

# 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. 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, particularly for 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 and find that incumbent ratings increase in 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.<sup>1</sup> 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 better understand how rating agencies compete and the effects of competition on ratings, we study the entry of two firms into the market for commercial mortgage-backed securities (CMBS) ratings. Our setting is unique given that (1) the entrants did not initially rate corporate, municipal, or sovereign bonds,<sup>2</sup> and (2) the upheaval in the structured finance market in recent years resulted in a significant loss of reputation for incumbent CRAs.

We find that the entrants issue systematically higher ratings, often by several notches,

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<sup>1</sup>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.

<sup>2</sup>See An, Deng, and Gabriel (2011), Dierker, Quan, and Torous (2005) and Titman and Tsyplakov (2010) for descriptions 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 security quality. The difference between entrant and incumbent ratings is especially pronounced in interest-only (IO) tranches, which the entrants rate *AAA* almost uniformly.<sup>3</sup> The entrants' ratings are still significantly higher in the non-IO sample although the economic magnitude of the difference is much smaller for these securities. The gap between entrant and incumbent ratings is higher for the entrant that is struggling more to gain market share, and it is also higher shortly after entry by the CRA that does gain significant market share. Taken together, the findings suggest that higher entrant ratings are part of a strategy to win business from the incumbents. However, it does not appear this strategy is sufficient to gain a dominant market position.

Because there are several potential alternative explanations for systematically higher entrant ratings, we conduct a series of exercises to rule these out. First, we do not find that entrants only rate securities that the incumbents rate low. 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. Third, 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. Taken together, these results suggest 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 to try to win business.

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<sup>3</sup>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).

We further find that entry affects the level of the incumbents' ratings. Our main variable of interest is the percentage of securities of a particular CMBS deal type ("conduit/fusion," "large loan," and "other" deal types) issued in a given year that are rated by the entrants. By simultaneously controlling for the year of issuance and the deal type, as well as time trends, we do not capture merely that CMBS ratings became more lax over time, or that some deal types are rated more leniently. We also use predetermined characteristics of the securities and two plausibly exogenous breaks in the time series to generate predicted entrant market shares and mitigate concerns about reverse causality.

We find that as the entrants' market share in a deal type increases, the ratings assigned by incumbents are more favorable from the perspective of the issuer. A 10 percentage point increase in the share of non-IO securities rated by an entrant raises the average incumbent rating by about 0.3 rating notches. 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 incumbent ratings. 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.

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 lax standards. Theoretical work shows that competition always exacerbates shopping and often exacerbates catering. However, no empirical work to date has attempted to distinguish between these two mechanisms or measure their relative impact on rating levels. We show that no one agency had close to 100% market share in the CMBS market, thus leaving scope for both shopping and catering.

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 is rated by that CRA, we know the CRA conducted analysis sufficient to rate the tranche with a missing rating. We consider deals with such a structure to have been shopped. Both our measures increase following entry, and one of the measures is consistently statistically significant in explaining the change in incumbent ratings in response to changes in entrant shares.

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 structured finance 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. In contrast, our regressions for the level of credit support for *AAA* securities suggest that disclosed shopping does not play a role.

Catering and shopping are thus both important, yet distinct channels through which increased competition can lead to higher ratings. Although policies to mitigate shopping, 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 and Hypotheses

### 2.1 Competition and product quality: what are the effects and what are the channels?

While competition is generally thought to improve product quality in most economic settings, ratings are unusual because the main consumers are investors while the purchasers are issuers. Similar settings include vehicle emissions testing and auditing of financial statements.<sup>4</sup> Because the buyers and consumers of ratings have different goals, it is not obvious from either a theoretical or empirical standpoint that increased competition should lead to higher rating quality.

Much of the theory on ratings in particular (e.g., Bolton, Freixas, and Shapiro 2012, Camanho, Deb, and Liu 2012, and Frenkel 2015) suggests that, under the issuer-pays fee scheme, the effect of competition depends on the reputation of the incumbents.<sup>5</sup> 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 (2015) finds that the degree to which competition can improve rating quality depends on how low the

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<sup>4</sup>See Bennett, Pierce, Snyder, and Toffel (2013) on auto emissions testing, and Lennox (2000), Chan, Lin, and Mo (2006), Lu (2006) and the review in DeFond and Zhang (2014) for audits.

<sup>5</sup>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.

reputation of the entrant is relative to the incumbent. Finally, Manso (2013) explores the implications of competition in the presence of feedback effects from ratings to a firm’s cost of capital. He finds that increased competition can result in downward pressure on ratings, which leads to a higher probability of default, and lower welfare.<sup>6</sup>

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

Given 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. In contrast, Behr, Kisgen, and Taillard (2014) find that rating quality decreased after the SEC introduced a NRSRO certification process in 1975 that resulted in *less* room for competition. Bae, Kang, and Wang (forthcoming) find that Fitch’s entry did not affect the level of credit ratings. 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.<sup>7</sup> Xia (2014) shows that the entry of an investor-pays CRA improves the quality of ratings.

Even if competition does result in less stringent ratings, the mechanism behind this ef-

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<sup>6</sup>In our setting, a “firm” is in fact a special purpose self-liquidating entity such that the survival of the firm is less responsive to changes in credit ratings.

<sup>7</sup>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.

fect 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: they 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 to shopping, rating catering is an action on the part of 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 catering, 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 works closest in spirit to our paper, Becker and Milbourn (2011), Cohen and Manuszak (2013), and Bae, Kang, and Wang (forthcoming), are set in time periods in which the incumbents’ reputation in the particular asset class in question (corporate bonds in the case of Becker and Milbourn and Bae et al, and structured finance in the case of Cohen and Manuszak) was solid. Additionally, the benefit to inflating ratings was high due to the size of these markets during their time periods. 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 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 fee income from doing so 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 benefits of exploiting a better reputation in the future. Along this dimension as well, therefore, our setup is one in which competition has the best chance of leading to more stringent 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 suggests that, indeed, competition may have even more deleterious effects in structured finance, and perhaps other similar asset classes, than in corporates. 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 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 market (SIFMA 2014b).

### **2.2.1 Hypotheses**

Motivated by the theoretical literature and the unique aspects of our setting, we test the following hypotheses:

**Hypothesis 1** *Entrant CRAs issue higher ratings than incumbents for the same security.*

After testing for differences in ratings between entrants and incumbents, we attempt to identify entrant catering by considering the following alternative hypotheses for these

differences:

**Hypothesis 1a** *We observe higher entrant ratings because they rate securities that incumbents have rated unexpectedly low.*

**Hypothesis 1b** *We observe higher entrant ratings because their rating models are less precise than those of incumbents.*

**Hypothesis 1c** *We observe higher entrant ratings because incumbents are excessively conservative as measured by average spreads on CMBS relative to similarly-rated securities in other asset classes.*

We then turn to the question of how entrant CRAs affect incumbent ratings. We first test whether the entrants affect incumbent ratings generally

**Hypothesis 2** *The presence of the entrant CRAs affects incumbent ratings.*

We then attempt to identify the channel through which entry affects incumbent ratings

**Hypothesis 2a** *Entry affects incumbent ratings because it widens the scope for shopping.*

**Hypothesis 2b** *Entry affects incumbent ratings because incumbents increase catering to issuers in response to entry.*

### 3 Data

We collect data from Bloomberg terminals on entrant and incumbent 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. We include all CMBS except ReREMIC deals,

CDOs, or agency multi-family deals.<sup>8</sup> Our incumbent CRAs are Moody’s, S&P, Fitch, and Dominion Bond Rating Service (DBRS), and our entrants are Morningstar Credit Ratings LLC (“Entrant 1”) and Kroll Bond Ratings (“Entrant 2”). All six CRAs are Nationally Recognized Statistical Rating Organizations (NRSROs).<sup>9</sup>

Entrant 1 was formed via 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 2013a). 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). It 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 2012). By mid-2013 entrant 2 had the third highest market share

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<sup>8</sup>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.

<sup>9</sup>See, for example, Beaver, Shakespeare, and Soliman (2006), Bongaerts, Cremers, and Goetzmann (2012), and Bruno, Cornaggia, and Cornaggia (forthcoming) regarding the importance of NRSRO certification for CRAs.

in CMBS ratings, and although initially active only in CMBS, it now also rates RMBS, credit card receivables securitizations, and auto loan securitizations. It has also recently started rating public finance bonds. However, its market share in these asset classes remains small.

Table 1 summarizes the securities in our sample. Our sample contains 2,488 securities from 287 separate deals, and only rated securities are included.<sup>10</sup> A CRA often rates particular securities within a deal rather than every security within a deal. The variable *trancheshop* is the total number of ratings for that security; we describe in Section 5 the reason we label this variable as *trancheshop*. 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 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 minimal since the vast majority of securitized commercial mortgages have defeasance clauses (see Dierker, Quan, and Torous 2005), therefore 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 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.<sup>11</sup> Half

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<sup>10</sup>Because the entrants were not both active in the market until January 2011, we drop the small number of ratings from Morningstar from 2009-2010. Thus, the majority of our econometric estimation is effectively done on a sample from January 2011 to June 2014.

<sup>11</sup>We drop all ratings below B-.

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. 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.

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

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.<sup>12</sup> 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.

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<sup>12</sup>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

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.<sup>13</sup> 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.

