier ratings than the non-IOs insofar as security and collateral characteristics explain a much smaller portion of the variance of ratings in these tranches than they do for tranches with principal balances. Furthermore, because the methodology to rate non-IO bonds is not readily adapted to IOs, our results suggest there may be greater benefit to shopping in securities that are more complicated to rate. In contrast to the results for the average incumbent rating, our regressions for the level of credit support for *AAA* securities suggest that disclosed shopping does not play a role. The coefficients on the shopping variables are statistically insignificant, but the coefficients on the entrants' market shares remain of similar magnitude and statistical significance.

Catering and shopping are thus both important channels through which increased competition can lead to higher ratings, and therefore both problems must be solved in order for competition to improve the quality of ratings. Although policies to mitigate the rating shopping problem such as disclosure requirements (see, e.g., Sangiorgi and Spatt 2013) or a limit on the number of ratings an issuer can seek may help, our results suggest that eliminating shopping is not a sufficient condition for greater competition to improve ratings quality.

The remainder of the paper proceeds as follows. The next section explains theoretical predictions about and previous empirical work on the effect of competition on ratings and relates them to our setting. Section 3 presents our data. Section 4 discusses the ratings of the entrants. In Section 5, we estimate the effect of entry on the ratings of the incumbents, and Section 6 concludes.

2 Background

2.1 Competition and rating quality: what are the effects and what are the channels?

That increased competition should lead to worse rating quality is not obvious from either a theoretical or empirical standpoint. Much of the theory (e.g., Bolton, Freixas, and Shapiro 2012, Camanho, Deb, and Liu 2012, and Frenkel forthcoming) suggests that, under the issuer-pays fee scheme, the effect of competition depends on the reputation of the incumbents.[5] In particular, Camanho, Deb, and Liu (2012) show that more competition can actually lead to more accurate ratings when the reputations of both the incumbent and the entrant are low. Intuitively, this occurs because the possibility of gaining market leadership when reputations are similar is higher than if one CRA has a much better reputation than the other. Since market leadership is "up for grabs," both CRAs have an incentive to rate accurately and make incremental gains in reputation and therefore market share. Conversely, if reputations are far apart, a "market-sharing" effect dominates, whereby the CRA with lower reputation will inflate ratings in order to gain additional market share. Similarly, Frenkel (forthcoming) finds that the degree to which competition can improve rating quality depends on how low the reputation of the entrant is relative to the incumbent.

The empirical results of Griffin, Nickerson, and Tang (2013), Strobl and Xia (2012), and Jiang, Stanford and Xie (2012) support the existence of catering. Although they do not examine the effect of entry, Griffin, Nickerson, and Tang (2013) find that competition among CRAs leads to ratings inflation in the collateralized debt obligation (CDO) market. Strobl and Xia (2012) use the investor-paid CRA Egan-Jones to document that S&P's corporate ratings are more inflated in situations in which they face a greater conflict of interest as a result of their issuer-pays business model. Jiang, Stanford, and Xie (2012) find that S&P's

[5] An issuer-paid CRA generates income from fees it collects from security issuers. In contrast investor-paid CRAs generate income by charging individual and institutional investors for access to their ratings.

transition from an investor-pay to an issuer-pay model resulted in higher ratings.

Give the unclear theoretical predictions, the effect of competition on ratings is an empirical question, but the empirical results to date are mixed. Becker and Milbourn (2011) and Cohen and Manuszak (2013) use data from prior to the financial crisis and find that increases in Fitch's market share are associated with more generous credit ratings. Similarly, Behr, Kisgen, and Taillard (2014) find that rating quality decreased after the SEC introduced a NRSRO certification process in 1975 that restricted competition. In contrast, Doherty, Kartasheva, and Phillips (2012) find that when S&P entered the insurance rating market it actually applied *stricter* rating standards than the incumbent A.M. Best.[6] Xia (2014) empirically shows that the entry of an investor-pays CRA improves the quality of ratings.

Even if it is true that competition leads to less stringent ratings, the mechanism behind this effect is still unclear. Much of the theoretical work (e.g., Skreta and Veldkamp 2009, Bolton, Freixas, and Shapiro 2012, and Sangiorgi and Spatt 2013) has focused on explicit rating "shopping," whereby issuers solicit ratings from multiple CRAs in search of the best ones. The presence of shopping does not necessarily indicate that CRAs are inflating ratings though: CRAs could be issuing ratings that are perfectly accurate given their private information, but cross-sectional differences in this private information could lead to differences in disclosed ratings.

In contrast, rating catering is an action on the part of the CRAs and occurs when they issue ratings that are higher than their private information dictates for the purpose of garnering more business. Unlike shopping, catering always implies some degree of rating inflation, and it is therefore a channel that is distinct from shopping. While Bolton, Freixas, and Shapiro (2012) and Sangiorgi and Spatt (2013) allow for the possibility of rating catering,

[6]Doherty, Kartasheva, and Phillips (2012) argue that this is likely due to the different incentives insurance companies have to seek additional ratings. A non-insurance corporate issuer usually seeks additional ratings in order to make its bonds appealing to investors with "regulatory constraints" (e.g., investors who can only hold bonds with ratings from two or more CRAs). An insurance company, in contrast, will seek an additional rating only if it allows it to charge a higher price to buyers of its policies such that seeking a more stringent rating is optimal.

to our knowledge only Camanho, Deb, and Liu (2012) have modeled the effect of competition with catering but with no possibility of shopping.

2.2 Our Setting

The work closest in spirit to our paper, Becker and Milbourn, studies an asset class and time period in which the incumbents' reputation was solid and the benefit to inflating ratings was high due to the size of the market. In contrast, our setting is one in which competition has the best chance of leading to more stringent ratings for two reasons.

First, our data come from a time period and asset class in which the incumbent rating agencies had very poor reputations. The massive downgrades of billions of dollars of RMBS and ABS CDOs and the failure of large financial institutions led to public backlash from lawmakers and lawsuits from investors. As our sample period begins in 2009, we have an environment in which competition is most likely to lead to more rigorous ratings as predicted in the model of Camanho, Deb, and Liu (2012).

Second, our setting is one in which the benefit from inflating fee income was small. Theoretical work (e.g., Bar-Isaac and Shapiro 2013, Bolton, Freixas, and Shapiro 2012) shows that CRAs are least likely to inflate ratings when the fee income is low. As the CMBS market has been relatively small post financial crisis, the benefits of issuing higher ratings to gain business are low relative to the future benefits of exploiting a better reputation later. Along this dimension as well, therefore, our setup is one in which competition has the best chance of leading to lower ratings.

We also analyze how the entrants compete and show clearly that they do so by being more generous, which suggests catering. Given that there are far fewer issuers of structured finance products than corporate bonds, catering is likely to be a more important issue for this asset class. The magnitude of our point estimates regarding the effect of competition on incumbent ratings suggest that, indeed, competition may have even more deleterious effects in structured finance, and perhaps other similar asset classes, than in corporate bonds.

Finally, our setting is one in which shopping can and, as we show, does occur on a significant scale. Although the CMBS market itself is small relative to the corporate bond market, the set of all mortgage- and non-mortgage-related asset-backed securities (i.e., "structured finance") is larger by total issuance and by amount outstanding than the corporate bond market (SIFMA 2014b).

3 Data

We collect data from Bloomberg terminals on ratings, collateral characteristics, tranche structure, and coupons of CMBS issued from January 2009 through June 2014. We begin our sample in 2009 as the disruption in securitization markets resulted in very little issuance in 2008. Additionally, securities issued after the financial crisis are quite different from those issued before. An appendix provides historical details on the CMBS market and compares it with our sample.

We include all CMBS except ReREMIC deals, CDOs, or agency multi-family deals. ReREMICs are more akin to CDOs than traditional CMBS as they are resecuritizations of existing CMBS tranches. Because they are resecuritizations, they have very different structures from the other CMBS in our sample and Bloomberg does not provide data to control for the collateral quality in these deals. Furthermore, ReREMICs primarily include securities issued before the financial crisis making them difficult to compare with CMBS backed exclusively by collateral originated after the financial crisis. Bloomberg usually classifies multi-family deals backed by the Government Sponsored Entities (GSEs) as collateralized mortgage obligations (CMOs) such that there are few in our sample to begin with. However, we drop any deals that have agency-backed flags.

Table 1 summarizes the securities in our sample. Our sample contains 2,488 securities from 287 separate deals. A CRA often rates particular securities within a deal rather than every security within a deal. The average security is rated by at least 2 CRAs and some are

rated by 4. Moody's and Fitch each rate more than half the securities, S&P rates a third, and Dominion Bond Ratings Service (DBRS) rates just over a quarter. Entrant 1 rates only 379 securities, whereas Entrant 2 rates 1,006, more than S&P. In total, more than half of the securities issued are rated by at least one entrant.

The entrants and incumbents use similar definitions to describe what various ratings for a structured finance security represent. Table 2 contains the exact definitions for AAA securities; the definitions for lower ratings are analogous. Since many of the tranches rated do not have principal balances, the language used in the rating definitions is largely about losses on the securities because of credit risk rather than simply default on the securities. Prepayment risk on CMBS is negligible since the vast majority of securitized commercial mortgages have defeasance clauses (see Dierker, Quan, and Torous 2005) such that the main source of risk is the credit risk of the collateral.

The entrants generate ratings on an alphabetical scale comparable to the incumbents. Hence, the ratings of all six CRAs (four incumbents plus two entrants) in the sample can be mapped one-to-one to the same numerical scale. We map the alphabetic ratings to a 16 notch numerical scale as follows: $AAA = 16$, $AA+ = 15$, $AA = 14$, $AA- = 13$, $A+ = 12$, $A = 11$, $A- = 10$, $BBB+ = 9$, $BBB = 8$, $BBB- = 7$, $BB+ = 6$, $BB = 5$, $BB- = 4$, $B+ = 3$, $B = 2$, $B- = 1$. Half of the securities are rated AAA by at least one CRA, and 46.9% are rated AAA by at least one incumbent, with the remaining 3.5% being rated AAA by only an entrant. The average rating assigned by incumbents is about one grade lower than the average rating assigned by the entrants. We discuss in the next section whether the differences in ratings across CRAs are because of differences in the securities they rate.

The size of the issue is the tranche size (*tranchesize*). We treat the small number of issues for which *tranchesize* is 0 or equal to the size of the deal (usually IO tranches) as missing for this variable. Subordination is the main measure of credit enhancement for non-IO structured finance products. It is the percentage of the value of all the securities in the deal that are below it in the priority of payments and the allocation of losses on the

principal of the collateral to the principal of the tranches. Thus, AAA securities usually have the most subordination and $B-$ tranches usually have the least. Because IO securities have no principal balance, they have no subordination.

The main measure of expected maturity in the CMBS market is the weighted average life (WAL) which Bloomberg provides in years. The WAL is calculated by projecting the principal repayment schedule and then calculating the number of years from issuance in which the average dollar of principal is paid off. It is similar to Macaulay's duration but includes only anticipated principal payments rather than scheduled principal and interest payments; see Davidson, Sanders, Wolff, and Ching (2003) for details. Because IO securities do not have a principal balance, they have no WAL. The WAL is calculated under particular assumptions about prepayment and default, and issuers usually provide a WAL in the prospectus supplement (Bloomberg populates its WAL field using these supplements). We use this measure to create categories of WAL: less than 3 years, 3 to 5 years, 5 to 7 years, and 7 years or more.

Previous studies on the effects of ratings on yields typically use quarterly or monthly cross-sectional regressions of the yield or yield spread on rating indicators. A typical framework regresses the bond's spread to a comparable maturity treasury on a dummy variable indicating whether the bond is rated by the entrant, or on the rating difference between the entrant and the incumbents. The key feature of these studies (e.g., Kisgen and Strahan 2010, Bongaerts, Cremers, and Goetzmann 2012) is that they use a time series of bond yields and ratings and estimate many cross-sectional regressions.

The inability to access a time series of yields and/or spreads on CMBS makes it impossible to use such an approach. A time series of yields on individual CMBS is unavailable for two reasons. First, reporting requirements for structured products are much less standardized than for corporate bonds – there is nothing equivalent to TRACE for these asset classes with the exception of TBA agency securities since May 2011. As such, the vast majority of CMBS do not have current yield or spread information available in Bloomberg. Bloomberg reports *modeled* prices for most securities on many dates subsequent to issuance but does not

have transaction prices. However, Bloomberg does have transaction prices for many senior tranches on dates near security issuance. For these dates the prices are extremely close to par, which makes the initial coupon a good measure of the return investors expected to earn. Although more junior securities may price further away from par (higher or lower), such deviations likely average to 0 in the cross section, and thus the initial coupon is an accurate measure of yield at issuance.[7]

The second challenge for getting a time series of yields for structured products is more fundamental than data disclosure requirements. Even were FINRA to disseminate the data it has collected on non-agency structured finance since May 2011, the majority of these products never trade after issuance.[8] Bessembinder, Maxwell, and Venkataraman (2013) report that only about 20% of structured products traded at all in the 21 month period from May 2011 to January 2013. While about half of corporate bonds also trade infrequently (see, for example, Edwards, Harris, and Piwowar 2007), there is a far larger number of corporate bonds than CMBS.

We thus focus on estimating the effect of CRA entry on the yield at issuance of CMBS, using the initial coupon spread over comparable maturity Treasuries as a proxy. To compute this spread, we use the WAL as the security's maturity and subtract off the yield on a treasury of comparable maturity in the month the security is issued.[9] The securities in our sample vary in the form of the coupons they pay and in their expected maturity, and include (1) floating rate ("floaters"), which pay a constant fixed spread to one month LIBOR, (2) fixed rate, and (3) variable rate securities other than floaters.

Our data contains the shares of each property type backed by the loans in the pool for

[7] An, Deng, and Gabriel (2011) and He, Qian, and Strahan (2012) make similar assumptions in their use of coupons as initial yields for structured finance.

[8] As of May 2011, the Financial Industry Regulatory Authority (FINRA) requires reporting of all MBS transactions but has not released the data it has collected for most classes of MBS, including CMBS, to the public. FINRA has released the data from 2011 onward to three groups of researchers; see Atanasov and Merrick (2013), Bessembinder, Maxwell, and Venkataraman (2013), and Hollifield, Neklyudov, and Spatt (2013).

[9] The actual legal maturity dates for CMBS are usually 30-40 years after issuance although that does not represent the true final payment date expected by investors.

the top 3 most common property types in that pool. From the top 3 property type shares, we construct the shares of retail, office, hospitality, and industrial property. To account for geographic heterogeneity, we construct variables measuring the share of loans in each pool that were originated in five MSAs: New York-Newark-Jersey City (*nyshare*), Los Angeles-Long Beach-Anaheim (*lashare*), Houston-Woodlands-Sugar Land (*houshare*), Miami-Fort Lauderdale-West Palm Beach (*mishare*), and Chicago-Naperville-Elgin (*chishare*). These five cities are the largest by deal count.

We have three additional variables that describe the collateral, all of which are measured at origination of the loans: (1) the weighted average loan-to-value (*waltv*), the weighted average debt-service coverage ratio (*wadscr*), which is the ratio of the net rents (usually called net operating income (NOI)) the property is expected to earn divided by the required mortgage payment, and (3) the weighted average maturity (*wam*) of the loans backing the security.

The mean issuance date of a security is June 2012. The CMBS market recovered slowly from the financial crisis. Thus, issuance of CMBS increases gradually over the sample, with 28 securities issued in 2009, 112 in 2010, 343 in 2011, 550 in 2012, 1006 in 2013, and 449 in the first half of 2014.

To account for heterogeneity in CMBS issuers in some of our empirical analysis, we include the total amount of issuance for the issuer/sponsor (*sponsortot*) in the year the security is issued.[10] We do so following the finding of He, Qian, and Strahan (2012) for the RMBS market that larger issuers often get more favorable ratings.

CMBS deals differ in their structure and the market is segmented according to the type, which is important because the CRAs have different methodologies for rating different types. Our first type is conduit/fusion, which comprise about two thirds of our sample. The second category is large loan or single loans, which are deals backed by only a few or one large loan.

[10]The lead manager is almost always a large financial institution. The issuer is often a SPV ultimately owned by a large financial institution. We use the prospectuses to identify, to the greatest extent possible, the ultimate bank sponsor/owner of the SPV.

We combine the Bloomberg categories Single-Asset and Large Loans into *typlarge* since we have relatively few large loan deals that are not only one loan and CRAs usually use the same methodology for rating Single-Asset and Large Loan deals. Our *typlarge* category constitutes 27% of our sample. We group the remaining deals (portfolio, European, and Small Balance) into an "other" category that contains 5% of the securities in our sample.

4 The Entrants' Ratings

Both entrants are Nationally Recognized Statistical Rating Organization (NRSROs).[11] The first resulted from the acquisition of a small investor-paid NRSRO by a large investment advisory services firm that subsequently converted the entity to an issuer-pays model. The conversion occurred after its acquisition in March 2010 (SEC 2012) and, because we are interested in studying issuer-paid ratings, we drop the small number of ratings (17 securities in total) by this entrant prior to its conversion. Entrant 1 also receives revenue from data services it provides to CMBS investors. Entrant 1 has plans to expand into the RMBS market and rated its first RMBS deal in late 2013 (Morningstar Credit Ratings, LLC 2013). Entrant 1 provides corporate credit ratings as well but is not an NRSRO for corporate ratings.

Entrant 2's debut in the CMBS market was January 19th, 2011 (Kroll Bond Ratings 2011a). This NRSRO, which is more than 40%-owned by pension funds and foundations, adopted the tagline "[o]ur name is on the line" to underscore its "emphasis on ratings trust and accuracy" (Kroll Bond Ratings 2011a). Entrant 2 rated its first deal, a single borrower transaction, in July 2011 (Kroll Bond Ratings 2011b). It initially focused only on the large loan / single asset segment of the market, releasing its methodology for rating such deals on August 9th, 2011 (Kroll Bond Ratings 2011c). In 2012, it moved into the conduit/fusion market and issued methodology for rating such transactions on February 23, 2012 (Kroll Bond Ratings 2012a). By mid-2013 Entrant 2 had the third highest market share in CMBS

[11] See, for example, Beaver, Shakespeare, and Soliman (2006), Bongaerts, Cremers, and Goetzmann (2012), Bruno, Cornaggia, and Cornaggia (2013), and Opp, Opp, and Harris (2013) regarding the importance of certification for CRAs.

ratings, and although initially active only in CMBS, it now also rates RMBS, credit card receivables securitizations, and auto loan securitizations. However, its market share in these asset classes remains very small.

Reflecting the belief that competition improves the quality of credit ratings, the SEC permitted both entrants to remain NRSROs, despite them deriving a large share of their CMBS rating revenue from a handful of issuers, because it was consistent with the SEC's goal of enhancing competition (SEC 2011, 2012, 2013). Figure 1 documents the evolution of the entrants' market share of the CMBS deal types. Entrant 1 does not exhibit much forward momentum, rating no securities in 2010 and around 20% in 2011 and 2013. Entrant 2 enters the market halfway through 2011 such that it rates just 10% of securities issued that year but 39% of large loan deals, consistent with its initial focus on that market segment.[12] Through the first half of 2014, it rates 56% of CMBS, giving it the third largest market share in that six month period ahead of S&P.

The summary statistics in Table 1 show that both the entrants have higher average ratings than the three main incumbents. It is possible this occurs because they rate intrinsically better securities, rather than because their rating methodology is more generous. To explore this possibility, Table 4 compares the entrants' ratings to ratings of incumbent CRAs that rate the same securities. Thus, in Table 4 we hold security characteristics constant, and the results indicate that both entrants issue systematically more generous ratings of the same security than the main incumbents.

The differences between both entrants' ratings and those of S&P, Moody's, and Fitch are all positive and statistically significant at the 1% level, indicating that the entrants rate the same security more generously. On average, entrant 1 rates securities one grade higher than the three main incumbents, and these differences are statistically significant. There is no significant difference between entrant 1's ratings and those of DBRS. Entrant 1 rates IO

[12]The 2% market share of conduit/fusion deals we list in Table 3 is likely because of minor differences in Bloomberg's classification of deals relative to the CRAs themselves. We take the Bloomberg deal type classifications as given to avoid applying our own biases in deal type classifications.

securities 3.1 grades higher than the average of the four main incumbents. It rates non-IO securities only 0.4 grades higher than the average of the incumbents although the difference is still highly statistically significant. Entrant 2 is somewhat less generous 1, although on average it still rates a security 0.4 grades higher than incumbents. The differences between Entrant 2's ratings and those of Fitch, Moody's, and S&P are positive and significant at the 1% level. DBRS rates slightly higher, on average, than entrant 2. Entrant 2's higher ratings than the incumbents are much more pronounced for IO tranches where it rates an average of 2.6 grades higher. It rates non-IOs only 0.04 grades higher on average although the difference is statistically significant. Entrant 2's higher ratings in non-IO tranches are also concentrated in the early part of the sample (2011-2012) when it is struggling to gain market share. In contrast, there is no statistical difference between entrant 2 and the average incumbent rating on the same issue in the second half of the sample (2013-2014).

The entrants rate IO tranches AAA almost uniformly, causing their ratings of these tranches to be several notches above the incumbents' in most cases. In contrast, the entrants' ratings of non-IOs are usually within four notches of the incumbents' average rating, a phenomenon illustrated in Figure 2 which plots the average incumbent rating against the rating of the entrant for each non-IO security rated by both. If entrant and incumbent ratings were the same, the dots would line up along the 45 degree line. Alternatively, if the differences between entrants and incumbents were simply a result of random differences of opinion, we would observe the dots in Figure 2 randomly scattered around the 45 degree line. Consistent with the statistics in Table 4, however, the entrant's ratings are usually above the 45 degree line. This suggests the entrants do not win business on securities they would rate lower than the incumbents, which would imply the entrants' strategy is to cater to issuers by rating higher. The difference between Entrant 2's ratings and those of the incumbents is only statistically significant in the early part of the sample, however.

4.1 Selection, Incumbent Conservatism, or Catering?

We have shown that the difference between the entrants' and incumbents' ratings persist after controlling for security characteristics. While this suggests catering, it is possible, that such differences arise due to selection effects. To determine whether this is the case, we look at three possible types of selection. First, we consider whether the differences arise because issuers purchase entrant ratings only after observing a low rating from one or more incumbents. Second, we examine whether the incumbents models are more precise than the entrants'. Third, we test whether entrants are more likely to rate issues from less reputable underwriting managers.

4.1.1 Selection due to low ratings from incumbents

If the differences arise because issuers choose to buy entrant ratings only after observing an unexpectedly low rating from one or more incumbents, a gap would exist even if the entrants do not issue systematically higher ratings. In other words, the difference would not be due to catering on the part of entrants.

To test this, we estimate a model of predicted incumbent ratings and test whether an entrant is more likely to rate an issue if the incumbent rates low. That is, we first estimate

$$avgratingincumbent_{i,j,t} = \alpha_0 + \alpha'_{\mathbf{x}} Controls_{i,j,t} + \epsilon_{i,j,t} \tag{1}$$

where i indexes the security, j indicates the deal type, and t indicates the year of issuance. The controls include dummies for the year of issue, deal type dummies, collateral characteristics, dummies for the coupon type (fixed rate, floating rate, or variable rate), and the *ex ante* WAL of the security in categories.

We then generate predicted ratings for each security ($predictavgratingincumbent_{i,j,t}$) the

incumbent rates and compute the "error" in average incumbent ratings:

$$avgincumerror_{i,j,t} = avgratingincumbent_{i,j,t} - predictavgratingincumbent_{i,j,t} \quad (2)$$

Additionally, we compute the binary variable

$$incumlow_{i,j,t} = \begin{cases} 1 & \text{if } avgratingincumbent_{i,j,t} < predictavgratingincumbent_{i,j,t} \\ 0 & \text{else.} \end{cases} \quad (3)$$

Finally, we estimate whether a low incumbent rating increases the probability of an entrant rating via

$$ratedentrant_{i,j,t} = \alpha_0 + \alpha_1 avgincumerror_{i,j,t} + YrofIssueFEs + DealTypeFEs + \epsilon_{i,j,t} \quad (4)$$

and

$$ratedentrant_{i,j,t} = \alpha_0 + \alpha_1 incumlow_{i,j,t} + YrofIssueFEs + DealTypeFEs + \epsilon_{i,j,t} \quad (5)$$

by probit. In equations (4) and (5), $YrofIssueFEs$ and $DealTypeFEs$ denote fixed effects for the year of issue and security type, respectively. The dependent variable, $ratedentrant$, takes a value of 1 if an entrant rates the security and 0 otherwise. We estimate equations (4) and (5) at the security level rather than the deal level as CRAs sometimes rate only a subset of securities in a deal rather than the entire deal.

Table 5 contains the results. The α_1 coefficients are statistically insignificant in all but one specification and changes signs depending on the specification. Thus, this exercise provides little evidence that unusually low incumbent ratings are driving the systematic difference between entrants and incumbents.

4.1.2 Selection due to noisier entrant ratings

Another reason we might *observe* systematically higher entrant ratings even if they do not *rate* systematically higher on purpose is if the entrants have noisier rating models. If entrant ratings are higher variance, issuers may choose, in a tie breaker situation, to purchase an entrant rating only if it is greater than or equal to the incumbent rating. While this channel is not entirely distinct from catering, since it too implies that the entrants garner business by rating higher than the incumbents, it implies a less deliberate strategy on the part of the entrants than having a methodology geared toward systematically higher ratings. To explore this possibility, we estimate separate rating models for each of the three main incumbents and the two entrants using our control variables and data from 2011 onward. We exclude year of issue dummies and the total amount of issuance of the sponsor in these estimations because the stated methodologies of the rating agencies are invariant to the year of issue and how much business the issuer has to offer the CRA. Table 6 presents the R^2s from these regressions. The R^2s are similar across CRAs indicating that the entrants' ratings are similar in precision to those of the incumbents. Column 4 reports the results for IO securities. The R^2's are much lower for these securities. However, the fit of the model for Entrant 2 is not lower than the average fit of the model for the incumbents.

There are three significant changes to the agencies' disclosed rating methodology over our sample period. First, S&P changed its methodology for rating Conduit/Fusion deals in 2009 (Standard & Poor's 2009a). Since the estimates in Table 6 use only data from 2011 onwards, this change does not affect our estimate of the precision of the CRAs models. Second, S&P changed its methodologies for evaluating both Conduit/Fusion and Large Loan transactions in September 2012. The financial press has commented that the 2012 changes to S&P's were towards making the ratings more lenient (see, for example, Tempkin 2012). Finally, Moody's changed its methodology for rating structured finance IO securities in February 2012 (Moody's Investors Service 2012). To verify that the R^2's of the incumbents are not lower than those of the entrants only because we are mixing models, in Columns 2 and 6

we report the R^2's for the models when we use only data from October 2012 onwards (for the non-IO securities) and from March 2012 onwards for the IOs. The results are similar in character. The results are also similar when we estimate the model separately by deal types for the October 2012 onwards subsample (not reported).

4.1.3 Selection due to underwriter reputation

Doherty, Kartasheva, and Phillips (2012) find that, after S&P entered the insurance market, higher quality issuers solicited ratings from S&P. We examine whether there is a similar effect following entry into the CMBS market. We use downgrades to securities as a proxy for reputation to examine whether managers of deals that suffered more (or more severe) downgrades *prior* to the entrants becoming active are more inclined to seek entrant ratings on new securities, i.e., on securities they issued *after* entry.[13] To construct measures of reputation, we find all securities with rating changes from Moody's, S&P, and Fitch between 2007 and 2010, and select only those that were issued between 2000 and 2010. We further restrict this set of securities by choosing only those from managers that are active post-entry (2011-2014:Q2).

Our measures of reputation are based on the proportion of securities issued from 2000-2010 that were downgraded by the incumbents from 2007-2010. This is the same measure of reputation that Hartman-Glaser (2013) suggests based on his theoretical model. We use the proportion of securities, rather than the dollar amount of downgraded securities as a percentage of deal size, because Bloomberg often reports the size of IO securities as the total deal size.[14] Specifically, we examine five measures: (1) the percentage of securities downgraded by any incumbent; (2) the percentage of securities downgraded by two or more incumbents; (3) the percentage of securities downgraded by 7 or more notches (the mean downgrade size for all three incumbents is roughly 6.5 notches), which we refer to as a "severe" downgrade; (4) the percentage of securities downgraded from investment-grade

[13] We use the "lead manager" of each deal as reported in Bloomberg.

[14] In other words, an interest only tranche of a deal worth $1,000 is reported as being $1,000.

to high yield by any incumbent; and (5), the percentage of securities downgraded from investment-grade to high yield by two or more incumbents. As such, we say that reputation becomes "worse" as these measures become larger in size.