Part of this is due to S&P losing market share as a result of a mishap on a July 2011 deal (it pulled ratings after pricing but before settlement) which led it to not rate any conduit deals for several months. S&P asserts its temporary exit from the conduit market was voluntary (Reuters, 2011), but some commentators in the financial press assert that it was effectively shut out (see, for example, Tempkin 2012a). Both entrants had plans to enter the CMBS market well in advance of this incident, though, so the entry is not endogenous to S&P’s problems. In fact, entrant 2 initially entered only the large loan segment of the CMBS market, therefore it could not have known it would have a unique opportunity in the

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<sup>13</sup>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.

conduit market due to S&P's problems.

## 4.1 Differences Between Entrant and Incumbent Ratings

We now turn to testing Hypothesis 1, that entrants rate higher than incumbents. Table 4 compares entrant and incumbent ratings for the set of securities rated by both, which allows us to hold security characteristics constant. The results of the paired t-tests indicate that both entrants issue systematically more generous ratings than the main incumbents on the same securities.

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 more generously. On average, entrant 1 rates one grade higher than the three main incumbents, but there is no significant difference between entrant 1's ratings and those of DBRS. Entrant 1 rates IO securities 3.1 grades higher than the average of the four incumbents, but rates non-IOs only 0.4 grades higher, although the difference is still highly statistically significant.

Entrant 2 is somewhat less generous than entrant 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. Like entrant 1, entrant 2's higher ratings are much more pronounced for IO tranches: it rates those an average of 2.6 grades higher, but rates non-IOs only 0.04 grades higher. 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 non-IOs in the second half of the sample (2013-2014).

S&P is the most "conservative" incumbent relative to the entrants, which may be because it faced greater regulatory pressure. Regulators' concerns centered on a period in early 2011 during which S&P is alleged to have deviated from its own published standards in its conduit ratings without disclosing the deviations from those standards to investors. The regulatory



pressure culminated in S&P agreeing to stop rating conduit deals for a period of one year beginning in January 2015 (Scully 2015). While we do not know for certain, as the matter was settled out of court, it seems possible that these regulatory concerns were related to the aforementioned July 2011 ratings mishap that led to S&P not rating any conduit transactions for several months thereafter.

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 entrants' ratings are usually above the 45 degree line. The difference in ratings is even more pronounced in the IO tranches - the entrants rate IOs *AAA* almost uniformly, and their average rating is nearly three notches higher than the average incumbent rating. The uniformity in IO ratings by the entrants may suggest they expend less resources in creating detailed models to assess risk, instead preferring to have a blanket policy that does not consider the variation in IO structures in the CMBS market.

#### **4.1.1 Selection, Incumbent Conservatism, or Catering?**

We have shown that the difference between the entrants' and incumbents' ratings persists after controlling for security characteristics. While this suggests catering, it is possible that such differences arise due to selection effects or because the incumbents are excessively conservative. To determine whether this is the case, we look at three alternative hypotheses. First, we consider whether the differences arise because issuers purchase entrant ratings only after observing a low rating from one or more incumbents (Hypothesis 1a). Second, we examine whether the incumbents models are more precise than the entrants' in the sense of a

larger fraction of the variance in ratings being explained by observable security characteristics (Hypothesis 1b). Third, we look at whether investors view incumbents' ratings as excessively conservative (Hypothesis 1c).

#### 4.1.2 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

$$avgratingincumbent_{i,j,t} = \alpha_0 + \alpha'_x Controls_{i,j,t} + \epsilon_{i,j,t} \quad (1)$$

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  $\alpha_1$  coefficients are statistically insignificant in all but one specification and change sign depending on the specification. We thus reject Hypothesis 1a.

#### 4.1.3 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. By noisier, we do not mean less accurate in the sense of being worse predictors of *ex post* default; as we discuss below, the nature of performance in structured finance makes it difficult to assess accuracy from an *ex post* perspective until many years after issuance. Rather, noise refers to lower precision in the sense of observables explaining less of the variation in ratings. 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, tranche size, 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, the security size, and how much business the issuer has to offer the CRA. Table 6 presents the  $R^2$ s from these regressions. The  $R^2$ s are similar across CRAs indicating that the entrants' ratings are similar in precision to those of the incumbents. Column (5) 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 2012b). 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). We thus reject Hypothesis 1b.

#### 4.1.4 Are incumbent ratings excessively conservative?

A final explanation for higher observed entrant ratings is that the incumbents are simply being too conservative, which may be plausible given 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) indicate, the CMBS in our sample have thus far performed too well (i.e., the collateral and securities have suffered very few delinquencies or principal/interest shortfalls) 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.<sup>14</sup> 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.

A further limitation in the structured finance market is that a time series of yields on individual securities 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

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<sup>14</sup>The previous Markit CMBX series, Series 5, was based on securities issued in 2007.

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. The second challenge for getting a time series of yields 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.<sup>15</sup> 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.

Absent variation in security performance or time series data on yields, we can assess whether the non-IO securities that the incumbents rate below *AAA* are conservatively rated by comparing the yields *at issuance* of CMBS with those of corporate bonds. We use the initial coupon as a measure of the yield for CMBS.<sup>16</sup>

Figure 3 shows that spreads on CMBS that the incumbents rate below *AAA* are almost always higher than spreads on like-rated corporate bonds.<sup>17</sup> 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

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<sup>15</sup>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).

<sup>16</sup>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. Although some junior securities may price below par according to industry participants, the bias this creates for us is to *understate* the yields earned on more junior securities.

<sup>17</sup>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 very least we do not find evidence that the market views incumbent non-IO ratings as excessively conservative. We are thus able to reject Hypothesis 1c for the securities that account for most of the sample.

The observed difference in IO ratings is also unlikely to be driven by incumbent conservatism. As Beaman and Pendergast (2013) discuss, even the IOs attached to *AAA* securities may be much riskier than a *AAA* rating would indicate. The same is true of IOs attached to non-*AAA* non-IOs or IOs not attached to a particular non-IO tranche. In fact, as Beaman and Pendergast (2013) illustrate, IOs receiving most of their cash flows from mezzanine investment-grade (above *BB+* but below *AAA*) tranches have more stable cash flows than IOs promised their cash flows from the non-IO *AAA* portion of the capital structure. The reason is that, while CMBS have far more prepayment protection than RMBS, any prepayments not completely covered by defeasance clauses for the entire loan term accrue to the most senior tranches first, thus reducing the interest available to pay IOs. The incumbent CRAs formerly had a practice of rating IOs *AAA* when the IOs received priority in the waterfall commensurate to a linked non-IO *AAA*'s payments (Beaman and Pendergast, 2013). However, the incumbents abandoned this practice in 2010 so that their ratings better reflect the true risks of investing in IOs (Beaman and Pendergast, 2013).

## 4.2 Are Entrant Ratings Substitutes for Incumbent Ratings?

The entrants' ratings do not appear to be perfect substitutes for the incumbents' ratings, as 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.

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 security if the incumbents disagree on the rating, including the special cases of *AAA* ratings or ratings around the investment-grade / high yield boundary; the results are available from the authors upon request.<sup>18</sup>

## 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 how much more 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 A, 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 competition can exacerbate rating catering. Additionally, this literature shows that

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<sup>18</sup>We also test whether entrants are more likely to rate a security from an incumbent with a better or worse reputation following Doherty, Kartasheva, and Phillips (2012). We find little evidence in support of the hypothesis that entrants are more likely to rate securities from entrants' with bad reputations. The results are available from the authors upon request.



incumbent ratings will certainly increase in response to competition via the shopping channel. Thus, to test Hypothesis 2, whether entry into the CRA market affects incumbents' ratings, we construct variables to separately identify both potential channels (Hypotheses 2b and 2a).

## 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 (large loan, conduit/fusion, or other). 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 also include a quadratic trend for the number of months since the start of the sample to control for trends in rating standards unrelated to the entrants.

We estimate

$$\begin{aligned} avgratingincumbent_{i,j,t} = & \alpha_0 + \alpha_1 entrant1share_{j,t} + \alpha_2 entrant2share_{j,t} \\ & + \alpha'_x Controls_{i,j,t} + \epsilon_{i,j,t} \end{aligned} \quad (6)$$

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), a quadratic in the months since the start of the sample, 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  $\alpha_2 > 0$ .

### 5.1.1 Ordered Probit Estimation

The specification implied by (6) 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 estimate (6) using both OLS and an ordered probit. The latter preserves the ranking of the different ratings but does not impose a linearity assumption.

### 5.1.2 Predicted Entrant Market Shares Specification

It may be the case that entrant market shares only increase in market segments in which the incumbents' disclosed ratings are increasing. 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. 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.

Nevertheless, as a check on our main results we estimate the effect of entry on the level of incumbent ratings using predicted entrant market shares. We do so by first estimating a regression of whether an entrant rates a security based on two sources of variation that changed the likelihood that an entrant rates a deal, but that are plausibly exogenous to incumbent rating levels. The first is a change to the Department of Labor regulations concerning the Employee Retirement Income Security Act of 1974 (ERISA). Entrant ratings become eligible for ERISA certification only in July 2013 (see Kroll Bond Ratings 2013 and Morningstar Credit Ratings, LLC 2013b), and certification eligibility should increase

the likelihood that an entrant rates a security without having any direct effect on how incumbents rate. We thus define a variable called *posterisa* that takes a value of 1 from July 2013 onward, and 0 otherwise.