Our data contains 49 managers that issued securities from 2011-2014:Q2, of which 16 were active and experienced downgrades by at least one CRA during 2007-2010. Of the 16 active lead managers, all had securities downgraded by two or more. On average, nearly 21% of their securities were downgraded by at least one CRA. About 10% suffered severe downgrades, and 10% on average suffered downgrades to below investment-grade.

To test whether this variation in downgrades has explanatory power for which managers seek entrant ratings, we estimate the following security-level probit regression:

$$ratedentrant_{i,j,t} = \alpha_0 + \alpha_1 reputation_i + \alpha'_{\mathbf{x}} Controls_{i,j,t} + \epsilon_{i,j,t} \tag{6}$$

In equation (6), $ratedentrant_{i,j,t}$ is equal to 1 if security j issued in year t by manager i was rated by an entrant, and 0 otherwise. The independent variable of interest is $reputation_i$, which is one of the five reputation measures for manager i described previously. We exclude any securities issued by managers that were not active prior to 2011 in estimating (6).

Table 7 presents the results for non-IO securities. We fail to find any statistically significant relationship between lead manager reputation and the probability that the lead manager will seek entrant ratings on its new issues. The signs on the reputation measures indicate that, if anything, managers with lower reputations are *less* likely to seek an entrant rating. The results for IO securities are similar and in an appendix available from the authors. Thus, we do not find evidence that manager reputation influences whether a manager gets an entrant rating.

4.1.4 Are incumbent ratings excessively conservative?

The previous exercises do no indicate that the observed difference in entrant and incumbent ratings is due to selection. A final explanation for higher observed entrant ratings is that the incumbents are simply being too conservative across the board. Although related to selection based on reputation, this channel is distinct in that it implies a *systematic* downward bias in incumbent ratings resulting from their experience in the financial crisis.

The ideal measure of incumbent conservatism is to use the cross-sectional performance of CMBS securities and/or collateral to assess relative rating accuracy. However, as summary statistics (available in an appendix from the authors) on securities and underlying collateral indicate, the CMBS in our sample have thus far performed too well to assess conservatism in this way. The primary reason for this is because, unlike in other asset classes (e.g., corporate bonds, municipal bonds), performance takes a considerable amount of time to observe in structured finance. Partly, the securities usually have stated maturity dates much longer (typically 30 to 40 years from issuance) than when most investors expect to stop receiving cash flows. Thus, a technical default in the sense of a writedown of principal for securities that have a principal balance, need not happen until that maturity date. Furthermore, some have argued (see Coval, Jurek, and Stafford 2009) that structured finance securities necessarily involve defaults more clustered in time than those on other kinds of bonds. The pricing of the Markit CMBX Series 6 and Series 7 indices, which are based on the performance of securities issued in 2012 and 2013, has also remained close to 100, indicating little expectation of imminent default.[15] Additionally, there have been few rating changes by incumbent CRAs. Despite solid good performance thus far, it is difficult to conclude that the securities are being rated too conservatively, especially given that subprime and Alt-A RMBS deals issued during the subprime boom also performed well until mid-2006.

One way to assess whether the non-IO securities that the incumbents rate below *AAA* are conservatively rated is by comparing the yields of CMBS with corporate bonds. Figure

[15]The previous Markit CMBX series, Series 5, was based on securities issued in 2007.

3 shows that spreads on CMBS that the incumbents rate below AAA are almost uniformly higher than spreads on like-rated corporate bonds.[16] While some of the higher spread on CMBS is likely an illiquidity premium, it is unlikely that this premium is enough to explain the more than 100 basis point average difference. Thus, the market seems to perceive these securities as riskier than corporate bonds of a given rating. Furthermore, spreads on BBB-rated corporate bonds (those closest to the investment grade-high yield cutoff) are almost uniformly *lower* than spreads on AA-rated CMBS (far away from the cutoff). Hence, at the very least we do not find evidence that the market views incumbent ratings as excessively conservative.

4.1.5 Is rating inflation sufficient to gain market share?

We find no evidence for selection-based explanations for higher entrant ratings, and the market does not appear to believe the incumbents are being excessively conservative. Rather, the systematically higher entrant ratings appear to be a deliberate to gain market share. However, a strategy of inflating ratings to gain business is likely not *sufficient* to compete with the incumbents. As illustrated in Figure 1, entrant 1 displays markedly less momentum than entrant 2, stagnating at 15% of total issuance. Despite this, there is a *larger* difference in ratings between entrant 1 and the incumbents than between entrant 2 and the incumbents. A possible explanation for its lack of momentum is that entrant 1's structured finance rating methodology is more opaque than entrant 2's. What is clear, though, is that entrant 1 cannot win business solely by inflating ratings.

4.2 Are Entrant Ratings Substitutes for Incumbent Ratings?

We have shown that the entrants' market share increases substantially over our sample period and that the entrants' ratings are on average higher than those of the three main incumbents.

[16] This is consistent with Merrill, Nadauld, and Strahan (2014), who find that yields on highly-rated structured finance securities held by insurance companies were higher than yields on like-rated corporate bonds.

The entrants' ratings do not appear to be perfect substitutes for the incumbents' ratings, however. An issuer's choice to get an entrant rating appears to be closely related to opting for an additional rating. For the 2011-2014:Q2 time period, the mean number of ratings for securities that get rated by an entrant is 2.8, while it is 2.0 for securities that do not get rated by an entrant. The difference in the number of ratings that securities rated by an entrant have persists in a multivariate context. In a regression of the number of ratings on our full set of controls, including year of issue and deal type dummies, and *ratedentrant*, the coefficient on *ratedentrant* is 0.7 in the non-IO sample and 0.8 in the IO sample. It is statistically significant at the 1% level in both the non-IO and IO samples. In the interest of brevity, the results are available upon request.

Despite entrants' ratings not being perfect substitutes for incumbent ratings *generally*, it does appear that one of the incumbents, S&P, is being displaced by the entrants. Figure 1 shows that Moody's and Fitch do not seem to lose business as a result of the entrants appearance, but S&P's market share declines substantially relative to the period before 2008. This is likely due in part to S&P voluntarily halting new conduit/fusion ratings for several months after it pulled ratings on $1.5 billion of securities in July 2011 (Bloomberg 2014). However, because the gap between entrant and incumbent ratings is highest for S&P (see Table 4), this displacement also suggests that the entrants are able to divert some business from S&P by giving systematically higher ratings.

Given that the choice to obtain an entrant rating often appears to be analogous to the choice to obtain another rating, it might be the case that entrants are more likely to rate a security if the incumbents disagree on its rating. Bongaerts, Cremers, and Goetzmann (2012) suggest that, for corporate bonds, Fitch often plays the role of a tie breaker. In our sample, however, we find it less likely that an entrant rates a deal if the incumbents disagree on the rating of the security, including the special cases of AAA ratings or ratings around the investment-grade / high yield boundary.

5 The Effect of Entry on Incumbent Ratings

While the entrants give more generous ratings to gain business, it is unclear whether the incumbent CRAs would necessarily respond to competitive pressure, or whether issuers are more able to shop when there are more CRAs. First, the incumbents may value their reputations enough that they ignore the competitive pressure, especially because, for the time being, the entrants compete only in structured finance products, which comprise a fraction of the incumbents' overall business. Second, it does not appear that entrant ratings are treated as perfect substitutes by issuers. Finally, it is unclear whether the market actually *believes* higher entrant ratings are accurate. As discussed in Appendix B, there is some evidence (albeit statistically weak) that investors require higher initial yields for securities rated AAA by an entrant vs securities with AAA ratings from only incumbents.

Despite the possibility that the incumbents do not respond, theoretical work suggests that rating catering can be exacerbated by competition. Additionally, this literature shows that incumbent ratings will certainly increase in response to competition via the shopping channel. Thus, to test whether entry into the CRA market affects incumbents' ratings, we construct variables to separately identify both potential channels.

5.1 Regression Design

Our identification of the effect of competition on incumbent ratings exploits differences in the market share of the entrants over time and within subsegments of the CMBS market. As Table 3 illustrates, there is substantial variation in which types of CMBS the entrants are active in. Hence, for each year and CMBS type, we construct the entrants' market shares as the percent of securities they rate. We then include year and CMBS type fixed effects to control for variation in ratings over the business cycle and the fact that some CMBS types may be riskier than others.

We estimate

$$\begin{aligned} avgratingincumbent_{i,j,t} &= \alpha_0 + \alpha_1 entrant1share_{j,t} + \alpha_2 entrant2share_{j,t} \\ &\quad + \alpha'_{\mathbf{x}} Controls_{i,j,t} + \epsilon_{i,j,t} \end{aligned} \tag{7}$$

where the controls include dummies for the year of issue and deal type, collateral characteristics, dummies for the coupon type (fixed rate, floating rate, or variable rate), and the *ex ante* WAL of the security in categories.

The independent variables of interest are $entrant1share_{j,t}$ and $entrant2share_{j,t}$, which are the percentage of securities of type j issued in year t that are rated by entrants 1 and 2, respectively. Competition results in more generous ratings by the incumbents if $\alpha_1 > 0$ or $\alpha_2 > 0$.

The specification implied by (7) assumes the effect each independent variable has on incumbent ratings is the same along all notches. This may not be true, however, as ratings are ordinal in nature. For example, the entrants' market share may have more of an effect on whether an incumbent rates a security $AA+$ vs. AAA than on whether it rates a security $A+$ vs. $AA-$. We thus follow Becker and Milbourn (2011) in estimating (7) using both OLS and an ordered probit. The latter preserves the ranking of the different ratings but does not impose a linearity assumption.

Given the importance of the AAA tranches for issuers, we also examine whether the entrants altered the tranches that the incumbents rated AAA. In particular, we are interested in whether the entrants' propensity to rate tranches AAA affected the level of subordination of the tranches that the incumbents rated AAA. We estimate

$$\begin{aligned} Subordination^{AAA}_{i,j,t} &= \beta_0 + \beta_1 entrant1share_{j,t} + \beta_2 entrant2share_{j,t} \\ &\quad + \alpha'_{\mathbf{x}} Controls_{i,j,t} + \epsilon_{i,j,t} \end{aligned} \tag{8}$$

In estimating (8), we include only securities that one of the incumbent CRAs rates AAA. More competition among CRAs lowers the amount of subordination if $\beta_1 < 0$ or $\beta_2 < 0$.

5.2 Shopping

In our setting, the results from estimating equations (7) and (8) cannot distinguish between whether any change in the incumbents' ratings is due to catering or shopping. As discussed previously, theory suggests that competition is likely to lead to more catering and hence higher ratings, and the results of Section 4 indicate catering on the part of the entrants. Theory also suggests that competition should lead to more shopping, thus we suspect that both channels are likely at work.

Constructing measures of shopping is challenging because it is never explicitly disclosed by issuers. To motivate our measures, it is important to first understand how shopping works in structured finance. In this market, unlike in the corporate setting, a set of interrelated securities are issued. During the rating process, an issuer typically engages in an informal, back-and-forth discussion with the CRA that centers on how it can maximize the portion of the deal that is rated AAA (i.e., determine the AAA subordination level). Determining subordination (and therefore the rating) for the highest tranche in the capital structure requires a CRA to analyze the underlying collateral for the deal, but does not require it to analyze the remainder of the waterfall, since by definition the top tranche is first to receive principal and interest payments. However, if an issuer wants ratings for a deal structure with, say, three tranches, a CRA must analyze and rate the first and second in order to rate the third. This is because rating a security that lies below others in the waterfall requires an analysis of the interest and principal cash flows that the waterfall promises to the tranches above it. More generally, to rate tranche n in the capital structure, a CRA must conduct enough analysis to also rate tranche $n-1$.

What remains unclear is exactly how far into the rating process an issuer and a CRA can get before the CRA must purchase the rating or risk an unsolicited rating. Fulghieri, Strobl,

and Xia (2014) suggest that CRAs issue unsolicited ratings precisely to deter shopping. From the perspective of a CRA, rating a structured finance deal involves a substantial investment of resources and it seems unlikely that the issuer can see the actual rating of every security in the deal before it decides whether to buy each one. It is more likely that it gets a preliminary opinion from a CRA on certain aspects of the deal and then decides whether to proceed with further negotiations. If the threat of unsolicited ratings is sufficiently strong, some of the shopping will be disclosed in the form of an additional rating. However, it is also possible that, so long as the issuer purchases ratings for enough of the securities in the deal, it can choose *not* to buy the ratings on only one or two tranches.

The limited empirical work on measuring shopping in structured finance assumes it occurs at the individual security level (see, e.g., He, Qian, and Strahan 2014). Defining shopping in this way is likely appropriate in the corporate or municipal bond market, but as the previous discussion suggests, it may not be in structured finance. Because a CRA must analyze the entire portion of the deal structure lying above the tranche to be rated, it is possible for an issuer to shop a single security only if it is the most senior in the deal. Shopping for ratings for mezzanine or junior securities necessarily implies that a CRA must also analyze (and more or less rate) the portion of the deal structure that is senior. In such a case it may be more accurate to characterize shopping as occurring at the *deal* level.

With this in mind, we define two measures of *undisclosed*, deal-level shopping. Both take advantage of the interdependence of securities in a deal and are based on missing ratings, as industry analysts have indicated that the presence of missing ratings in a deal indicates shopping (see, for example, Commercial Mortgage Alert 2014).

To define the first measure, $dealshop1$, we look for deals in which different tranches are missing ratings from different CRAs. For example, suppose we observe a deal with tranches A, B, and C (in order of seniority). Suppose S&P rates all three, Moody's rates A and C, and entrant 2 rates A and B. Thus, two different tranches (B and C) are missing ratings from different CRAs (Moody's and entrant 2). This implies the issuer had a desire for at

least two ratings each on tranches B and C, but that it *chose* to use different CRAs to rate them. In other words, the issuer shopped for ratings on B and C. In this case, we code every security in the deal as $dealshop1 = 1$. Further, we code both Moody's and entrant 2 as having been "shopped" on this particular deal.