Additionally, we take advantage of the fact that entrant 2 initially rated only large loan deals, a decision it made before observing incumbent ratings during its first several months of existence. It did not release a methodology for conduit/fusion deals until February 2012 and did not rate its first conduit/fusion deal until March 2012. We thus define a variable called *entrant2out* as equal to 1 for all securities in conduit/fusion deals issued from July 2011 (entrant 2's debut) to February 2012. We expect that *entrant2out* will have a positive effect on the probability that entrant 1 rates a security, since the two ratings are imperfect substitutes, but a negative effect on the probability that entrant 2 rates a security. The fact that entrant 2 initially chose to focus on the large loan market rather than the conduit/fusion market should have no effect on incumbent ratings other than through how it influences the entrants' market shares.

We include a quadratic time trend to control for trends over time unrelated to these two sources of exogenous variation. We also include deal types, property type shares, our geographic variables, *floater*, *variable*, and *IO* in predicting entrant market shares since these security characteristics should not affect  $\epsilon_{i,j,t}$  in equation (6) but may influence whether an entrant rates a security. For example, an entrant may be more likely to rate securities with a high share of office property due to greater knowledge of the office market or a methodology known to be favorable to office property. Similarly, entrants may be more likely to get chosen to rate particular tranche types. We include all the same variables except *posterisa* and *entrant2out* in estimating equation (6) to avoid omitted variable bias.

We thus estimate a probit model of

$$ratedentrant_{i,t} = \gamma_0 + \gamma_{erisa} posterisa + \gamma_{e2out} entrant2out + DealTypeFEs + \gamma'_x X_{i,t} + v_{i,j,t} \quad (7)$$

where  $X_{i,t}$  includes *month*, *monthsq*, *floater*, *variable*, *IO*, geographic characteristics, and property type shares. Note that, in estimating (7), we exclude characteristics that are commonly subject to negotiation between CRAs and issuers such as the level of subordination. Because negotiation over the level of subordination also affects the size of the tranche and the WAL, we treat these variables as potentially subject to endogeneity bias and exclude them from (7). Similarly, issuers and CRAs often negotiate over the LTV of the loans, particularly for large loan deals, such that we exclude *waltv*. The LTV of the loans in turn influences *wadscr* and could affect *wam* such that we exclude these variables as well. Finally, we do not include year fixed effects since our goal is to simulate deal type shares by year based solely on *posterisa* and *entrant2out*, predetermined security characteristics, and a time trend.

After estimating (7) separately for each entrant, we then generate predicted values for the probability that an entrant rates each security in the sample,  $pratedentrant_{i,t}$ . We then assign a value of 1 to this variable if the predicted probability is greater than or equal to 0.5, and 0 otherwise. Finally, to get predicted entrant market shares, we calculate the mean of *pratedentrant* for each entrant by year and CMBS subtype.

### 5.1.3 Subordination

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 estimate

$$\begin{aligned} Subordination_{i,j,t}^{AAA} &= \beta_0 + \beta_1 entrant1share_{j,t} + \beta_2 entrant2share_{j,t} \\ &\quad + \beta'_x Controls_{i,j,t} + \epsilon_{i,j,t} \end{aligned} \tag{8}$$

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 (6) 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 competition should lead to more shopping, thus both channels may be 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.

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.

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.<sup>19</sup>

In addition to  $dealshop1$  and  $dealshop2$ , we include a third measure of shopping defined at the security level: the number of ratings, which we call  $trancheshop$  for the purposes of the regressions. This is a measure of “disclosed” 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.<sup>20</sup> 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

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<sup>19</sup>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.

<sup>20</sup>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.

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 (6) and (8) with *trancheshop* and *dealshop1* or *dealshop2*. If either coefficient is positive, some of the decrease in the stringency in ratings is due to the greater capacity of issuers to shop for ratings thus supporting Hypothesis 2a. On the other hand, if the coefficient on *entrant1share* or *entrant2share* is statistically significant and positive after controlling for the amount of shopping, the data indicate that incumbents cater to issuers more as entrants’ increase their market share (Hypothesis 2b).

## 5.3 Results

### 5.3.1 Average incumbent ratings

Table 7 presents the results from estimating equation (6) on the non-IO securities. In all specifications, we cluster the standard errors by year-deal type because our main variable of



interest varies only at the year-deal type level. Columns (1)-(3) show the effect of entrant market shares on the average incumbent rating. Columns (1) and (2) show the estimation results by OLS and by ordered probit. In both specifications, the coefficient on entrant 2's share is statistically significant at the 1% level while the coefficient on entrant 1's share is statistically significant at the 10% level. Column (3) presents the results when estimating the effect using the predicted entrant market shares rather than the actual ones; the results from the first stage of the estimation are in an appendix available from the authors. When the effect is estimated via the predicted entrant market shares rather than OLS, the coefficient on entrant 2's share continues to be statistically significant at the 5% level. The coefficient on *entrant1share* is positive but is no longer statistically significant.

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 0.35 grades. As Entrant 2 increased its overall market share from 0 to 56% (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 0.4 grade higher average incumbent rating.

Columns (4)-(6) present the effect of *entrant1share* and *entrant2share* for each of the three main incumbents separately. For each of the incumbents, *entrant2share* is statistically significant at the 10% level. It is higher for Moody's and Fitch than for S&P. Entrant 1's share is statistically significant at the 5% level for S&P and Fitch but not for Moody's.

In summary, the results support Hypothesis 2 that the presence of the entrants' affects incumbent ratings. The evidence is stronger for entrant 2 than for entrant 1.

### **5.3.2 Subordination for securities rated AAA by an incumbent**

Table 8 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 1 percentage point, and this is statistically significant at the 1% level when we estimate the model by OLS. When we estimate the model using predicted market shares (Column (4)), *entrant2share* is statistically significant at the 5% level and the magnitude is such that a 10 percentage point increase in market share is associated with a 0.7 percentage point decrease in subordination. Entrant 1's share is not statistically significant in either estimation. These results provide further support in favor of Hypothesis 2 sample but, similarly to our results for the level of ratings, the evidence is much stronger for entrant 2 than for entrant 1.

### 5.3.3 Shopping

Table 9 tabulates the frequency of *dealshop1* and *dealshop2* across various time periods and deal types. 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*. Shopping is higher post entry by both measures (column (3) vs column (2)) and, consistent with the prediction of Skreta and Veldkamp (2009), it is more common in more complex (and harder to rate) conduit/fusion deals than in large loan deals (column (4) vs. column (5)).

Table 10 compares our incumbent rating results when we exclude our measures of shopping and when we include these variables. The coefficients on the entrant shares decrease in magnitude when moving from columns (1) and (4) to (2) and (5) in Table 10 and the coefficients on both *trancheshop* and *dealshop1* are positive and statistically significant at the 5% level. When we use *dealshop2* as the measure of undisclosed shopping (columns (3) and (6)), its coefficient is statistically insignificant, but *trancheshop* is still positive and significant, and the coefficients on the entrant shares decrease by a similar magnitude when moving from columns (1) and (4) to (3) and (6). The results in Table 10 indicate that some of the increase in incumbent ratings is due to shopping on the part of issuers, but a substantial portion appears to be explained by catering on the part of incumbents.

There is less evidence that disclosed or undisclosed shopping affects the subordination of the *AAA* tranches, however. In Table 8, the coefficients on *entrant1share* and *entrant2share* change little when we add the shopping measures to the model and only *dealshop1* is statistically significant (at the 10%) level. The results are similar in unrepeated robustness checks in which we regress subordination for other rating buckets (e.g., *AA*, *A*, *BBB*) on the number of ratings.

We also estimate the effect of entrant market shares on the level of incumbent ratings in the IO sample. The results are available in Table 11. In the IO sample, incumbent ratings are increasing in entrant 2's market share but not in entrant 1's market share when we do not include our shopping variables. When we include the shopping variables, however, neither entrants' market share is statistically significant but both *dealshop1* and *trancheshop* are significant at the 5% level.

Overall, the evidence indicates both catering and shopping are responsible for the observed increase in average incumbent ratings in the non-IO sample, thus corroborating Hypotheses 2b and 2a. In the IO sample, however, the evidence indicates that issuer shopping explains all of the observed increase in incumbent ratings, thus corroborating only hypothesis 2a. That incumbents do not respond in IOs despite high entrant ratings of these securities may be explained by the fact that the market does not view the entrants' ratings as credible.

## 6 Conclusions

We have studied the effect of CRA entry on the level of ratings in structured finance. The entrants issue systematically higher ratings than the incumbents, and this indicates a strategy of catering to issuers. Furthermore, as the entrants' market share increases, the incumbents' ratings rise and the level of subordination they require for *AAA* tranches falls. The observed increase in the ratings of the incumbents is due to both rating catering on their part and to shopping by issuers.

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 in structured finance. We cannot be certain that the entrants' higher ratings 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 such that relaxation of standards has been associated with less accurate ratings. 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 catering problems are addressed.