Our second measure, $dealshop2$, is less stringent than $dealshop1$ and takes a value of 1 for all securities in a deal for which a tranche in the deal is missing a rating from a CRA but a tranche below it in the capital structure has a rating from the same CRA. For example, if we observe that the A3 tranche does not have a rating from S&P but that the B tranche was rated by S&P, we would label every security in that deal as $dealshop2 = 1$. Such a rating pattern implies that S&P did analysis sufficient to assess the risk of loss, and thus rate, the A3 tranche, as it is not possible to rate the B tranche without first assessing the risk of eating through the capital above it. As such, we know there was a rating for the A3 tranche that was not purchased. To code $dealshop2$, we identify seniority based on the average rating on the tranche and then by its alphanumeric name, since for the majority of non-IOs, the priority of the tranche in the capital structure is indicated by its name (e.g., the A3 tranche is below the A1 tranche and the C tranche is below the B tranche). We sort first on average rating since the IO tranches are almost always labeled beginning with an 'X' but usually have high ratings. We do not label the deal as having been shopped if the missing rating is for an unrated tranche, or if the more senior tranche for which a rating is missing has less subordination than the less senior tranche.

There are two advantages of $dealshop1$ over $dealshop2$. First, it prevents us from coding a deal as having been shopped simply because we observe fewer ratings for some tranches, and second, it requires no assumptions about the waterfall.[17]

In addition to $dealshop1$ and $dealshop2$, we include a third measure of shopping defined at the security level: the number of ratings, $nratings$. This is a measure of "disclosed"

[17]A third way to define undisclosed shopping would be to code a deal as having been shopped if any tranche is missing a rating from a CRA that has rated at least one other tranche in the same deal. In the interest of being conservative in estimating the frequency of shopping, we do not follow this approach, as there are other reasons one might observe missing junior ratings.

shopping because an issuer *de facto* discloses shopping if it purchases multiple ratings. For example, observing four ratings means the security was shopped to at least four CRAs, and possibly more, and that those four ratings were sufficiently high to induce the issuer to purchase them.[18] An alternative view is offered in He, Qian, and Strahan (2014), who find that non-AAA RMBS securities with single ratings perform worse than those with multiple ratings. This is taken as evidence that single-rated tranches have been shopped *more* and thus many potentially low ratings, which would have indicated the observed poor performance, were never purchased. Hence, these results would suggest a measure of shopping should be decreasing in the number of ratings, but this may not be the case due to the ability of CRAs to issue unsolicited ratings.

The distinction between our interpretation and He, Qian, and Strahan's (2014) is that ours proxies for the amount of *disclosed* shopping, while the latter interpret a missing rating as indicating *undisclosed* shopping. Because, unlike in the corporate bond market, no CRA in the CMBS market ever had 100% market share (see Figure 1), it is less clear in the structured finance market that an issuer will always seek three or more ratings and then only purchase one or two. As discussed previously, an issuer cannot in practice ask a CRA to evaluate a single tranche in the middle of the capital structure. Thus, if an issuer proposes to purchase a rating for only a junior tranche (either because the proposed ratings for the senior tranches are too low relative to the ratings it has received from other CRAs, or because it only needed a better rating for the junior tranche to begin with) the CRA can simply threaten to issue unsolicited ratings for the senior tranches in addition to the junior.

To understand the extent to which disclosed and undisclosed shopping drives the increase in incumbent ratings, we augment equations (7) and (8) with $nratings$ and $dealshop1$ or $dealshop2$. If either coefficient is positive, some of the decrease in the stringency in ratings is due to the greater capacity for issuers to shop for ratings.

[18] A more precise definition of disclosed shopping could be the number of ratings *above* 2, given that regulatory constraints during our estimation time period incentivized issuers to obtain at least 2 ratings for many senior securities. The results are nearly identical if we use such an alternative definition.

5.3 Results

5.3.1 Average incumbent ratings

Table 8 presents the results from estimating equation (7) by OLS and by ordered probit on the non-IO securities. The coefficients on both entrants' share individually are statistically significant at the 5% level when we cluster the standard errors by deal in both the OLS and ordered probit results. We cluster the standard errors by deal because there is likely correlation among ratings within a deal. In an appendix we also cluster at the deal type-year level and our results are unchanged. The economic magnitude of the effect for non-IO tranches is such that a 10 percentage point increase in Entrant 2's market share raises the average incumbents' rating by roughly 0.3 grades. As Entrant 2 increased its overall market share from 0 to 40% (see Table 3), the effect is economically important since it implies an increase in average ratings by incumbents of more than a grade. The magnitude of the coefficient on Entrant 1's share is slightly higher and implies that a 10 percentage point increase in market share results in a 0.5 grade higher average incumbent rating.

Table 9 presents the estimation effects of entry on incumbent IO ratings by OLS and by ordered probit. In Column 1, the coefficient on $entrant2share$ is positive and statistically significant at the 5% level in the OLS regressions (Column 1) and at the 10% level in the ordered probit regressions (Column 4). The economic magnitude is such that a 10% increase in Entrant 2's market share raises the average incumbent rating by half a grade. Although the incumbents disclosed ratings are higher in response to entrant 1's market share in the non-IO market, there is no significant effect in the IO market. The coefficients on $entrant1share$ in Columns 1 and 4 of Table 9 are positive but far from statistically significant, and they are also much smaller in magnitude than the coefficients on $entrant2share$. The lack of sensitivity to entrant 1's market share may be because its uniform pattern of rating IO tranches AAA (see Panel A of Table 4) is viewed as incredible by investors.

The magnitudes of the effects are larger than those found by Becker and Milbourn (2011)

in the corporate market, particularly for the IO securities. Becker and Milbourn find that an increase of 10 percentage points in entrant Fitch's market share raised incumbent ratings by 0.13 grades after controlling for year and industry fixed effects (the closest specification to ours given the differences between the markets). The larger response of incumbent ratings structured finance may be because issuers shop for ratings, and catering is likely more severe in this asset class because of the smaller number of issuers.

5.3.2 Subordination for securities rated AAA by an incumbent

Table 10 contains the results from estimating equation (8). Column 1 shows that, for tranches that at least one incumbent has rated AAA, a higher market share for Entrant 2 is associated with less subordination. A 10 percentage point increase in the market share of Entrant 2 lowers subordination by 0.75 percentage points, and this is statistically significant at the 5% level. The change in Entrant 2's overall market share from the beginning to the end of our sample thus reduced subordination by 3 percentage points. Entrant 1's share has a stronger effect on subordination, and it too is significant at the 5% level. In particular, a 10 percentage point increase in Entrant 1's market share lowers subordination by nearly a full percentage point. As in the average rating regressions, the combined effect of both entrants on incumbent AAA subordination levels (not shown in the tables) is stronger than the sum of the parts. The OLS estimate implies a decrease of 6%, which is equivalent to the difference between a AAA and a $AA+$.[19]

5.3.3 Shopping

Table 11 tabulates the frequency of $dealshop1$ and $dealshop2$ across various time periods and deal types, and also . By our more stringent measure of shopping, $dealshop1$, 6% of deals in our sample are shopped, whereas nearly a quarter are shopped according to $dealshop2$.

[19] In our primary sample, the difference in incumbent subordination for a security rated AAA on average vs. one rated $AA+$ on average is 5.5 percentage points. This difference is 5.2 percentage points in the historical sample.

Consistent with theoretical predictions, (1) shopping is higher post entry by both measures (column 3 vs column 2), and (2) it is more common in more complex (and harder to rate) conduit/fusion deals than in large loan deals (column 4 vs column 5). Comparing the results for the non-IO securities in Table 8 when we exclude our measures of shopping and when we include these variables reveals that some of the increase in incumbent ratings is due to shopping on the part of issuers. The coefficients on the entrant shares decrease in magnitude when moving from Columns 1 and 4 to 2 and 5 in Table 8 and the coefficient on *nratings* is highly significant in the expected direction. Although the sign of *dealshop*1 is positive, it is not statistically significant when we cluster the standard errors by deal. The coefficients on the entrant shares are very similar when we use *dealshop*2 in place of *dealshop*1.

In the IO sample, (Table 9), the entrant market shares become insignificant once we control for shopping (Columns 2 and 5), and *nratings*, the measure of security-level, disclosed shopping, is statistically significant and of the expected sign. Although *dealshop*1 is still insignificant in the OLS regression, it is significant at the 10% level in the ordered probit regression (Column 5). Additionally, the magnitude of the coefficients on both undisclosed shopping measures are also much larger in the IO sample.

The fit of the models, as measured by the R^2 and pseudo-R^2, is much poorer for the IO sample than for the non-IO sample indicating that observable security characteristics explain far less of the rating. There are also more disagreements among the CRAs on rating IOs than rating non-IOs: the incumbents disagree on the rating of only 10% of non-IOs but 15% of the IOs. The IO tranches thus appear to be more complex than the non-IO tranches, and consistent with these results, Skreta and Veldkamp (2009) predicts more rating shopping in more complex securities.

There is little evidence that disclosed or undisclosed shopping affects the subordination of the *AAA* tranches, however. In Table 10, the coefficients on *entrant*1*share* and *entrant*2*share* change little when *nratings* and *dealshop*1 are added to the model. The results are very similar when we use *dealshop*2 in place of *dealshop*1. The coefficients remain

insignificant in unreported robustness checks in which we regress subordination for other rating buckets (e.g., AA, A, BBB) on the number of ratings.

Overall, the evidence indicates that both catering and shopping are responsible for the observed increase in average incumbent ratings.

5.3.4 Reverse causality

Our discussion has assumed that the causality runs from entrant market shares to incumbent ratings, either through catering or shopping, or, as we have shown, a combination of both. However, it is impossible to completely rule out reverse causality in these regressions. It may be the case that entrant market shares only increase in market segments in which the incumbents disclosed ratings are becoming less stringent. The most plausible reverse causality mechanism is one in which the entrants are more able to increase their market share in segments characterized by more shopping on the part of issuers. This explanation of our results would be consistent with our finding of both more disclosed and undisclosed shopping in market segments with high entrant market shares.

However, we are not aware of any theoretical work suggesting a particular reason for an exogenous increase in the desire to shop in a particular deal type and year. While the desire to shop may increase over time, or may be higher in a particular deal type due to differences in the complexity of the deal, our regressions control for both the deal type and the year. We find it much less likely that shopping demand should vary at the deal type - year level for reasons unrelated to the degree of competition because there is no obvious mechanism that would drive that behavior.

6 Conclusions

We have studied the entry of two CRAs on the level of ratings in structured finance. The entrants issue higher ratings than the incumbents. The higher ratings of the entrants are

especially pronounced in a particular type of security, IOs. The systematically higher ratings of the entrants indicate rating catering on the part of the entrants. Furthermore, as the entrants' market share increases, the incumbents' ratings rise and the level of subordination provided to tranches rated AAA by the incumbents falls. Given our empirical specification and theory, the most likely direction of causality is from entrant market shares to higher ratings from incumbents, rather than more generous ratings from incumbents to larger entrant market shares. The increase in the ratings of the incumbents is due to both rating catering on the part of the incumbent CRAs and to shopping by issuers. We find disclosed shopping to be responsible for all of the increase in ratings in IO securities, which we suggest are more complex to rate than those receiving both principal and interest payments. In contrast, we find that the decrease in the level of subordination of AAA tranches cannot be explained by our shopping measures, indicating that the decrease is due to catering on the part of CRAs.

It is too soon to assess the relative accuracy of the ratings of the incumbents and entrants in our market given the nature of default and, for IO tranches, loss of value in structured finance. We cannot be certain that the entrants very high ratings of IOs or the increase in observed incumbent ratings in all securities will not be justified based on *ex post* losses. The theoretical literature identifies an *upward* bias from competition, however, so it is less probable that the incumbents are excessively conservative in their ratings. Alp (2013) has also shown that, historically, moves towards relaxing rating standards have been associated with more default. Finally, the theoretical literature indicates that the undisclosed shopping that we uncover is not welfare improving. As such, our results suggest that, contrary to the stated belief of the SEC and the policy of European regulators, increasing competition among CRAs is likely to exacerbate, rather than reduce, any tendency the CRAs have to issue inflated ratings unless both the rating shopping and rating catering problems are solved.

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Table 1: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
nratings	2488	2.4	0.7	1	4
numericsp	841	11.6	4.4	1	16
numericmoodys	1618	12.6	4.4	1	16
numericfitch	1442	12	4.7	1	16
numericdbrs	652	12.9	4.3	1	16
avgratingincumbent	2488	11.9	4.6	1	16
numericentrant1	379	12.8	4.1	1	16
numericentrant2	1006	12.7	4.4	1	16
avgratingentrant	1291	12.7	4.4	1	16
AAAanyone	2488	0.503	0.5	0	1
AAAincumbent	2488	0.469	0.499	0	1
AAAentrantonly	2488	0.035	0.183	0	1
cpnspread	2031	1.915	0.991	0.005	8.924
tranchesize	2438	165	253	1	4100
subordination	1854	19.6	13.2	0	75
IO	2488	0.2	0.4	0	1
floater	2488	0.13	0.34	0	1
variable	2488	0.47	0.5	0	1
walunder3	2052	0.13	0.34	0	1
wal3to5	2052	0.15	0.36	0	1
wal5to7	2052	0.07	0.26	0	1
walover7	2052	0.64	0.48	0	1
retailshare	2348	32	27	0	100
officeshare	2348	20	21	0	100
hospshare	2348	15	31	0	100
indshare	2348	1	4	0	28
waltv	2354	60	8	8	113
wadscr	2267	2.2	0.9	1.2	7.4
wam	2419	96.2	35.1	12	540
year	2488	2012.5	1.1	2009	2014
sponsortot	2488	14809.4	10259.6	14	34458
typconduitfusion	2488	0.68	0.47	0	1
typlarge	2488	0.27	0.44	0	1
typother	2488	0.05	0.22	0	1
nyshare	2178	16.3	24.7	0	100
lashare	2178	4.7	12.8	0	100
chishare	2178	2.9	9.1	0	100
mishare	2178	2.4	11.2	0	100
houshare	2178	1.5	4	0	26
dealshop1	2488	0.08	0.27	0	1
dealshop2	2488	0.35	0.48	0	1

Variable definitions in Table 1 are as follows: *nratings* is the total number of ratings the security received; *numericsp*, *numericmoodys*, $numericfitch$, *numericdbrs*, *numericentrant*1, and *numericentrant*2 are the numeric ratings of S&P, Moody's, Fitch, DBRS, Entrant 1, and Entrant 2 where 16 corresponds to AAA and a rating of 1 corresponds to B-. *avgratingincumbent* is the average rating assigned by the four incumbent CRAs. *avgratingentrant* is the average rating assigned by the entrants. *AAAanyone* takes a value of 1 if any CRA assigns the security a AAA rating and 0 otherwise. *AAAincumbent* takes a value of 1 if any incumbent CRA assigns a AAA rating. *AAAentrantonly* takes a value of 1 if only an entrant CRA assigns a AAA rating. *tranchesize* is the $ value of the issue (in millions). *cpnspread* is the annual spread at issuance (in %) that the security pays relative to a US treasury of comparable maturity (available only for non-IO tranches). *subordination* is the level of subordination (in %) of the security. IO takes a value of 1 if the security is an interest-only tranche. $floater$ takes a value of 1 if the coupon is a fixed spread above a benchmark index (almost always 1-month LIBOR). *variable* takes a value of 1 if the coupon is variable rate other than a floater. *walunder*3, *wal*3*to*5, *wal*5*to*7, *walover*7 are indicator variables that take a value of 1 if the security's weighted average life (WAL) is in the range indicated. *retailshare*, $officeshare$, *hospshare*, and *indshare* capture the percentage of the loans backed by retail, office, hospitality, and industrial properties. *waltv* is the weighted average loan-to-value (LTV) of the loans (in %). *wadscr* is the weighted average debt service coverage ratio. *wam* is the weighted average maturity of the loans measured in months. *year* is the year of issuance of the security. *sponsortot* is the total $ volume (in millions) of CMBS issued by the lead sponsor of the deal in the year the security is issued. $typconduitfusion$, *typlarge*, and *typother* are indicator variables for CMBS deal types. *nyshare*, *lashare*, *chishare*, *mishare*, and *houshare* capture the percentage of the loans originated on property in the New York, Los Angeles, Chicago, Miami, and Houston MSAs, respectively. *dealshop*1 takes a value of 1 if the security is part of a deal in which alternate

tranche ratings are missing from two different CRAs. *dealshop*2 takes a value of 1 if the security is part of a deal with a capital structure in which tranche n has a rating from CRA A, but tranche $n-1$ is *not* rated by CRA A.