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Table 1: Summary Statistics

| Variable                  | Obs. | Mean    | Median  | Std. Dev. | Min   | Max   |
|---------------------------|------|---------|---------|-----------|-------|-------|
| <i>trancheshop</i>        | 2488 | 2.4     | 2       | 0.7       | 1     | 4     |
| <i>numericssp</i>         | 841  | 11.6    | 13      | 4.4       | 1     | 16    |
| <i>numericmoody</i>       | 1618 | 12.6    | 16      | 4.4       | 1     | 16    |
| <i>numericfitch</i>       | 1442 | 12.0    | 14      | 4.7       | 1     | 16    |
| <i>numericdbrs</i>        | 652  | 12.9    | 16      | 4.3       | 1     | 16    |
| <i>avgratingincumbent</i> | 2488 | 11.9    | 14      | 4.6       | 1     | 16    |
| <i>numericentrant1</i>    | 379  | 12.8    | 16      | 4.1       | 1     | 16    |
| <i>numericentrant2</i>    | 1006 | 12.7    | 16      | 4.4       | 1     | 16    |
| <i>avgratingentrant</i>   | 1291 | 12.7    | 16      | 4.4       | 1     | 16    |
| <i>AAAanyone</i>          | 2488 | 0.503   | 1       | 0.5       | 0     | 1     |
| <i>AAAincumbent</i>       | 2488 | 0.469   | 0       | 0.499     | 0     | 1     |
| <i>AAAentrantonly</i>     | 2488 | 0.035   | 0       | 0.183     | 0     | 1     |
| <i>cpnspread</i>          | 2031 | 1.915   | 1.727   | 0.991     | 0.005 | 8.924 |
| <i>tranchesize</i>        | 2438 | 165     | 75      | 253       | 1     | 4100  |
| <i>subordination</i>      | 1854 | 19.6    | 18.5    | 13.2      | 0     | 75    |
| <i>IO</i>                 | 2488 | 0.2     | 0       | 0.4       | 0     | 1     |
| <i>floater</i>            | 2488 | 0.13    | 0       | 0.34      | 0     | 1     |
| <i>variable</i>           | 2488 | 0.47    | 0       | 0.5       | 0     | 1     |
| <i>walunder3</i>          | 2052 | 0.13    | 0       | 0.34      | 0     | 1     |
| <i>wal3to5</i>            | 2052 | 0.15    | 0       | 0.36      | 0     | 1     |
| <i>wal5to7</i>            | 2052 | 0.07    | 0       | 0.26      | 0     | 1     |
| <i>walover7</i>           | 2052 | 0.64    | 1       | 0.48      | 0     | 1     |
| <i>retailshare</i>        | 2348 | 32      | 28      | 27        | 0     | 100   |
| <i>officeshare</i>        | 2348 | 20      | 17      | 21        | 0     | 100   |
| <i>hospsshare</i>         | 2348 | 15      | 0       | 31        | 0     | 100   |
| <i>indshare</i>           | 2348 | 1       | 0       | 4         | 0     | 28    |
| <i>waltv</i>              | 2354 | 60      | 63      | 8         | 8     | 113   |
| <i>wadscr</i>             | 2267 | 2.2     | 1.9     | 0.9       | 1.2   | 7.4   |
| <i>wam</i>                | 2419 | 96.2    | 108     | 35.1      | 12    | 540   |
| <i>year</i>               | 2488 | 2012.5  | 2013    | 1.1       | 2009  | 2014  |
| <i>sponsortot</i>         | 2488 | 14809.4 | 13271.3 | 10259.6   | 14    | 34458 |
| <i>tyconduitfusion</i>    | 2488 | 0.68    | 1       | 0.47      | 0     | 1     |
| <i>typlarge</i>           | 2488 | 0.27    | 0       | 0.44      | 0     | 1     |
| <i>typother</i>           | 2488 | 0.05    | 0       | 0.22      | 0     | 1     |
| <i>nyshare</i>            | 2178 | 16.3    | 10      | 24.7      | 0     | 100   |
| <i>lashare</i>            | 2178 | 4.7     | 0       | 12.8      | 0     | 100   |
| <i>chishare</i>           | 2178 | 2.9     | 0       | 9.1       | 0     | 100   |
| <i>mishare</i>            | 2178 | 2.4     | 0       | 11.2      | 0     | 100   |
| <i>houshare</i>           | 2178 | 1.5     | 0       | 4         | 0     | 26    |
| <i>dealshop1</i>          | 2488 | 0.08    |         | 0.27      | 0     | 1     |
| <i>dealshop2</i>          | 2488 | 0.35    |         | 0.48      | 0     | 1     |

Variable definitions in Table 1 are as follows: *trancheshop* is the total number of ratings the security received; *numericssp*, *numericmoody*s, *numericfitch*, *numericdbrs*, *numericentrant1*, and *numericentrant2* 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). *cpnsread* 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. *walunder3*, *wal3to5*, *wal5to7*, *walover7* 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. *tyconduitfusion*, *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. *dealshop1* takes a value of 1 if the security is part of a deal in which alternate tranche ratings are missing from two different CRAs. *dealshop2* 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 |
|--------------------------------------|------|------|------|------|------|--------|-------|
| <i>Panel A: All Deal Types</i>       |      |      |      |      |      |        |       |
| ratedentrant1                        | 0%   | 0%   | 21%  | 13%  | 17%  | 13%    | 15%   |
| ratedentrant2                        | 0%   | 0%   | 10%  | 42%  | 49%  | 56%    | 40%   |
| ratedentrant                         | 0%   | 0%   | 31%  | 49%  | 63%  | 62%    | 52%   |
| <i>Panel B: Conduit/Fusion Deals</i> |      |      |      |      |      |        |       |
| ratedentrant1                        | 0%   | 0%   | 24%  | 5%   | 6%   | 13%    | 9%    |
| ratedentrant2                        | 0%   | 0%   | 2%   | 40%  | 66%  | 61%    | 47%   |
| ratedentrant                         | 0%   | 0%   | 26%  | 45%  | 70%  | 68%    | 54%   |
| <i>Panel C: Large Loan Deals</i>     |      |      |      |      |      |        |       |
| ratedentrant1                        | 0%   | 0%   | 18%  | 29%  | 45%  | 15%    | 31%   |
| ratedentrant2                        | 0%   | 0%   | 39%  | 46%  | 18%  | 43%    | 29%   |
| ratedentrant                         | 0%   | 0%   | 57%  | 61%  | 57%  | 50%    | 53%   |
| <i>Panel D: Other Deals</i>          |      |      |      |      |      |        |       |
| 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 |
|--|-------|---------|-------|-------|-------------|------------|------|--------|
| <i>Panel A: Entrant 1 vs. Incumbents</i>       |       |         |       |       |             |            |      |        |
| 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    |
| <i>Panel B: Entrant 2 vs. Incumbents</i>       |       |         |       |       |             |            |      |        |
| 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    |
| <i>Panel C: Entrant Average vs. Incumbents</i> |       |         |       |       |             |            |      |        |
| 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. 3) \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , and \* $p < 0.1$ . 4) Data includes all tranches of CMBS deals rated AAA by at least one CRA issued January 2009 through June 2014 excluding ReREMICS and CDOs.

Table 5: Issues An Entrant Rates and Incumbent Ratings

|                      | (1)                   | (2)                   | (3)                   | (4)                   |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                      | Non-IO Securities     |                       | IO Securities         |                       |
| <i>avgincumerror</i> | 0.022<br>(0.015)      |                       | 0.024<br>(0.020)      |                       |
| <i>incumlow</i>      |                       | -0.11*<br>(0.068)     |                       | -0.058<br>(0.15)      |
| <i>tranchesize</i>   | -0.00029<br>(0.00033) | -0.00025<br>(0.00033) |                       |                       |
| <i>subordination</i> | 0.0040<br>(0.0040)    | 0.0039<br>(0.0040)    |                       |                       |
| <i>floater</i>       | -0.39*<br>(0.20)      | -0.39*<br>(0.20)      |                       |                       |
| <i>variable</i>      | -0.077<br>(0.094)     | -0.072<br>(0.094)     | 0.17<br>(0.51)        | 0.21<br>(0.52)        |
| <i>wal3to5</i>       | 0.18<br>(0.15)        | 0.17<br>(0.15)        |                       |                       |
| <i>wal5to7</i>       | -0.0038<br>(0.18)     | -0.0035<br>(0.18)     |                       |                       |
| <i>walover7</i>      | 0.13<br>(0.14)        | 0.11<br>(0.14)        |                       |                       |
| <i>waltv</i>         | -0.0061<br>(0.0093)   | -0.0068<br>(0.0093)   | 0.0030<br>(0.017)     | 0.0030<br>(0.017)     |
| <i>wadscr</i>        | -0.033<br>(0.072)     | -0.033<br>(0.072)     | -0.060<br>(0.12)      | -0.056<br>(0.12)      |
| <i>wam</i>           | 0.0030<br>(0.0031)    | 0.0031<br>(0.0031)    | 0.0082<br>(0.0050)    | 0.0083*<br>(0.0051)   |
| <i>sponsortot</i>    | 3.9e-06<br>(4.9e-06)  | 4.1e-06<br>(4.9e-06)  | -2.6e-08<br>(9.9e-06) | -2.4e-07<br>(9.9e-06) |
| Constant             | -0.0097<br>(0.81)     | 0.092<br>(0.81)       | -1.17<br>(1.55)       | -1.20<br>(1.55)       |
| 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         | 1,538                 | 1,538                 | 330                   | 330                   |
| Pseudo $R^2$         | 9%                    | 9%                    | 10%                   | 9%                    |

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 period 2011-2014. 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) 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 for securities issued from 2011-2014. 2) \* Denotes too few observations (fewer than 60) to estimate reliably.

Table 7: Effect of Entrants' Market Shares on Incumbent Ratings

|                       | (1)                       | (2)         | (3)          | (4)                         | (5)                             | (6)                            |
|-----------------------|---------------------------|-------------|--------------|-----------------------------|---------------------------------|--------------------------------|
|                       | <i>avgratingincumbent</i> |             |              | <i>numeric<sub>sp</sub></i> | <i>numeric<sub>moodys</sub></i> | <i>numeric<sub>fitch</sub></i> |
|                       | OLS                       | Ord. Probit | Pred. Shares |                             |                                 |                                |
| <i>entrant1share</i>  | 4.37*                     | 2.74*       |              | 7.91***                     | 5.07                            | 7.80**                         |
|                       | (2.43)                    | (1.40)      |              | (2.47)                      | (4.12)                          | (2.89)                         |
| <i>entrant2share</i>  | 3.50***                   | 1.89***     |              | 2.71*                       | 7.02*                           | 4.82*                          |
|                       | (1.06)                    | (0.62)      |              | (1.34)                      | (3.27)                          | (2.32)                         |
| <i>pentrant1share</i> |                           |             | 2.18         |                             |                                 |                                |
|                       |                           |             | (4.83)       |                             |                                 |                                |
| <i>pentrant2share</i> |                           |             | 2.10**       |                             |                                 |                                |
|                       |                           |             | (0.75)       |                             |                                 |                                |
| <i>tranchesize</i>    | 0.0032**                  | 0.013***    | 0.0031**     | 0.0041**                    | 0.0018                          | 0.0024                         |
|                       | (0.0013)                  | (0.0052)    | (0.0013)     | (0.0016)                    | (0.0013)                        | (0.0019)                       |
| <i>subordination</i>  | 0.33***                   | 0.17***     | 0.33***      | 0.24***                     | 0.37***                         | 0.40***                        |
|                       | (0.058)                   | (0.043)     | (0.057)      | (0.035)                     | (0.048)                         | (0.054)                        |
| <i>floater</i>        | 0.37                      | 0.45        | 0.25         | 0.99                        | 0.13                            | 0.42                           |
|                       | (0.38)                    | (0.39)      | (0.41)       | (0.59)                      | (0.49)                          | (0.72)                         |
| <i>variable</i>       | -0.41                     | -0.20       | -0.39        | -1.01**                     | -0.36                           | 0.21                           |
|                       | (0.59)                    | (0.20)      | (0.59)       | (0.46)                      | (0.54)                          | (0.60)                         |
| <i>waltv</i>          | -0.14***                  | -0.091***   | -0.13***     | -0.091*                     | -0.20***                        | -0.14***                       |
|                       | (0.026)                   | (0.022)     | (0.028)      | (0.049)                     | (0.047)                         | (0.031)                        |
| <i>wadscr</i>         | 0.14                      | 0.056       | 0.20         | 0.58***                     | -0.18                           | -0.17                          |
|                       | (0.14)                    | (0.066)     | (0.16)       | (0.10)                      | (0.12)                          | (0.53)                         |
| <i>wam</i>            | 0.032***                  | 0.022***    | 0.029***     | 0.045***                    | 0.041***                        | -0.0024                        |
|                       | (0.0054)                  | (0.0043)    | (0.0054)     | (0.011)                     | (0.0061)                        | (0.010)                        |
| <i>sponsortot</i>     | 0.000015                  | 5.7e-06     | 0.000014     | 0.000013                    | 0.000023**                      | 2.5e-06                        |
|                       | (9.7e-06)                 | (8.5e-06)   | (0.000010)   | (0.000019)                  | (7.6e-06)                       | (0.000014)                     |
| <i>newmonth</i>       | -0.092                    | 0.079       | -0.12        | 0.69**                      | -0.41***                        | -0.22                          |
|                       | (0.13)                    | (0.083)     | (0.13)       | (0.29)                      | (0.13)                          | (0.17)                         |
| <i>newmonthsq</i>     | 0.00059                   | -0.0012     | 0.00092      | -0.0068**                   | 0.0044***                       | 0.0018                         |
|                       | (0.0014)                  | (0.00094)   | (0.0013)     | (0.0027)                    | (0.0013)                        | (0.0017)                       |
| Constant              | 15.7***                   |             | 14.2***      | 6.13*                       | 21.0***                         | 20.4***                        |
|                       | (1.64)                    |             | (1.77)       | (3.30)                      | (3.92)                          | (3.31)                         |
| Observations          | 1,610                     | 1,610       | 1,610        | 504                         | 1,143                           | 1,022                          |
| Year of Issue FEs     | Yes                       | Yes         | Yes          | Yes                         | Yes                             | Yes                            |
| Deal Type FEs         | Yes                       | Yes         | Yes          | Yes                         | Yes                             | Yes                            |
| Geog. Controls        | Yes                       | Yes         | Yes          | Yes                         | Yes                             | Yes                            |
| Prop. Type Controls   | Yes                       | Yes         | Yes          | Yes                         | Yes                             | Yes                            |
| WAL Controls          | Yes                       | Yes         | Yes          | Yes                         | Yes                             | Yes                            |
| Std. Errors Clustered | Yes                       | Yes         | Yes          | Yes                         | Yes                             | Yes                            |
| $R^2$                 | 79%                       |             | 79%          | 81%                         | 81%                             | 82%                            |
| Pseudo- $R^2$         |                           | 38%         |              |                             |                                 |                                |

Notes: 1) Dependent variable in columns (1)-(3) is the average rating of the security by incumbent CRAs. 2) Dependent variable in columns (4)-(6) is the rating of the security by each of the main incumbent CRAs. 3) *pentrant1share* and *pentrant2share* are the predicted entrant market shares as described in the text; see the appendix for the results of the first stage. 4) Standard errors, clustered by dealtype-year, are in parentheses. 5) \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , and \* $p < 0.1$ . 6) Data includes all non-IO tranches of CMBS deals issued January 2009 through June 2014 excluding ReREMICS and CDOs. 7) See Table 1 for variable definitions.

Table 8: Entrants' Market Shares and Subordination of Tranches Rated AAA by an Incumbent

|                       | (1)                     | (2)                     | (3)                     | (4)                     | (5)                     | (6)                     |
|-----------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|                       |                         | OLS                     |                         |                         | Predicted Shares        |                         |
| <i>entrant1share</i>  | -8.97<br>(7.13)         | -8.85<br>(7.04)         | -8.92<br>(7.07)         |                         |                         |                         |
| <i>entrant2share</i>  | -9.79***<br>(3.09)      | -9.66***<br>(3.12)      | -9.76***<br>(3.13)      |                         |                         |                         |
| <i>pentrant1share</i> |                         |                         |                         | 2.31<br>(11.9)          | 2.16<br>(12.0)          | 2.35<br>(12.0)          |
| <i>pentrant2share</i> |                         |                         |                         | -6.86***<br>(1.75)      | -6.80***<br>(1.80)      | -6.87***<br>(1.81)      |
| <i>dealshop1</i>      |                         | -0.41*<br>(0.21)        |                         |                         | -0.39*<br>(0.20)        |                         |
| <i>dealshop2</i>      |                         |                         | -0.15<br>(0.32)         |                         |                         | -0.15<br>(0.33)         |
| <i>trancheshop</i>    |                         | -0.042<br>(0.19)        | -0.013<br>(0.18)        |                         | -0.0067<br>(0.19)       | 0.022<br>(0.18)         |
| <i>tranchesize</i>    | 0.0045*<br>(0.0021)     | 0.0044*<br>(0.0021)     | 0.0045*<br>(0.0021)     | 0.0046**<br>(0.0020)    | 0.0046**<br>(0.0020)    | 0.0046**<br>(0.0020)    |
| <i>floater</i>        | 0.81<br>(1.22)          | 0.80<br>(1.22)          | 0.82<br>(1.22)          | 0.89<br>(1.28)          | 0.87<br>(1.27)          | 0.90<br>(1.27)          |
| <i>variable</i>       | -2.79***<br>(0.44)      | -2.78***<br>(0.44)      | -2.77***<br>(0.45)      | -2.77***<br>(0.43)      | -2.76***<br>(0.43)      | -2.75***<br>(0.44)      |
| <i>waltv</i>          | 0.24**<br>(0.082)       | 0.23**<br>(0.081)       | 0.24**<br>(0.081)       | 0.22**<br>(0.082)       | 0.22**<br>(0.081)       | 0.22**<br>(0.081)       |
| <i>wadscr</i>         | 0.063<br>(0.22)         | 0.060<br>(0.21)         | 0.053<br>(0.21)         | -0.044<br>(0.27)        | -0.044<br>(0.27)        | -0.052<br>(0.27)        |
| <i>wam</i>            | -0.044***<br>(0.011)    | -0.045***<br>(0.012)    | -0.045***<br>(0.011)    | -0.040***<br>(0.0093)   | -0.041***<br>(0.0099)   | -0.040***<br>(0.0096)   |
| <i>sponsortot</i>     | -0.000023<br>(0.000019) | -0.000022<br>(0.000019) | -0.000022<br>(0.000018) | -0.000018<br>(0.000019) | -0.000017<br>(0.000019) | -0.000017<br>(0.000019) |
| <i>newmonth</i>       | 1.49<br>(0.85)          | 1.49<br>(0.85)          | 1.49<br>(0.85)          | 1.57*<br>(0.83)         | 1.56*<br>(0.83)         | 1.56*<br>(0.83)         |
| <i>newmonthsq</i>     | -0.013<br>(0.0079)      | -0.013<br>(0.0079)      | -0.013<br>(0.0079)      | -0.014*<br>(0.0077)     | -0.014*<br>(0.0077)     | -0.014*<br>(0.0077)     |
| <i>Constant</i>       | -9.13<br>(9.64)         | -8.87<br>(9.65)         | -8.97<br>(9.66)         | -5.27<br>(9.47)         | -5.10<br>(9.50)         | -5.15<br>(9.48)         |
| Observations          | 766                     | 766                     | 766                     | 766                     | 766                     | 766                     |
| $R^2$                 | 74%                     | 74%                     | 74%                     | 75%                     | 75%                     | 75%                     |
| Year of Issue FEs     | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     |
| Deal Type FEs         | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     |
| Geog. Controls        | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     |
| Prop. Type Controls   | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     |
| WAL Controls          | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     |
| Std. Errors Clustered | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     | Yes                     |