Table 2: Rating Definitions for AAA

S&P	The obligor's capacity to meet its financial commitment on the obligation is extremely strong.
Moody's	Financial obligations assessed aaa (sca) are judged to have the highest credit quality and thus subject to the lowest credit risk, when used as inputs in determining a structured finance transaction's rating.
Fitch	"AAA" ratings denote the lowest expectation of default risk. They are assigned only in cases of exceptionally strong capacity for payment of financial commitments. This capacity is highly unlikely to be adversely affected by foreseeable events.
DBRS	Highest credit quality. The capacity for the payment of financial obligations is exceptionally high and unlikely to be adversely affected by future events.
Entrant 1	A rating of "AAA" is the highest letter-grade assigned by Morningstar. Securities rated "AAA" have an extremely strong ability to make timely interest payments and ultimate principal payments on or prior to a rated final distribution date.
Entrant 2	Determined to have almost no risk of loss due to credit-related events. Assigned only to the very highest quality obligors and obligations able to survive extremely challenging economic events.

Notes: 1) S&P and DBRS do not have rating definitions specific to structured finance; the appropriate scale for structured finance for these CRAs is 'long-term obligation'. 2) Sources are the CRA's most recent publication of rating definitions: (Standard & Poor's 2009b, Moody's Investors Service 2014, FitchRatings 2014, DBRS 2013, Morningstar Credit Ratings, LLC 2012, and Kroll Bond Ratings 2014). 3) Moody's changed its rating definition for structured finance in 2014 relative to 2009; the definition in the 2009 publication (Moody's Investors Service 2009) uses similar language to the definition in the 2014 publication.

Table 3: Share of Securities Rated by Entrants

Year	2009	2010	2011	2012	2013	2014H1	Total
Panel A: All Deal Types							
ratedentrant1	0%	0%	21%	13%	17%	13%	15%
ratedentrant2	0%	0%	10%	42%	49%	56%	40%
ratedentrant	0%	0%	31%	49%	63%	62%	52%
Panel B: Conduit/Fusion Deals							
ratedentrant1	0%	0%	24%	5%	6%	13%	9%
ratedentrant2	0%	0%	2%	40%	66%	61%	47%
ratedentrant	0%	0%	26%	45%	70%	68%	54%
Panel C: Large Loan Deals							
ratedentrant1	0%	0%	18%	29%	45%	15%	31%
ratedentrant2	0%	0%	39%	46%	18%	43%	29%
ratedentrant	0%	0%	57%	61%	57%	50%	53%
Panel D: Other Deals							
ratedentrant1	0%	0%	0%	41%	0%	0%	10%
ratedentrant2	0%	0%	0%	50%	2%	0%	13%
ratedentrant	0%	0%	0%	50%	2%	0%	13%

Table 4: Comparison of Entrants' Ratings with Incumbents' on Same Issues

Entrant Rating	S&P	Moody's	Fitch	DBRS	Incum. Avg.	Difference	N	T-stat
Panel A: Entrant 1 vs. Incumbents								
12.36	11.11					1.25	195	6.0
13.38		12.51				0.87	177	5.3
13.16			12.52			0.64	151	4.8
13.92				13.95		-0.03	39	-0.2
12.80					11.82	0.98	379	8.1
IOs only:								
16.00					12.86	3.14	75	6.7
non-IOs only:								
12.01					11.57	0.44	304	6.7
non-IOs only, 2011-2012:								
12.06					11.74	0.32	119	3.2
non-IOs only, 2013-2014:								
11.97					11.45	0.52	185	6.0
Panel B: Entrant 2 vs. Incumbents								
12.48	11.81					0.67	296	4.5
13.55		13.27				0.28	674	4.9
12.63			12.28			0.35	574	6.2
13.39				13.46		-0.07	216	-2.3
12.69					12.27	0.42	1006	7.4
IOs only:								
15.77					13.14	2.63	149	8.3
non-IOs only:								
12.16					12.12	0.04	857	2.2
non-IOs only, 2011-2012:								
11.81					11.71	0.10	214	3.2
non-IOs only, 2013-2014:								
12.27					12.25	0.02	643	0.9
Panel C: Entrant Average vs. Incumbents								
12.37	11.45					0.92	443	7.0
13.52		13.11				0.41	813	6.9
12.75			12.34			0.41	717	7.7
13.46				13.50		-0.04	230	-1.7
13.00					12.10	0.9	1291	10.4
IOs only:								
15.84					12.99	2.85	207	10.4
non-IOs only:								
12.10					11.95	0.14	1084	6.3
non-IOs only, 2011-2012:								
11.85					11.67	0.18	308	4.2
non-IOs only, 2013-2014:								
12.20					12.07	0.13	776	4.8

Notes: 1) Table shows the average rating of the entrant vs. the incumbent in the column listed on securities that both CRAs rate. 2) IO is an interest-only security.

Table 5: Issues An Entrant Rates and Incumbent Ratings

	(1)	(2)	(3)	(4)
	Non-IO Securities		IO Securities	
avgincumerror	0.022		0.024	
	(0.015)		(0.020)	
incumlow		-0.12*		0.013
		(0.068)		(0.15)
tranchesize	-0.00028	-0.00024		
	(0.00033)	(0.00033)		
subordination	0.0041	0.0038		
	(0.0040)	(0.0040)		
floater	-0.39*	-0.38*		
	(0.20)	(0.20)		
variable	-0.073	-0.069	0.17	0.19
	(0.094)	(0.094)	(0.51)	(0.52)
wal3to5	0.18	0.18		
	(0.15)	(0.15)		
wal5to7	-0.0037	-0.0012		
	(0.18)	(0.18)		
walover7	0.13	0.11		
	(0.14)	(0.14)		
waltv	-0.0061	-0.0067	0.0027	0.0031
	(0.0093)	(0.0093)	(0.017)	(0.017)
wadscr	-0.033	-0.033	-0.062	-0.061
	(0.072)	(0.072)	(0.12)	(0.12)
wam	0.0031	0.0032	0.0079	0.0084*
	(0.0031)	(0.0031)	(0.0050)	(0.0051)
sponsortot	3.9e-06	4.1e-06	-1.9e-07	-1.0e-07
	(4.9e-06)	(4.9e-06)	(9.9e-06)	(9.9e-06)
Constant	-6.16	-6.28	-7.13	-7.24
	(100)	(171)	(175)	(173)
Year of Issue FEs	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes
Prop. Type Controls	Yes	Yes	Yes	Yes
Observations	1,610	1,610	349	349
Pseudo-R^2	14%	14%	15%	14%

Notes: 1) Dependent variable takes a value of 1 if the entrant rates it, 0 otherwise. 2) The main variables of interest are *avgincumerror* and *incumlow*. 3) *avgincumerror* is the average incumbent rating of a security less the prediction of the rating from a regression of the incumbents' ratings over the 2011-2014 period. 4) *incumlow* takes a value of 1 if $avgincumerror < 0$. 5) Standard errors are in parentheses. 6) $***p < 0.01$, $**p < 0.05$, and $*p < 0.1$. 7) Data includes all tranches of CMBS deals rated AAA by at least one CRA issued January 2009 through June 2014 excluding ReREMICS and CDOs. 8) See Table 1 for variable definitions.

Table 6: Precision of Rating Models Across CRAs

CRA	All Deal Types	All Deal Types 2012Q4-	Conduit / Fusion	Large Loans	IOs	IOs 2012Q2-
S & P	79%	81%	88%	84%	33%	37%
Moody's	79%	84%	85%	90%	5%	10%
Fitch	81%	84%	86%	91%	16%	15%
Entrant 1	80%	85%	81%	93%	*	*
Entrant 2	85%	87%	90%	94%	28%	28%
Year of Issue FEs	No	No	No	No	No	No
Deal Type FEs	Yes	Yes	No	No	Yes	Yes
Collateral Controls	Yes	Yes	Yes	Yes	Yes	Yes
Coupon Type FEs	Yes	Yes	Yes	Yes	Yes	Yes
WAL Controls	Yes	Yes	Yes	Yes	No	No
Subordination Control	Yes	Yes	Yes	Yes	No	No

Notes: 1) The table presents the R^2's from a regression of the numeric rating on security characteristics. 2) * Denotes too few observations (fewer than 60) to estimate reliably.

Table 7: Reputation and Selection of Entrant Ratings, Non-IO Securities

	(1)	(2)	(3)	(4)	(5)
reputation	-0.39	-0.64	-0.49	-0.54	-0.68
	(0.89)	(1.23)	(1.52)	(1.75)	(2.58)
tranchesize	-0.00032	-0.00032	-0.00031	-0.00031	-0.00031
	(0.00037)	(0.00037)	(0.00037)	(0.00037)	(0.00036)
subordination	0.0048	0.0048	0.0049	0.0048	0.0048
	(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0048)
floater	-0.15	-0.15	-0.15	-0.15	-0.15
	(0.37)	(0.37)	(0.37)	(0.37)	(0.37)
variable	0.014	0.014	0.015	0.014	0.014
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
waltv	-0.0070	-0.0075	-0.0064	-0.0066	-0.0064
	(0.033)	(0.033)	(0.032)	(0.032)	(0.033)
wadscr	-0.087	-0.094	-0.081	-0.081	-0.079
	(0.19)	(0.19)	(0.19)	(0.19)	(0.19)
wam	0.0034	0.0029	0.0036	0.0037	0.0037
	(0.0091)	(0.0092)	(0.0092)	(0.0091)	(0.0092)
sponsortot	-2.3e-06	-2.2e-06	-2.1e-06	-1.7e-06	-1.7e-06
	(0.000016)	(0.000016)	(0.000016)	(0.000016)	(0.000016)
Constant	0.24	0.35	0.15	0.14	0.12
	(2.79)	(2.83)	(2.80)	(2.80)	(2.82)
Year of Issue FEs	Yes	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes	Yes
Prop. Type Controls	Yes	Yes	Yes	Yes	Yes
WAL Controls	Yes	Yes	Yes	Yes	Yes
SEs Clustered by Deal	Yes	Yes	Yes	Yes	Yes
Observations	1,430	1,430	1,430	1,430	1,430
Pseudo-R^2	10%	10%	10%	10%	10%

Notes: 1) Dependent variable is an indicator equal to 1 if the security is rated by an entrant, and 0 otherwise. 2) The main variable of interest is *reputation* which can be one of five measures (corresponding to the columns of the table): (1) the percentage of securities downgraded by any incumbent; (2) the percentage of securities downgraded by two or more incumbents; (3) the percentage of securities downgraded by 6 or more notches; (4) the percentage of securities downgraded from investment-grade to high yield by any incumbent; and (5), the percentage of securities downgraded from investment-grade to high yield by two or more incumbents rates the security AAA. 3) Standard errors are in parentheses, $***p < 0.01$, $**p < 0.05$, and $*p < 0.1$. 4) Data includes all CMBS deals issued January 2011 through June 2014 excluding ReREMICS and CDOs.

Table 8: Effect of Entrants' Market Shares on Incumbents' Average Rating, Non-IOs

	(1)	(2)	(3)	(4)	(5)
		OLS		Ordered Probit	
entrant1share	4.95**	4.38**	4.42**	3.13**	2.94**
	(1.96)	(1.85)	(1.85)	(1.22)	(1.17)
entrant2share	3.34***	2.58**	2.62**	1.82***	1.46**
	(1.09)	(1.09)	(1.09)	(0.67)	(0.66)
dealshop1		0.15			0.17
		(0.19)			(0.11)
dealshop2			-0.04		
			(0.12)		
nratings		0.56***	0.57***		0.31***
		(0.16)	(0.16)		(0.087)
tranchesize	0.0032***	0.0033***	0.0032***	0.013***	0.013***
	(0.0007)	(0.0007)	(0.0007)	(0.003)	(0.004)
subordination	0.33***	0.32***	0.32***	0.17***	0.17***
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
floater	0.40	0.53	0.52	0.49	0.60
	(0.34)	(0.35)	(0.35)	(0.47)	(0.49)
variable	-0.42	-0.47*	-0.47*	-0.21*	-0.23**
	(0.26)	(0.26)	(0.26)	(0.12)	(0.12)
waltv	-0.13***	-0.13***	-0.13***	-0.089***	-0.087***
	(0.03)	(0.03)	(0.03)	(0.018)	(0.017)
wadscr	0.15	0.18	0.17	0.068	0.078
	(0.22)	(0.21)	(0.21)	(0.12)	(0.12)
wam	0.032***	0.030***	0.030***	0.023***	0.023***
	(0.007)	(0.007)	(0.007)	(0.005)	(0.005)
sponsortot	0.000014	0.000011	0.000012	4.5e-06	2.3e-06
	(0.000011)	(0.000010)	(0.000010)	(8.7e-06)	(8.5e-06)
Constant	14.7***	13.5***	13.5***		
	(2.0)	(1.9)	(1.9)		
Year of Issue FEs	Yes	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes	Yes
Prop. Type Controls	Yes	Yes	Yes	Yes	Yes
WAL Controls	Yes	Yes	Yes	Yes	Yes
Std. Errors Clustered by Deal	Yes	Yes	Yes	Yes	Yes
Observations	1,610	1,610	1,610	1,610	1,610
R^2	79%	79%	79%		
Pseudo-R^2				38%	38%

Notes: 1) Dependent variable is the average rating of the security by incumbent CRAs. 2) Standard errors are in parentheses. 3) $***p < 0.01$, $**p < 0.05$, and $*p < 0.1$. 4) Data includes all tranches of CMBS deals issued January 2009 through June 2014 excluding ReREMICS and CDOs. 5) See Table 1 for variable definitions.

Table 9: Effect of Entrants' Market Shares on Incumbents' Average Rating, IO Securities

	(1)	(2)	(3)	(4)	(5)
		OLS		Ordered Probit	
entrant1share	1.63	-1.72	-1.35	0.69	-0.50
	(4.36)	(3.86)	(3.89)	(1.38)	(1.35)
entrant2share	5.24**	2.11	2.37	1.07*	0.092
	(2.15)	(2.04)	(2.02)	(0.61)	(0.63)
dealshop1		0.68			0.30*
		(0.47)			(0.17)
dealshop2			0.04		
			(0.40)		
nratings		2.26***	2.26***		0.76***
		(0.37)	(0.37)		(0.13)
variable	2.41	0.53	0.67	1.14*	0.66
	(2.09)	(2.31)	(2.33)	(0.64)	(0.74)
waltv	0.027	0.042	0.042	0.004	0.009
	(0.042)	(0.046)	(0.047)	(0.012)	(0.013)
wadscr	0.21	0.39	0.38	0.08	0.14*
	(0.30)	(0.32)	(0.33)	(0.07)	(0.08)
wam	0.026**	0.018*	0.018	0.0064*	0.0036
	(0.011)	(0.011)	(0.011)	(0.0037)	(0.0035)
sponsortot	-0.000043	-0.000039	-0.000039	-0.000012	-0.000013*
	(0.000027)	(0.000025)	(0.000026)	(7.4e-06)	(7.4e-06)
Constant	6.27	5.17	5.06		
	(5.00)	(5.06)	(5.21)		
Year of Issue FEs	Yes	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes	Yes
Prop. Type Controls	Yes	Yes	Yes	Yes	Yes
Std. Errors Clustered by Deal	Yes	Yes	Yes	Yes	Yes
Observations	349	349	349	349	349
R^2	22%	33%	22%		
Pseudo-R^2				6%	10%

Notes: 1) Dependent variable is the average rating of the security by incumbent CRAs. 2) Standard errors are in parentheses. 3) $***p < 0.01$, $**p < 0.05$, and $*p < 0.1$. 4) Data includes all IO tranches of CMBS deals issued January 2009 through June 2014 excluding ReREMICS and CDOs. 5) See Table 1 for variable definitions.

Table 10: Entrants' Market Shares and Subordination of Tranches Rated AAA by an Incumbent

	(1)	(2)	(3)
entrant1share	-9.80**	-10.1**	-10.1**
	(4.93)	(5.01)	(4.98)
entrant2share	-7.50**	-7.94**	-8.05**
	(3.05)	(3.29)	(3.23)
dealshop1		-0.29	
		(0.89)	
dealshop2			-0.24
			(0.37)
nratings		0.34	0.38
		(0.41)	(0.42)
tranchesize	0.0035***	0.0035***	0.0035***
	(0.0012)	(0.0012)	(0.0012)
floater	0.56	0.61	0.64
	(0.76)	(0.74)	(0.74)
variable	-2.61***	-2.63***	-2.61***
	(0.53)	(0.53)	(0.54)
waltv	0.24***	0.25***	0.25***
	(0.08)	(0.08)	(0.08)
wadscr	0.098	0.12	0.10
	(0.54)	(0.54)	(0.55)
wam	-0.045***	-0.046***	-0.046***
	(0.016)	(0.015)	(0.015)
sponsortot	-0.000022	-0.000021	-0.000019
	(0.000025)	(0.000024)	(0.000024)
Constant	5.14	4.60	4.59
	(6.38)	(6.36)	(6.38)
Year of Issue FEs	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes
Prop. Type Controls	Yes	Yes	Yes
WAL Controls	Yes	Yes	Yes
Std. Errors Clustered by Deal	Yes	Yes	Yes
Observations	766	766	766
R^2	72%	72%	72%

Notes: 1) Dependent variable is the subordination level of the security. 2) Only securities rated AAA by at least one incumbent are included. 3) Standard errors are in parentheses. 4) $***p < 0.01$, $**p < 0.05$, and $*p < 0.1$. 5) Data includes all non-IO tranches of CMBS deals issued January 2009 through June 2014 excluding ReREMICS and CDOs. 6) See Table 1 for variable definitions.

Table 11: Frequency of Deals with Undisclosed Shopping

	(1)	(2)	(3)	(4)	(5)
Period	2009-2014:H1	2009-2010	2011-2014:H1	2009-2014:H1	2009-2014:H1
Deal Type	All	All	All	Conduit/Fusion	Large Loan
dealshop1	5.6%	0.0%	6.3%	9.8%	2.8%
dealshop1_sp	2.6%	0.0%	3.0%	7.4%	1.4%
dealshop1_moodys	6.1%	0.0%	6.6%	9.0%	2.0%
dealshop1_fitch	7.9%	0.0%	9.0%	10.9%	4.7%
dealshop1_dbrs	1.3%	0.0%	1.4%	2.4%	0.0%
dealshop1_entrant1	4.3%	-	4.3%	14.3%	0.0%
dealshop1_entrant2	5.3%	-	5.3%	5.0%	6.5%
dealshop2	24.4%	12.5%	25.9%	40.6%	13.8%
dealshop2_sp	2.6%	0.0%	3.0%	3.7%	2.8%
dealshop2_moodys	8.8%	0.0%	9.6%	7.2%	16.3%
dealshop2_fitch	23.8%	22.2%	24.1%	35.9%	7.0%
dealshop2_dbrs	0.0%	0.0%	0.0%	0.0%	0.0%
dealshop2_entrant1	14.9%	-	14.9%	35.7%	3.2%
dealshop2_entrant2	18.9%	-	18.9%	28.3%	3.2%

Notes: 1) Data includes all CMBS deals issued January 2009 through June 2014 excluding ReREMICS and CDOs. 2) Statistics are deal-level. 3) See Table 1 for variable definitions. *dealshop*1_*sp*, *dealshop*1_*moodys*, *dealshop*2_*sp*, *dealshop*2_*moodys*, etc., are defined analogously for the given CRA.

Figure 1: Share of Securities Rated by CRAs over Time

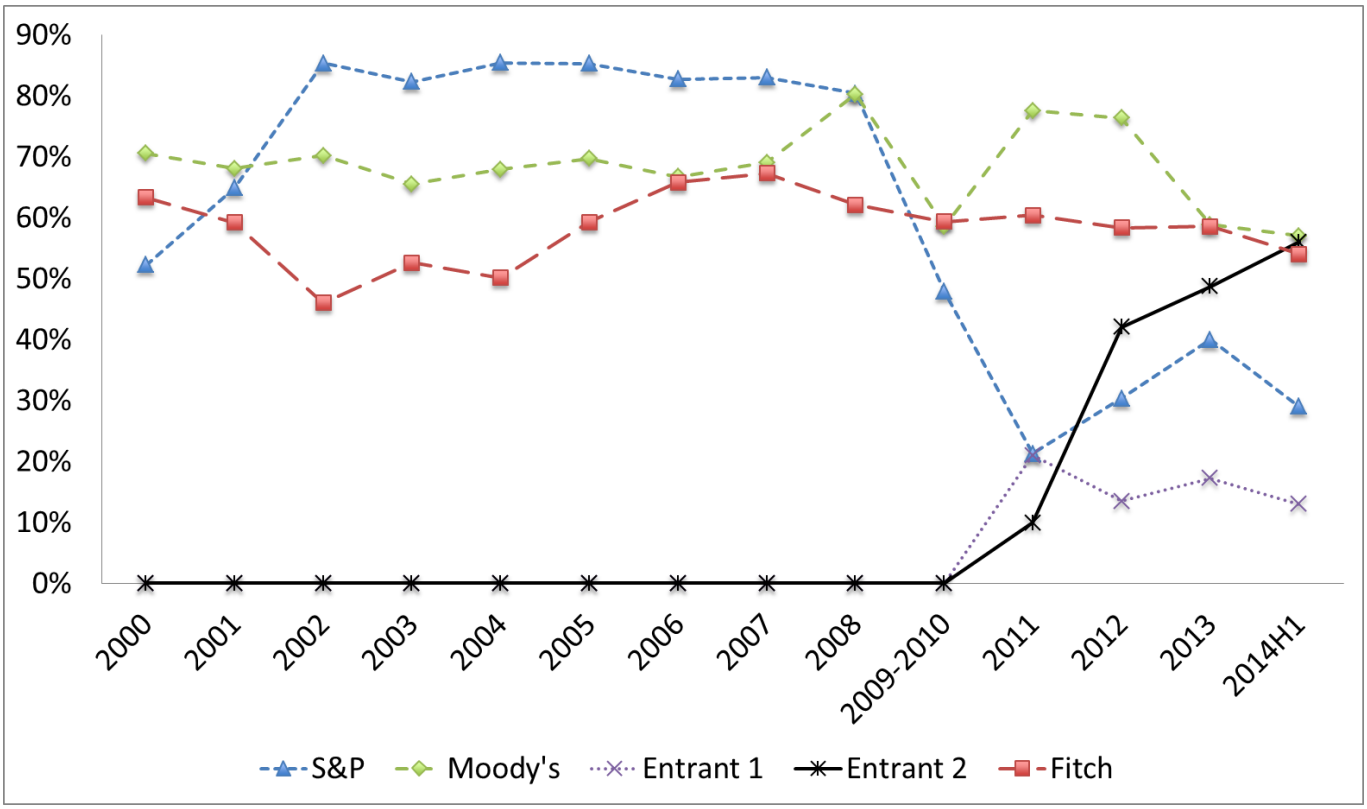
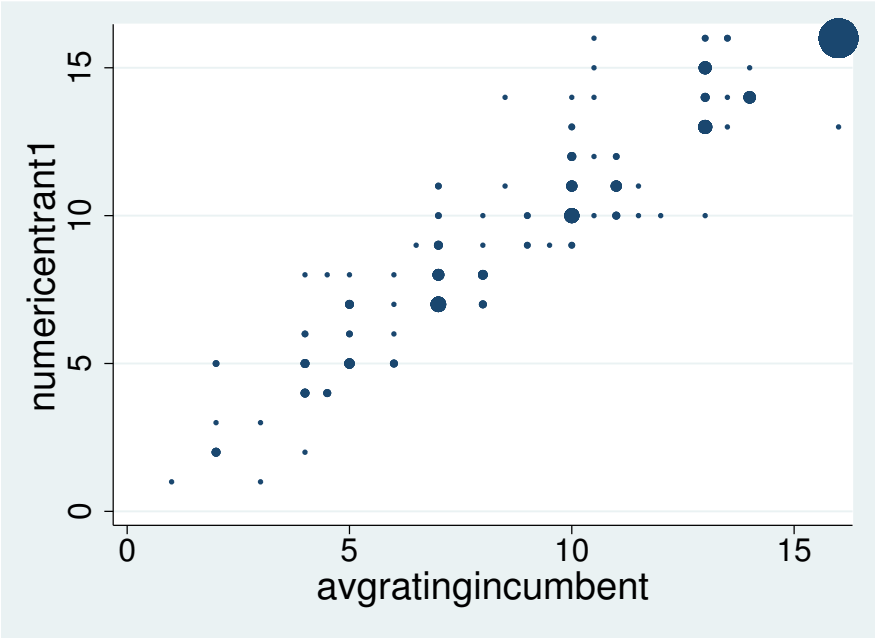
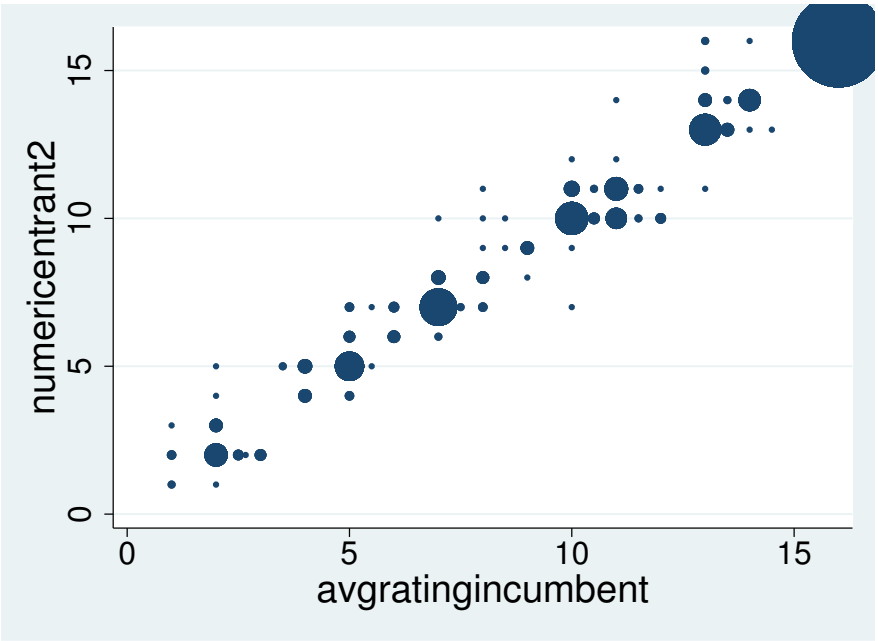


Figure 2: Entrants vs. Incumbent CRAs Average Ratings on non-IO Securities



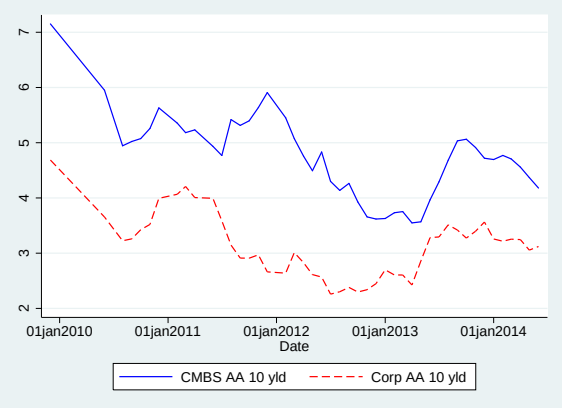
(a) Entrant 1



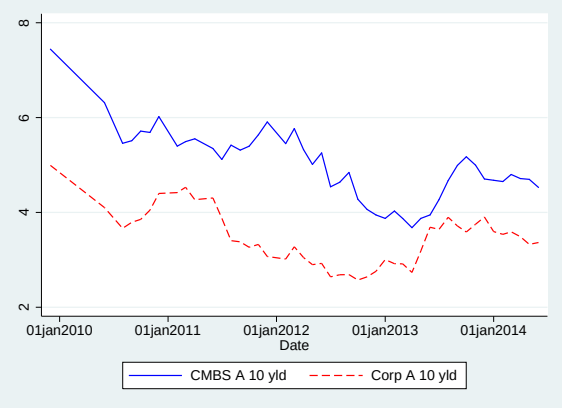
(b) Entrant 2

Notes: 1) Numeric Ratings: 16=AAA, 1=B-. 2) The figure plots ratings of entrants against average rating of incumbent on the same security. 3) Dots are frequency-weighted.