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, clustered by dealtype-year 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 9: 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   |
| <i>dealshop1</i> | 5.6%         | 0.0%      | 6.3%         | 9.8%           | 2.8%         |
| <i>dealshop2</i> | 24.4%        | 12.5%     | 25.9%        | 40.6%          | 13.8%        |

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.

Table 10: Shopping and the Change in Incumbent Ratings

|                       | (1)       | (2)        | (3)        | (4)        | (5)              | (6)        |
|-----------------------|-----------|------------|------------|------------|------------------|------------|
|                       |           | OLS        |            |            | Predicted Shares |            |
| <i>entrant1share</i>  | 4.37*     | 3.87       | 3.91*      |            |                  |            |
|                       | (2.43)    | (2.19)     | (2.19)     |            |                  |            |
| <i>entrant2share</i>  | 3.50***   | 2.76**     | 2.80**     |            |                  |            |
|                       | (1.06)    | (1.00)     | (1.02)     |            |                  |            |
| <i>pentrant1share</i> |           |            |            | 2.18       | 2.83             | 2.73       |
|                       |           |            |            | (4.83)     | (4.62)           | (4.61)     |
| <i>pentrant2share</i> |           |            |            | 2.10**     | 1.66**           | 1.68**     |
|                       |           |            |            | (0.75)     | (0.73)           | (0.74)     |
| <i>dealshop1</i>      |           | 0.20**     |            |            | 0.21**           |            |
|                       |           | (0.073)    |            |            | (0.092)          |            |
| <i>dealshop2</i>      |           |            | -0.049     |            |                  | -0.032     |
|                       |           |            | (0.14)     |            |                  | (0.14)     |
| <i>trancheshop</i>    |           | 0.60**     | 0.61**     |            | 0.59**           | 0.59**     |
|                       |           | (0.26)     | (0.26)     |            | (0.25)           | (0.25)     |
| <i>tranchesize</i>    | 0.0032**  | 0.0032**   | 0.0032**   | 0.0031**   | 0.0031**         | 0.0031**   |
|                       | (0.0013)  | (0.0013)   | (0.0013)   | (0.0013)   | (0.0013)         | (0.0013)   |
| <i>subordination</i>  | 0.33***   | 0.32***    | 0.32***    | 0.33***    | 0.32***          | 0.32***    |
|                       | (0.058)   | (0.057)    | (0.057)    | (0.057)    | (0.056)          | (0.056)    |
| <i>floater</i>        | 0.37      | 0.52       | 0.51       | 0.25       | 0.40             | 0.39       |
|                       | (0.38)    | (0.44)     | (0.44)     | (0.41)     | (0.46)           | (0.45)     |
| <i>variable</i>       | -0.41     | -0.45      | -0.45      | -0.39      | -0.43            | -0.43      |
|                       | (0.59)    | (0.57)     | (0.57)     | (0.59)     | (0.56)           | (0.56)     |
| <i>waltv</i>          | -0.14***  | -0.13***   | -0.13***   | -0.13***   | -0.12***         | -0.12***   |
|                       | (0.026)   | (0.024)    | (0.025)    | (0.028)    | (0.026)          | (0.026)    |
| <i>wadscr</i>         | 0.14      | 0.17       | 0.16       | 0.20       | 0.23             | 0.22       |
|                       | (0.14)    | (0.13)     | (0.13)     | (0.16)     | (0.15)           | (0.15)     |
| <i>wam</i>            | 0.032***  | 0.030***   | 0.030***   | 0.029***   | 0.028***         | 0.028***   |
|                       | (0.0054)  | (0.0055)   | (0.0057)   | (0.0054)   | (0.0055)         | (0.0057)   |
| <i>sponsortot</i>     | 0.000015  | 0.000012   | 0.000013   | 0.000014   | 0.000011         | 0.000012   |
|                       | (9.7e-06) | (0.000011) | (0.000011) | (0.000010) | (0.000011)       | (0.000011) |
| <i>newmonth</i>       | -0.092    | -0.14      | -0.14      | -0.12      | -0.17            | -0.17      |
|                       | (0.13)    | (0.13)     | (0.12)     | (0.13)     | (0.12)           | (0.12)     |
| <i>newmonthsq</i>     | 0.00059   | 0.0010     | 0.0011     | 0.00092    | 0.0014           | 0.0014     |
|                       | (0.0014)  | (0.0013)   | (0.0013)   | (0.0013)   | (0.0012)         | (0.0012)   |
| Constant              | 15.7***   | 14.8***    | 14.9***    | 14.2***    | 13.6***          | 13.7***    |
|                       | (1.64)    | (1.47)     | (1.46)     | (1.77)     | (1.64)           | (1.63)     |
| Observations          | 1,610     | 1,610      | 1,610      | 1,610      | 1,610            | 1,610      |
| $R^2$                 | 79%       | 79%        | 79%        | 79%        | 80%              | 80%        |
| Year of Issue FEs     | Yes       | Yes        | Yes        | Yes        | Yes              | Yes        |
| Deal Type FEs         | Yes       | Yes        | Yes        | Yes        | Yes              | Yes        |
| Geog. Controls        | Yes       | Yes        | Yes        | Yes        | Yes              | Yes        |
| Prop. Type Controls   | Yes       | Yes        | Yes        | Yes        | Yes              | Yes        |
| WAL Controls          | Yes       | Yes        | Yes        | Yes        | Yes              | Yes        |
| Std. Errors Clustered | Yes       | Yes        | Yes        | Yes        | Yes              | Yes        |

Notes: 1) Dependent variable is the average rating of the security by incumbent CRAs. 2) *pentrant1share* and *pentrant2share* are the predicted entrant market shares as described in the text; see the appendix for the results of the first stage. 3) Standard errors, clustered by dealtype-year, 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: Effect of Entrants' Market Shares on Incumbent Ratings - IO Tranches