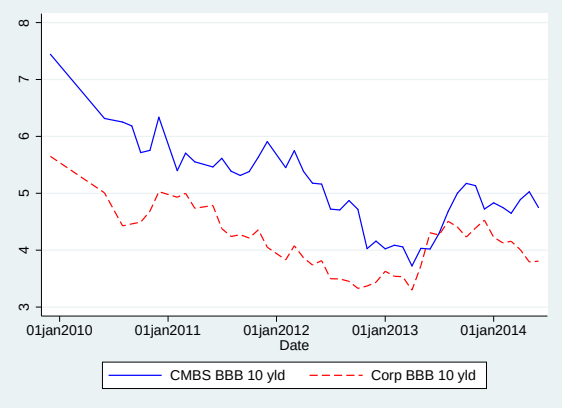
Figure 3: Interest Rates on CMBS vs. Corporates



(a) AA



(b) A



(c) BBB

Notes: 1) Ratings for CMBS are ratings by incumbent CRAs. 2) Corporate bond yields come from Bloomberg's composite yield indices, which are constructed daily using all bonds that have Bloomberg Valuation prices at market close. 3) CMBS yields are the coupon at issuance averaged by quarter for CMBS with WAL between 9 and 15 years.

A Historical Context

To provide a broader context for our estimation sample and to explore differences in securities issued before and after the crisis, Table A.1 summarizes CMBS securities rated by one or more of Moody's, S&P, and Fitch during the period 2000-2008.[20] As this encompasses the boom years of 2003-2007, the securities issued during this period display marked differences with those in our estimation sample. Because DBRS is excluded from the historical sample, we perform comparisons based only on ratings by Moody's, S&P, and Fitch. Unreported t-tests indicate that, with the exception of *variable* and *waltv*, all differences between the samples in Table A.1 (historical) and the 2009-2014Q2 sample excluding DBRS ratings are significant at the 1% level.

There are 16,841 securities from 1,298 deals in the historical sample, and the average security is rated by 2 of the 3 CRAs. The average rating of 10.7 is more than a notch lower than the average incumbent rating of 11.9 during the estimation period. There is some variation in average ratings during the historical sample, with the average rising almost monotonically from 9.7 in 2000 to 11.6 in 2008. On an individual level, S&P issues the most ratings during 2000-2008, which is in contrast to its third-place position in number of ratings issued during 2009-2014Q2. It is also the most generous in the historical sample, although the differences in average ratings between it and the other two incumbents are not economically meaningful.

The average subordination level is over 7 percentage points lower in the historical sample. However, it displays significant variation over time, as illustrated in Table A.2. Average subordination levels for all securities and for the set of AAA-rated securities decrease monotonically from 2000 to 2004, but then flatten out from 2005 to 2010 before increasing again starting in 2011. This pattern could occur because the underlying characteristics of the securities in deals may have changed over time.

[20] Although DBRS was active in the CMBS market during this time, its rating data are not easily accessible on Bloomberg. However, Moody's, S&P, and Fitch ratings are representative of ratings during the time period.

To test whether the CRAs exhibit systematic differences over time in how stringently they rate securities, we estimate

$$Subordination_{i,j,t} = \alpha_0 + \gamma_{\mathbf{x}}^{'} PeriodDummies + \alpha_{\mathbf{x}}^{'} Controls_{i,j,t} + \epsilon_{i,j,t} \tag{9}$$

where $Subordination_{i,j,t}$ is the level of subordination of security j rated by CRA i at time t, and $PeriodDummies$ are indicators for whether the security was issued during (1) 2000-2003 ($firstpd$), (2) 2004-2008 ($secondpd$), or (3) 2009-2013 ($thirdpd$), respectively. The variables included as controls are listed in Table A.3. Equation 9 is estimated for both the full sample of securities (columns 1 and 2), and for the AAA-rated subsample only (columns 3 and 4).

The results in Table A.3 indicate that the underlying security characteristics explain a large portion of the changes in subordination levels over time. The variable $firstpd$ is excluded, so the effects of $secondpd$ and $thirdpd$ are interpreted relative to the period 2000-2003. The coefficients, three of which are highly significant with and without robust standard errors, indicate that moving from the first period to the second increases average subordination by about 0.5 percentage points for all securities and 2.4 percentage points for only AAA-rated securities, respectively. Moving from the first to the third results in much larger increases of about 7.4 and 9.9 percentage points. Robustness checks in which alternative definitions of the time periods (e.g., 2000-2005, 2006-2008, 2009-2014Q2) are used indicate the effects are qualitatively similar.

Overall, there are meaningful differences, both statistically and economically, between the pre- and post-crisis sample of CMBS securities and their ratings. After the financial crisis, the CRAs required more subordination for securities after controlling for differences in security characteristics. By beginning our estimation sample in 2009, we avoid variation caused by changes in the ratings landscape before and after the financial crisis.

Table A.1: Historical Summary Statistics, 2000-2008

Variable	Obs.	Mean	Std. Dev.	Min	Max
nratings	16841	2	0.5	1	3
numericsp	13150	11.1	4.7	1	16
numericmoodys	11301	11	4.8	1	16
numericfitch	9582	11	4.7	1	16
avgrating_B3	16841	10.7	4.8	1	16
AAA_B3	16841	0.326	0.469	0	1
tranchesize	16741	283.1	2685.1	0	226000
cpnspread	11939	1.202	0.763	0	4.109
subordination	11440	12.4	12.1	0	100
floater	16841	0.3	0.5	0	1
variable	16841	0.5	0.5	0	1
walunder3	13373	0.2	0.4	0	1
wal3to5	13373	0.1	0.3	0	1
wal5to7	13373	0.1	0.3	0	1
walover7	13373	0.6	0.5	0	1
retailshare	10922	27	23	0	100
officeshare	10922	26	23	0	100
hospshare	10922	5	17	0	100
indshare	10922	3	8	0	100
waltv	13637	62	152	0	7250
wadscr	12016	1.7	0.6	1	6
wam	14682	100.4	56.4	6	529
year	16841	2004.2	2.2	2000	2008
sponsortot	16841	27,289	32,809	10	426,300
typconduitfusion	16841	0.6	0.49	0	1
typlarge	16841	0.25	0.43	0	1
typother	16841	0.16	0.36	0	1
nyshare	9573	10	15	0	100
lashare	9573	4	7	0	64
chishare	9573	2	8	0	100
mishare	9573	2	9	0	100
houshare	9573	1	4	0	46

Notes: 1) *avgrating_B3* is the average rating assigned by the Big Three incumbents only (Moody's, S&P, and Fitch). 2) *AAA_B3* takes a value of 1 if any one of Moody's, S&P, or Fitch assign a AAA rating. 3) See Table 1 for other variable definitions. 4) Although DBRS was actively rating CMBS during the historical sample, Bloomberg does not have comprehensive information on their ratings such that we focus on ratings by Moody's, S&P, and Fitch in our comparision of ratings over our sample period with the pre-financial crisis period.

Table A.2: Mean Subordination Levels (%), 2000-2014Q2 (Big Three ratings only)

Year	All securities	*AAA*-rated
2000	13.3	28.2
2001	13.9	27.9
2002	11.3	22.6
2003	9.8	18.7
2004	9.6	17.5
2005	13.1	24.4
2006	13.6	27.0
2007	13	25.7
2008	13.5	24.1
2009	13.2	21.9
2010	12.9	20.5
2011	15.6	24.2
2012	18.1	28.8
2013	20.9	31.4
2014:H2	23.7	31.5

Table A.3: Subordination Level Regressions, 2000-2014Q2

	(1) All Securities	(2) *AAA*-rated Securities
secondpd	0.54	2.40***
	(0.40)	(0.61)
thirdpd	7.36***	9.94***
	(0.43)	(0.57)
tranchesize	0.022***	0.0051***
	(0.0011)	(0.0005)
floater	2.11**	0.93
	(0.91)	(0.60)
variable	-4.63***	-0.89**
	(0.37)	(0.38)
wal3to5	-1.02	0.16
	(0.78)	(0.40)
wal5to7	-0.65	-0.26
	(0.65)	(0.35)
walover7	-10.0***	-3.15***
	(0.64)	(0.36)
waltv	0.12*	0.19***
	(0.06)	(0.06)
wadscr	-1.01	-1.79**
	(0.63)	(0.86)
wam	0.028***	-0.008
	(0.011)	(0.010)
sponsortot	0.000033***	0.000041***
	(9.1e-06)	(0.000011)
Constant	11.6**	10.9**
	(4.8)	(5.0)
Year of Issue FEs	No	No
Deal Type FEs	Yes	Yes
Geog. Controls	Yes	Yes
Prop. Type Controls	Yes	Yes
SEs Clustered by Deal	Yes	Yes
Observations	8,522	3,214
R^2	53%	37%

Notes: 1) Dependent variable is the subordination level of the security. 2) Only securities rated AAA by at least one incumbent are included in columns 3 and 4. 3) Standard errors are in parentheses. 4) $***p < 0.01$, $**p < 0.05$, and $*p < 0.1$. 5) Data includes all tranches of CMBS deals issued January 2000 through June 2014 excluding ReREMICS and CDOs. 6) *secondpd* and *thirdpd* take values of 1 for the time periods 2004-2008 and 2009-2014Q2; the omitted issuance year category is 2000-2003. 7) See Table 1 for other variable definitions.

B Market Valuation of Entrant Ratings

Given that the entrants are more likely to issue AAA ratings, a natural question is whether the market discounts these ratings. To test whether investors treat AAA ratings from entrants and incumbents differently, we estimate

$$cpnspread_{i,j,t} = \alpha_0 + \alpha_1 AAAentrantonly_{i,j,t} + \alpha'_{\mathbf{x}} Controls_{i,j,t} + \epsilon_{i,j,t} \tag{10}$$

on the set of securities that are rated AAA by at least one CRA and

$$cpnspread_{i,j,t} = \beta_0 + \beta_1 AAAtwowithentrant_{i,j,t} + \beta'_{\mathbf{x}} Controls_{i,j,t} + \epsilon_{i,j,t} \tag{11}$$

on the set of securities rated by exactly two CRAs where both ratings are AAA. In equation (10), $AAAentrantonly$ takes a value of 1 if only an entrant rates it AAA. In equation (11), $AAAtwowithentrant$ takes a value of 1 if at least one of the two AAA ratings is from an entrant.

In equations (10) and (11), i indexes the security, j indicates the deal type, and t indicates the year of issuance. The controls include dummies for the year of issue, deal type dummies, collateral characteristics, dummies for the coupon type (fixed rate, floating rate, or variable rate), and the *ex ante* WAL of the security in categories. If investors perceive the entrants' ratings to be a less reliable indicator of quality than the incumbents', they will demand a higher return for an issue rated AAA by only an entrant ($AAAentrantonly = 1$). Similarly, if investors find incumbent ratings more credible than those of entrants, it will treat a security rated AAA by less than two incumbents ($AAAtwowithentrant = 1$) riskier than a security rated AAA by two incumbents. A finding that $\alpha_1 > 0$ or $\beta_1 > 0$ thus indicates that investors do not treat ratings from entrants and incumbents equally.

Column 1 of Table B.1 contains the results of estimating (10) on securities of all coupon types. The coefficient on $AAAentrantonly$ is positive but statistically insignificant. Because

the effect of the covariates may differ depending on whether the coupon is fixed rate, variable, or floating, in Column 2 we estimate (10) using only the subset of securities that have a fixed rate coupon while in column 3 we estimate the model using only securities that have variable or floating rate coupons. In Column 2, the coefficient on $AAAentrantonly$ indicates that a security rated AAA by only an entrant must pay investors roughly 39 basis points more than a security rated AAA by at least one incumbent, but the effect is statistically insignificant.

Columns 3 and 4 of Table B.1 present the findings from estimating (11) on all securities with exactly two AAA ratings. In Column 3, which includes securities of all coupon types, $\beta_1 > 0$ is positive but only borderline significant at the 10 % level. The magnitude indicates that securities that have at least one of their AAA ratings from an entrant must pay investors 19 basis points more than securities that two incumbents rates AAA. When we estimate (11) separately for securities with fixed coupons, the coefficient continues to be positive, of similar magnitude, and is statistically significant at the 10% level.

Thus, it appears that investors treat AAA ratings from entrants differently than those of incumbents. The statistical evidence is admittedly not strong but the consistency of the signs across specifications suggests there may be some discounting of entrant ratings.