|                       | (1)                       | (2)                      | (3)                      | (4)                       | (5)                      | (6)                      |
|-----------------------|---------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|
|                       |                           | OLS                      |                          |                           | Predicted Shares         |                          |
| <i>entrant1share</i>  | 1.31<br>(3.05)            | -1.57<br>(2.02)          | -1.20<br>(2.09)          |                           |                          |                          |
| <i>entrant2share</i>  | 4.19**<br>(1.50)          | 1.46<br>(1.48)           | 1.73<br>(1.56)           |                           |                          |                          |
| <i>pentrant1share</i> |                           |                          |                          | -5.71<br>(5.57)           | -4.36<br>(4.44)          | -5.00<br>(4.21)          |
| <i>pentrant2share</i> |                           |                          |                          | 2.77***<br>(0.73)         | 1.35<br>(1.09)           | 1.46<br>(1.13)           |
| <i>dealshop1</i>      |                           | 0.77**<br>(0.29)         |                          |                           | 0.70**<br>(0.29)         |                          |
| <i>dealshop2</i>      |                           |                          | 0.0050<br>(0.33)         |                           |                          | -0.010<br>(0.32)         |
| <i>trancheshop</i>    |                           | 2.31***<br>(0.70)        | 2.29***<br>(0.67)        |                           | 2.29***<br>(0.72)        | 2.27***<br>(0.69)        |
| <i>floaters</i>       | 3.93<br>(4.18)            | 4.87<br>(4.69)           | 4.70<br>(4.79)           | 4.09<br>(3.91)            | 5.37<br>(4.51)           | 5.21<br>(4.59)           |
| <i>variable</i>       | 4.75**<br>(1.95)          | 3.45*<br>(1.65)          | 3.49*<br>(1.69)          | 4.76**<br>(1.94)          | 3.57*<br>(1.69)          | 3.61*<br>(1.72)          |
| <i>waltv</i>          | 0.023<br>(0.051)          | 0.043<br>(0.048)         | 0.042<br>(0.049)         | 0.027<br>(0.050)          | 0.045<br>(0.047)         | 0.044<br>(0.048)         |
| <i>wadscr</i>         | 0.20<br>(0.13)            | 0.38<br>(0.24)           | 0.37<br>(0.25)           | 0.23<br>(0.15)            | 0.41<br>(0.24)           | 0.39<br>(0.25)           |
| <i>wam</i>            | 0.030***<br>(0.0088)      | 0.021*<br>(0.010)        | 0.020*<br>(0.010)        | 0.028***<br>(0.0086)      | 0.019*<br>(0.0097)       | 0.019*<br>(0.0098)       |
| <i>sponsortot</i>     | -0.000046**<br>(0.000017) | -0.000043*<br>(0.000021) | -0.000043*<br>(0.000023) | -0.000048**<br>(0.000017) | -0.000044*<br>(0.000022) | -0.000043*<br>(0.000024) |
| <i>newmonth</i>       | 0.042<br>(0.13)           | -0.19<br>(0.18)          | -0.19<br>(0.18)          | 0.041<br>(0.12)           | -0.16<br>(0.17)          | -0.16<br>(0.17)          |
| <i>newmonthsq</i>     | 0.00020<br>(0.0016)       | 0.0019<br>(0.0016)       | 0.0020<br>(0.0016)       | 0.00020<br>(0.0015)       | 0.0017<br>(0.0014)       | 0.0017<br>(0.0015)       |
| Constant              | 3.10<br>(4.89)            | 3.76<br>(6.25)           | 3.81<br>(6.32)           | 1.81<br>(4.81)            | 3.18<br>(6.24)           | 3.10<br>(6.26)           |
| Observations          | 349                       | 349                      | 349                      | 349                       | 349                      | 349                      |
| $R^2$                 | 22%                       | 34%                      | 34%                      | 22%                       | 34%                      | 33%                      |
| Year of Issue FEs     | Yes                       | Yes                      | Yes                      | Yes                       | Yes                      | Yes                      |
| Deal Type FEs         | Yes                       | Yes                      | Yes                      | Yes                       | Yes                      | Yes                      |
| Geog. Controls        | Yes                       | Yes                      | Yes                      | Yes                       | Yes                      | Yes                      |
| Prop. Type Controls   | Yes                       | Yes                      | Yes                      | Yes                       | Yes                      | Yes                      |
| Std. Errors Clustered | Yes                       | Yes                      | Yes                      | Yes                       | Yes                      | Yes                      |

Notes: 1) Dependent variable is the average rating of the security by incumbent CRAs. 2) *pentrant1share* and *pentrant2share* are the predicted entrant market shares as described in the text; see table above for results of the first stage. 3) Standard errors, clustered by dealtype-year, are in parentheses. 4) \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , and \* $p < 0.1$ . 5) Data includes all IO tranches of CMBS deals issued January 2009 through June 2014 excluding ReREMICS and CDOs. 6) See Table 1 for variable definitions.

Figure 1: Share of Securities Rated by CRAs over Time

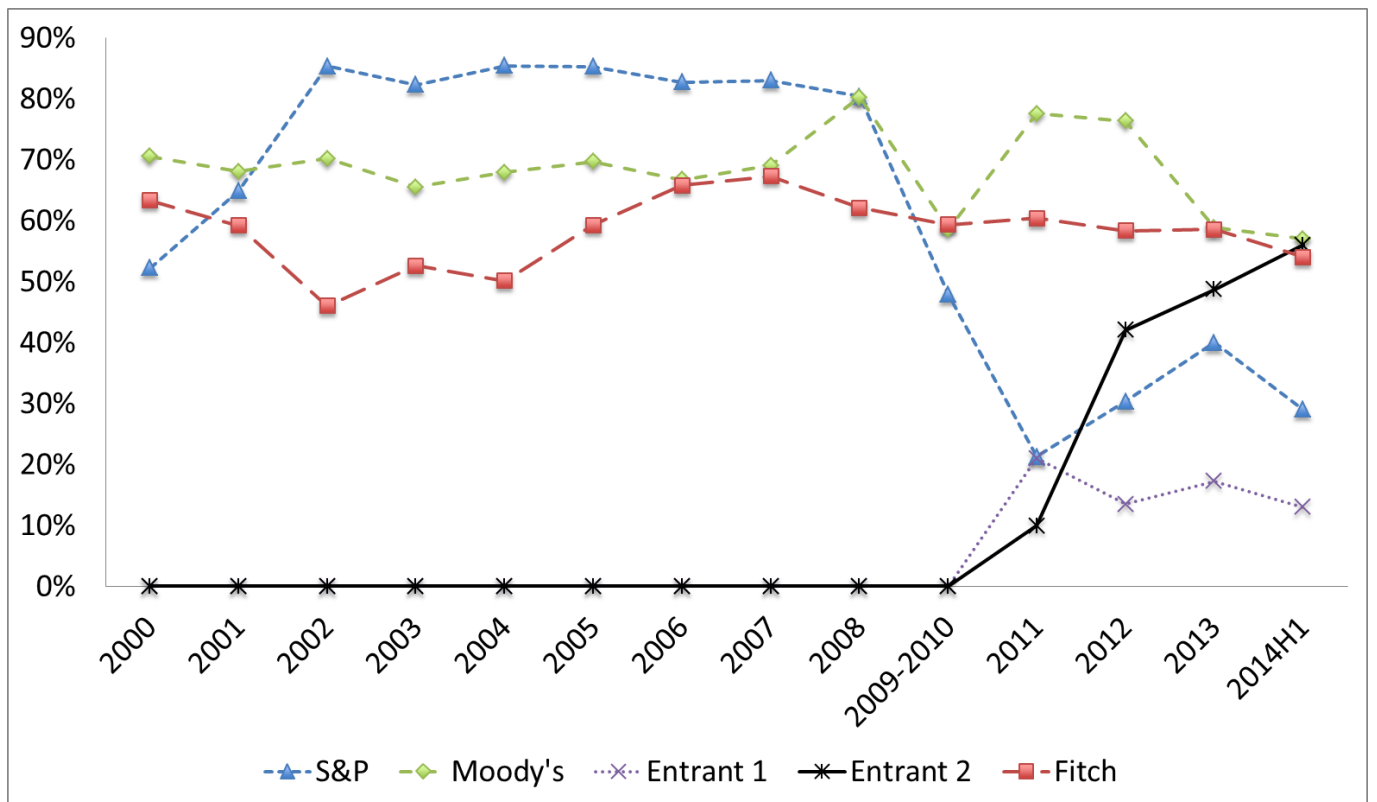
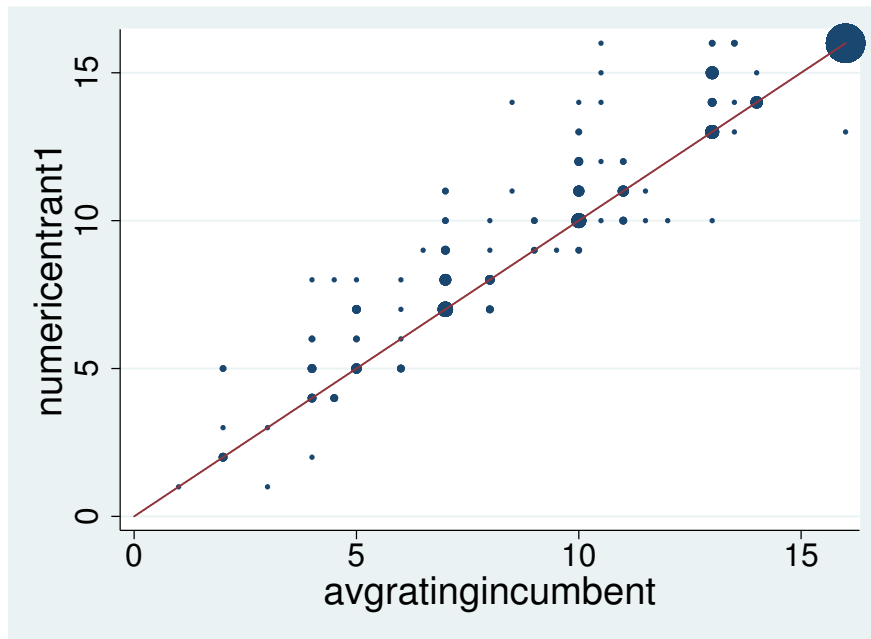
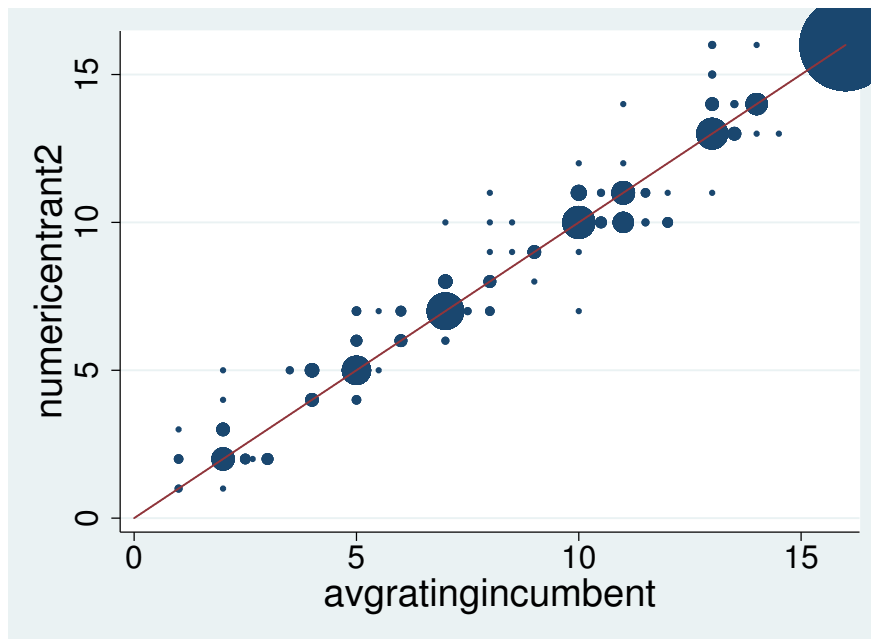