Table B.1: *AAA* Yields and Securities Rated *AAA* by Entrants

	(1)	(2)	(3)	(4)
AAAentrantonly	0.18	0.39		
	(0.24)	(0.31)		
AAAtwowithentrant			0.19	0.23*
			(0.12)	(0.12)
tranchesize	-0.00044***	-0.00039***	-0.00052***	-0.00055***
	(0.000092)	(0.000088)	(0.00019)	(0.00018)
subordination	-0.011***	-0.0088**	-0.0061	0.00083
	(0.0034)	(0.0035)	(0.0065)	(0.0064)
floater	0.023		0.036	
	(0.13)		(0.40)	
variable	0.34***		0.38***	
	(0.045)		(0.11)	
wal3to5	0.46***	0.57***	0.40***	0.60***
	(0.043)	(0.040)	(0.096)	(0.090)
wal5to7	0.64***	0.66***	0.66***	0.74***
	(0.054)	(0.049)	(0.13)	(0.12)
walover7	0.62***	0.66***	0.60***	0.72***
	(0.039)	(0.035)	(0.087)	(0.079)
waltv	0.0100**	0.0017	0.0034	-0.0046
	(0.0040)	(0.0045)	(0.0080)	(0.0098)
wadscr	-0.036	-0.13**	-0.10	-0.23
	(0.034)	(0.054)	(0.061)	(0.16)
wam	0.0011	0.00050	0.0012	0.00010
	(0.0012)	(0.0011)	(0.0030)	(0.0027)
sponsortot	-2.6e-06	-5.0e-07	-3.5e-06	-3.4e-06
	(1.8e-06)	(1.9e-06)	(4.4e-06)	(4.9e-06)
Constant	0.95**	1.59***	1.47*	1.67*
	(0.38)	(0.43)	(0.80)	(0.87)
Year of Issue FEs	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes
Prop. Type Controls	Yes	Yes	Yes	Yes
Coupon Type	All	Fixed	All	Fixed
Observations	741	645	240	201
R^2	54%	55%	54%	56%

Notes: 1) Dependent variable is the spread on the security relative to a US treasury of comparable maturity. 2) The main variable of interest in Columns (1) and (2) is *AAAentrantonly* which takes a value of 1 if only an entrant rates the security AAA. The main variable of interest in Columns (3) and (4) is *AAAtwowithentrant* which takes a value of 1 if at least one of the *AAA* ratings is from an entrant. 3) Standard errors are in parentheses. 4) $***p < 0.01$, $**p < 0.05$, and $*p < 0.1$. 5) Data in Columns (1) and (2) includes all non-IO tranches of CMBS deals rated *AAA* by at least one CRA issued January 2009 through June 2014 excluding Re-REMICS and CDOs. Data in Columns (3) and (4) includes all tranches of CMBS rated *AAA* by exactly two CRAs that are also rated by exactly two CRAs. 6) See Table 1 for variable definitions.

C Additional Empirical Results

C.1 Reputation and Selection of Entrant Ratings, IO Tranches

Table C.1: Reputation and Selection of Entrant Ratings, IO Securities

	(1)	(2)	(3)	(4)	(5)
reputation	-0.14	-0.30	0.083	-0.057	0.13
	(0.90)	(0.89)	(1.09)	(1.28)	(1.89)
tranchesize	0.00037***	0.00037*	0.00037*	0.00037*	0.00037*
	(0.00014)	(0.00021)	(0.00021)	(0.00021)	(0.00021)
waltv	-0.0089	-0.0094	-0.0081	-0.0084	-0.0081
	(0.033)	(0.024)	(0.024)	(0.024)	(0.024)
wadscr	0.039	0.033	0.049	0.045	0.049
	(0.20)	(0.16)	(0.15)	(0.16)	(0.16)
wam	0.0085	0.0081	0.0091	0.0088	0.0090
	(0.010)	(0.0082)	(0.0082)	(0.0082)	(0.0082)
retailshare	0.011	0.011	0.010	0.010	0.010
	(0.0091)	(0.0067)	(0.0066)	(0.0066)	(0.0066)
officeshare	0.0056	0.0057	0.0053	0.0054	0.0053
	(0.0088)	(0.0064)	(0.0063)	(0.0063)	(0.0063)
hospshare	-0.00067	-0.00073	-0.00051	-0.00058	-0.00052
	(0.0082)	(0.0058)	(0.0059)	(0.0059)	(0.0059)
indshare	0.014	0.014	0.014	0.014	0.014
	(0.025)	(0.022)	(0.022)	(0.022)	(0.022)
sponsortot	-3.2e-06	-3.4e-06	-2.7e-06	-2.9e-06	-2.8e-06
	(0.000015)	(0.000013)	(0.000013)	(0.000013)	(0.000013)
Constant	-0.65	-0.55	-0.83	-0.76	-0.83
	(2.83)	(2.19)	(2.16)	(2.18)	(2.18)
Year of Issue FEs	Yes	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes	Yes
SEs Clustered by Deal	Yes	Yes	Yes	Yes	Yes
Observations	278	278	278	278	278
Pseudo-R^2	10%	10%	10%	10%	10%

Notes: 1) Dependent variable is an indicator equal to 1 if the security is rated by an entrant, and 0 otherwise. 2) The main variable of interest is *reputation* which can be one of five measures (corresponding to the columns of the table): (1) the percentage of securities downgraded by any incumbent; (2) the percentage of securities downgraded by two or more incumbents; (3) the percentage of securities downgraded by 6 or more notches; (4) the percentage of securities downgraded from investment-grade to high yield by any incumbent; and (5), the percentage of securities downgraded from investment-grade to high yield by two or more incumbents rates the security AAA. 3) Standard errors are in parentheses, $***p < 0.01$, $**p < 0.05$, and $*p < 0.1$. 4) Data includes all CMBS deals issued January 2011 through June 2014 excluding ReREMICS and CDOs.

C.2 Effect of Entrants' Market Shares on Incumbents' Average Rating, Standard Errors Clustered by Deal Type-Year

Table C.2: Effect of Entrants' Market Shares on Incumbents' Average Rating, Non-IOs
Standard Errors Clustered by Deal Type-Year

	(1)	(2)	(3)	(4)	(5)
		OLS		Ordered Probit	
entrant1share	4.95*	4.38*	4.42*	3.13**	2.94**
	(2.45)	(2.20)	(2.21)	(1.40)	(1.30)
entrant2share	3.34***	2.58**	2.62**	1.82***	1.46**
	(1.07)	(1.00)	(1.01)	(0.65)	(0.61)
dealshop1		0.15**			0.17***
		(0.06)			(0.04)
dealshop2			-0.04		
			(0.13)		
nratings		0.56*	0.57*		0.31**
		(0.26)	(0.26)		(0.15)
tranchesize	0.0032**	0.0033**	0.0032**	0.013**	0.013**
	(0.0013)	(0.0013)	(0.0013)	(0.006)	(0.005)
subordination	0.33***	0.32***	0.32***	0.17***	0.17***
	(0.06)	(0.06)	(0.06)	(0.04)	(0.04)
floater	0.40	0.53	0.52	0.49	0.60
	(0.37)	(0.43)	(0.43)	(0.41)	(0.40)
variable	-0.42	-0.47	-0.47	-0.21	-0.23
	(0.58)	(0.55)	(0.55)	(0.19)	(0.18)
waltv	-0.13***	-0.13***	-0.13***	-0.089***	-0.087***
	(0.03)	(0.03)	(0.03)	(0.023)	(0.023)
wadscr	0.15	0.18	0.17	0.068	0.078
	(0.13)	(0.12)	(0.13)	(0.057)	(0.052)
wam	0.032***	0.030***	0.030***	0.023***	0.023***
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)
sponsortot	0.000014	0.000011	0.000012	4.5e-06	2.3e-06
	(9.8e-06)	(0.000011)	(0.000011)	(8.0e-06)	(9.2e-06)
Constant	14.7***	13.5***	13.5***		
	(1.70)	(1.61)	(1.62)		
Year of Issue FEs	Yes	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes	Yes
Prop. Type Controls	Yes	Yes	Yes	Yes	Yes
WAL Controls	Yes	Yes	Yes	Yes	Yes
Std. Errors Clustered by Deal Type-Year	Yes	Yes	Yes	Yes	Yes
Observations	1,610	1,610	1,610	1,610	1,610
R^2	79%	79%	79%		
Pseudo-R^2				38%	38%

Notes: 1) Dependent variable is the average rating of the security by incumbent CRAs. 2) Standard errors are in parentheses. 3) $***p < 0.01$, $**p < 0.05$, and $*p < 0.1$. 4) Data includes all tranches of CMBS deals issued January 2009 through June 2014 excluding ReREMICS and CDOs. 5) See Table 1 for variable definitions.

Table C.3: Effect of Entrants' Market Shares on Incumbents' Average Rating, IO Securities
Standard Errors Clustered by Deal Type-Year

	(1)	(2)	(3)	(4)	(5)
		OLS		Ordered Probit	
entrant1share	1.63	-1.72	-1.35	0.69	-0.50
	(2.92)	(1.81)	(1.86)	(0.89)	(0.64)
entrant2share	5.24***	2.11	2.37	1.07***	0.092
	(1.47)	(1.48)	(1.53)	(0.40)	(0.38)
dealshop1		0.68**			0.30*
		(0.26)			(0.16)
dealshop2			0.04		
			(0.33)		
nratings		2.26***	2.26***		0.76***
		(0.67)	(0.64)		(0.15)
variable	2.41	0.53	0.67	1.14	0.66
	(2.37)	(2.77)	(2.78)	(0.85)	(0.99)
waltv	0.027	0.042	0.042	0.004	0.009
	(0.052)	(0.052)	(0.052)	(0.015)	(0.016)
wadscr	0.21	0.39	0.38	0.08	0.14
	(0.13)	(0.25)	(0.26)	(0.05)	(0.09)
wam	0.026**	0.018	0.018	0.0064	0.0036
	(0.0094)	(0.011)	(0.011)	(0.0044)	(0.0044)
sponsortot	-0.000043**	-0.000039*	-0.000039*	-0.000012**	-0.000013*
	(0.000015)	(0.000018)	(0.000020)	(4.8e-06)	(6.7e-06)
Constant	6.27	5.17	5.06		
	(5.67)	(6.41)	(6.29)		
Year of Issue FEs	Yes	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes	Yes
Prop. Type Controls	Yes	Yes	Yes	Yes	Yes
SEs Clustered by Deal Type-Year	Yes	Yes	Yes	Yes	Yes
Observations	349	349	349	349	349
R^2	22%	33%	22%		
Pseudo-R^2				6%	10%

Notes: 1) Dependent variable is the average rating of the security by incumbent CRAs. 2) Standard errors are in parentheses. 3) $***p < 0.01$, $**p < 0.05$, and $*p < 0.1$. 4) Data includes all IO tranches of CMBS deals issued January 2009 through June 2014 excluding ReREMICS and CDOs. 5) See Table 1 for variable definitions.

C.3 Security Performance

Tables C.4 and C.5 report summary statistics performance for the securities in our estimation sample. Given the low degree of seasoning, we do not observe any meaningful principal losses and/or interest shortfalls. Table C.4 reports current cumulative principal losses on the *deal* as a percentage of deal size, by year. Only the 2011 vintage tranches exhibit any kind of principal loss at this point, and those losses are too small to reach into any of the investment grade tranches at this point. The average cumulative loss is less than 0.01% of deal size, and the median is 0.0%. Beyond 2011, there are no reported principal losses.

Interest shortfalls for the estimation sample securities are also negligible. Table C.5 reports the cumulative shortfalls on the *securities* in dollars. Only 0.3% and 0.4% of the securities issued in 2011 and 2012 have any interest shortfalls.

Table C.4: Cumulative principal losses (% of total deal size)

Year	Obs.	Mean	Std. Dev.	Min	Max	% of total
2009	11	0	0	0	0	0.00%
2010	105	0	0	0	0	0.00%
2011	308	0.006	0.04	0	0.3	9.60%
2012	533	0	0	0	0	0.00%
2013	974	0	0	0	0	0.00%
2014:H1	449	0	0	0	0	0.00%

Notes: 1) Cumulative principal loss is as a percentage of total deal size. 2) The column "% of total" represents the percentage of securities in each year that had nonzero (and nonmissing) cumulative principal losses.

Table C.5: Cumulative interest shortfall

Year	Obs.	Mean	Std. Dev.	Min	Max	% of total
2009	15	3.27	12.66	0	49.02	3.60%
2010	107	0.46	4.74	0	49	0.90%
2011	325	38.3	690.38	0	12446	0.30%
2012	539	0.32	5.26	0	97.16	0.40%
2013	982	0	0	0	0	0.00%
2014:H1	446	0	0	0	0	0.00%

Notes: 1) Cumulative interest shortfall is in dollars. 2) The column "% of total" represents the percentage of securities in each year that had nonzero (and nonmissing) cumulative interest shortfalls.

C.4 Loan-Level Collateral Performance

In addition to interest shortfalls and/or principal losses for the bonds, we are also interested in the performance of the underlying collateral. Every deal in our sample is comprised of a single collateral group, so we measure the performance at the deal level. Our data contains the most recent[21] percentage of loans which are 90 or more days delinquent, including loans in foreclosure, bankruptcy, and those that are real estate owned (REO). We also observe the percentage that are just 90 or more days delinquent.[22]

Tables C.6 and C.7 report deal-level summary statistics for these measures, by year of issuance.[23] The two measures are very similar in distribution, indicating that the number of loans that are in bankruptcy, foreclosure, or REO status is small. Consistent with the data on individual bond performance, 2011 vintage deals display the largest amount of delinquent loans, with an average of 0.13%. The 2012 and 2013 deals also have some poorly-performing collateral, but overall the amount of delinquencies in the sample as a whole is not material.

Table C.6: Percentage of loans 90+ days delinquent, plus bankruptcy, foreclosure and REO status

Year	Obs.	Mean	Std. Dev.	Min	Max	% of total
2009	4	0	0	0	0	0%
2010	17	0	0	0	0	0%
2011	30	0.13	0.38	0	1.9	17%
2012	59	0.09	0.4	0	1.9	7%
2013	100	0.06	0.32	0	1.9	4%
2014:H1	49	0	0	0	0	0%
Total	259	0.06	0.3	0	1.9	5%

Notes: 1) Data is at the deal level. 2) The column "% of total" represents the percentage of securities in each year that had nonzero (and nonmissing) values of 90 day delinquent plus bankrupt, foreclosed, and REO.

[21] For the vast majority of securities this is May 2014 or later.

[22] We also observe similar measures for 60 days, but we do not report these because they are nearly identical, both statistically and economically, to the 90 day measures.

[23] We winsorize at the 99% level due to a single large outlier.

Table C.7: Percentage of loans 90+ days delinquent

Year	Obs.	Mean	Std. Dev.	Min	Max	% of total
2009	2	0	0	0	0	0%
2010	15	0	0	0	0	0%
2011	28	0.11	0.35	0	1.77	13%
2012	55	0.03	0.22	0	1.64	2%
2013	99	0.06	0.31	0	1.77	4%
2014:H1	49	0	0	0	0	0%
Total	248	0.04	0.25	0	1.77	4%

Notes: 1) Data is at the deal level. 2) The column "% of total" represents the percentage of securities in each year that had nonzero (and nonmissing) values of 90 days delinquent.