Figure 2: Entrants vs. Incumbent CRAs Average Ratings on non-IO Securities



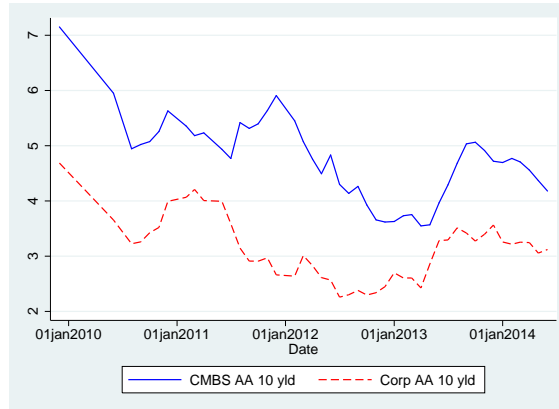
(a) Entrant 1



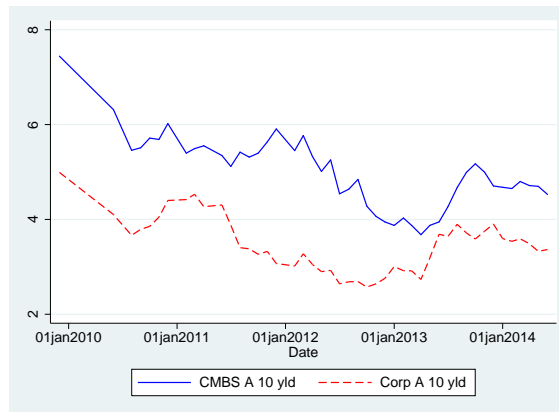
(b) Entrant 2

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.

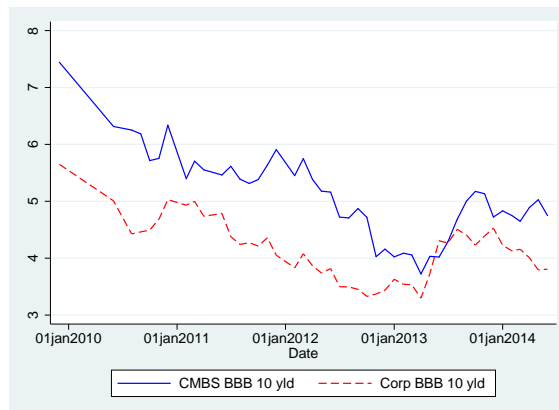
Figure 3: Interest Rates on CMBS vs. Corporates



(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 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

$$cpnspread_{i,j,t} = \alpha_0 + \alpha_1 AAAentrantonly_{i,j,t} + \alpha'_x Controls_{i,j,t} + \epsilon_{i,j,t} \quad (9)$$

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

$$cpnspread_{i,j,t} = \beta_0 + \beta_1 AAAtwowithentrant_{i,j,t} + \beta'_x Controls_{i,j,t} + \epsilon_{i,j,t} \quad (10)$$

on the set of securities rated by exactly two CRAs where both ratings are *AAA*. In equation (9), *AAAentrantonly* takes a value of 1 if only an entrant rates it *AAA*. In equation (10), *AAAtwowithentrant* takes a value of 1 if at least one of the two *AAA* ratings is from an entrant. *cpnspread*<sub>*i,j,t*</sub> is 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.<sup>21</sup>

In equations (9) and (10), *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

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<sup>21</sup>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.

do not treat ratings from entrants and incumbents equally.

Column 1 of Table A.1 contains the results of estimating (9) 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 (9) 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 A.1 present the findings from estimating (10) 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 (10) 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 A.1: AAA Yields and Securities Rated AAA by Entrants

|                          | (1)                       | (2)                       | (3)                      | (4)                      |
|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|
| <i>AAAentrantonly</i>    | 0.18<br>(0.24)            | 0.39<br>(0.31)            |                          |                          |
| <i>AAAtwowithentrant</i> |                           |                           | 0.19<br>(0.12)           | 0.23*<br>(0.12)          |
| <i>tranchesize</i>       | -0.00044***<br>(0.000092) | -0.00039***<br>(0.000088) | -0.00052***<br>(0.00019) | -0.00055***<br>(0.00018) |
| <i>subordination</i>     | -0.011***<br>(0.0034)     | -0.0088**<br>(0.0035)     | -0.0061<br>(0.0065)      | 0.00083<br>(0.0064)      |
| <i>floater</i>           | 0.023<br>(0.13)           |                           | 0.036<br>(0.40)          |                          |
| <i>variable</i>          | 0.34***<br>(0.045)        |                           | 0.38***<br>(0.11)        |                          |
| <i>wal3to5</i>           | 0.46***<br>(0.043)        | 0.57***<br>(0.040)        | 0.40***<br>(0.096)       | 0.60***<br>(0.090)       |
| <i>wal5to7</i>           | 0.64***<br>(0.054)        | 0.66***<br>(0.049)        | 0.66***<br>(0.13)        | 0.74***<br>(0.12)        |
| <i>walover7</i>          | 0.62***<br>(0.039)        | 0.66***<br>(0.035)        | 0.60***<br>(0.087)       | 0.72***<br>(0.079)       |
| <i>waltv</i>             | 0.0100**<br>(0.0040)      | 0.0017<br>(0.0045)        | 0.0034<br>(0.0080)       | -0.0046<br>(0.0098)      |
| <i>wadscr</i>            | -0.036<br>(0.034)         | -0.13**<br>(0.054)        | -0.10<br>(0.061)         | -0.23<br>(0.16)          |
| <i>wam</i>               | 0.0011<br>(0.0012)        | 0.00050<br>(0.0011)       | 0.0012<br>(0.0030)       | 0.00010<br>(0.0027)      |
| <i>sponsortot</i>        | -2.6e-06<br>(1.8e-06)     | -5.0e-07<br>(1.9e-06)     | -3.5e-06<br>(4.4e-06)    | -3.4e-06<br>(4.9e-06)    |
| Constant                 | 0.95**<br>(0.38)          | 1.59***<br>(0.43)         | 1.47*<br>(0.80)          | 1.67*<br>(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 ReREMICS 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.

## B Additional Empirical Results

### B.1 Additional Results for Estimation of Effect of Entrant Shares on Incumbent Ratings

Table B.1: First Stage Probit Estimation for Predicted Entrant Market Shares Approach

|                     | (1)                     | (2)                     |
|---------------------|-------------------------|-------------------------|
|                     | <i>ratedentrant1</i>    | <i>ratedentrant2</i>    |
| <i>floater</i>      | -0.81***<br>(0.17)      | 0.19<br>(0.15)          |
| <i>variable</i>     | -0.031<br>(0.084)       | -0.067<br>(0.068)       |
| <i>IO</i>           | -0.14<br>(0.11)         | -0.019<br>(0.091)       |
| <i>posterisa</i>    | 0.84***<br>(0.16)       | 0.20*<br>(0.12)         |
| <i>entrant2out</i>  | 1.05***<br>(0.15)       | -0.73***<br>(0.21)      |
| <i>newmonth</i>     | 0.084***<br>(0.025)     | 0.26***<br>(0.029)      |
| <i>newmonthsq</i>   | -0.0011***<br>(0.00031) | -0.0023***<br>(0.00032) |
| Constant            | -3.79***<br>(0.57)      | -7.08***<br>(0.69)      |
| Observations        | 2,178                   | 2,178                   |
| Year of Issue FEs   | No                      | No                      |
| Deal Type FEs       | Yes                     | Yes                     |
| Geog. Controls      | Yes                     | Yes                     |
| Prop. Type Controls | Yes                     | Yes                     |
| Pseudo R-squared    | 15%                     | 19%                     |

Notes: 1) Dependent variable in columns 1 and 2 takes a value of 1 if entrant 1 or entrant 2 rates the security, respectively. 2) Standard errors are in parentheses. 3) \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , and \* $p < 0.1$ . 5) Data includes tranches of CMBS deals issued January 2009 through June 2014 excluding ReREMICS and CDOs. 4) See Table 1 for variable definitions.



## B.2 Security Performance

Tables B.2 and B.3 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 B.2 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 B.3 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 B.2: 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 B.3: 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.

### B.3 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<sup>22</sup> 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.<sup>23</sup>

Tables B.4 and B.5 report deal-level summary statistics for these measures, by year of issuance.<sup>24</sup> 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 B.4: 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.

<sup>22</sup>For the vast majority of securities this is May 2014 or later.

<sup>23</sup>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.

<sup>24</sup>We winsorize at the 99% level due to a single large outlier.

Table B.5: 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.