How Competition Lowers Credit Rating Standards*

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Abstract

We analyze the effects of the entry into structured finance products of new credit rating agencies on the rigor of ratings. Our setting is unique as we study a period in which the incumbents' reputation in these assets was extremely poor and the benefit of more fee income from inflating ratings was low. We find that entrants issue systematically higher ratings and that their market share increases substantially while following this strategy. Furthermore, through a combination of rating catering and shopping, ratings by incumbents become more generous as the entrants increase their market share in a product type.

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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. Ratings were misleading about the quality of residential mortgage-backed securities (RMBS) in particular and other structured finance classes more generally. As many investors in structured finance invest primarily in securities perceived to be information insensitive, and thus rely heavily on credit ratings, the collapse in trading and issuance of structured products during the crisis is likely related to investors' loss of the ability to trust ratings.[1]

Given the central role that the CRAs play in financial markets, several commentators including the SEC (2011, 2012) have suggested that one way to improve credit ratings is to enable greater competition. Indeed, in the spring of 2012, European regulators implemented a framework to increase competition between CRAs (Kanter (2012)). To further our understanding of how firms compete in the CRA market and the effects of competition on ratings, we study the entry of two firms into the CRA market. The entrants compete in ratings for a particular type of structured finance product, commercial mortgage-backed securities (CMBS). Given the upheaval in the structured finance market in recent years, and the significant loss of reputation incumbent CRAs suffered in the structured finance market, there may have been a unique opportunity for a new entrant with rigorous ratings standards

[1]See Hanson and Sunderam (2013) for a model of the role of information insensitive securities in the collapse of securitization markets.

to succeed.

We find that the entrants issue systematically higher ratings, often by several notches, than established CRAs. The entrants' average ratings are higher than each of the three main incumbents, and when entrants and incumbents rate the same security, both entrants rate higher, indicating that entrants ratings are not higher due to unobserved heterogeneity in the quality of the securities. The relatively higher ratings of the entrants are especially pronounced for interest-only (IO) tranches.

We consider whether the entrants rate systematically higher than the incumbents because the entrants only rate securities that the incumbents rate low but the data do not support that explanation. Nor do we 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. We also do not find that entrants are more likely to rate securities from less reputable deal underwriters.

Rather, issuers only solicit entrant ratings when they expect the entrants to rate higher than or equivalent to the incumbents, which is consistent with the entrants issuing higher ratings in order to win business. In particular, the entrants are much more likely to rate a security AAA than the incumbents. While assessing performance in structured finance takes much longer than other asset classes, yields on CMBS that incumbents rate below AAA are 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 CMBS ratings. We find some tentative evidence that investors may perceive AAA ratings from entrants to be riskier than AAA ratings from incumbents.

By the end of our sample (June 2014), more than 60% of newly issued CMBS are rated by at least one entrant. The entrant that gains significant market share rates more than half of all CMBS by June 2014, which is more than incumbent S&P. The other, more generous entrant's market share stagnates at roughly 20% of new issues, however. The entrants' ratings are often supplemental to those of the incumbents as the total number of ratings is

higher when an entrant rates an issue. The market share of the most conservative incumbent, S&P, declines substantially, however. Although S&P had lost some market share in the 2009-2010 period, perhaps because of a methodology change in 2009, it rates less than 30% of securities the year the entrants enter. That is, the incumbent who, on the same issues, has the largest gap between its ratings and those of the entrants rates substantially fewer issues after the entrants come in relative to its market share in the 2000-2010 period.

Using a difference-in-difference approach, we further find that the entrants' more generous ratings affect the rigor of the incumbents' ratings. Our main variable of interest is the entrants' yearly share of security ratings in CMBS subtypes. By simultaneously controlling for the year of issuance and the subtype, we are not capturing merely that CMBS ratings became more lax over time, or that some subtypes are rated more leniently. We find that as the entrants' market share increases, the ratings assigned by incumbent CRAs are more favorable from the perspective of the issuer. A 10 percentage point increase in the share of securities rated by an entrant raises the average incumbent rating by between 0.3 and 0.5 grades. As the entrants' combined market share increases to 62% over our sample period, this represents an economically meaningful increase in the favorability of ratings by incumbents. We also find that an increase in the entrants' share lowers the level of subordination, a key measure of credit support for structured finance, for securities rated AAA by at least one incumbent.

In contrast to the corporate bond market that Becker and Milbourn (2011) study, the finding that the ratings of the incumbents increase in the entrants' market share could be due to rating shopping on the part of issuers, rating catering on the part of the CRAs, or a combination of both. Rating shopping occurs when issuers solicit multiple ratings in an attempt to find the most favorable ones. Rating catering refers to the CRAs courting business by using laxer standards. Theoretical work shows that competition always exacerbates shopping and often exacerbates catering. As Becker and Milbourn (2011) emphasize, in the corporate bond market incumbents S&P and Moody's had virtually 100% market share,

implying little room for shopping. We show that no one agency had close to 100% market share in the CMBS market, thus leaving scope for issuers to shop.

We find evidence that the increase in incumbent ratings is partly due to both channels. To distinguish the two, we augment our analysis of the incumbents' response to changes in the entrants' market shares with the total number of ratings a security receives to proxy for rating shopping. When added to the regressions, the number of ratings has a positive and strongly significant effect on the average incumbent rating, and it causes the coefficients on the entrants' shares to decline in magnitude and become insignificant in the IO sample. Despite the particularly generous ratings of IO tranches from the incumbents, we find strong support for shopping and little evidence in favor of catering for this subsample. The IOs have noisier ratings than the non-IO tranches (i.e., security characteristics explain only a small portion of the variance in their ratings), so this result suggests there may be greater benefit to shopping in securities that are more complicated to rate.

In contrast to the results for the average incumbent rating, our regressions for the level of credit support for AAA securities suggest that rating catering is the main channel. The coefficient on the number of ratings is statistically insignificant, but the coefficients on the entrants' market shares remain of similar magnitude and statistical significance after including the number of ratings.

Catering and shopping are thus both important channels through which increased competition can lead to less rigorous ratings. This finding is important because it indicates that both problems must be solved for competition to improve the quality of ratings. Although policies to mitigate the rating shopping problem such as disclosure requirements (see, e.g., Sangiorgi and Spatt (2013)) or a limit on the number of ratings an issuer can seek may improve the quality of ratings, our results show that solving the rating shopping problem is not a sufficient condition for greater competition to improve the quality of ratings.

The presence of catering is consistent with the empirical results of Griffin, Nickerson, and Tang (2013), who, although they do not examine the effect of entry, find that competition

among CRAs leads to ratings inflation in the collateralized debt obligation (CDO) market. Our results are also related to a number of recent empirical papers on ratings quality. In particular, they are consistent with those of Becker and Milbourn (2011), who study the corporate bond market. However, as we explain in the next section, our setting contrasts with that of Becker and Milbourn (2011) in that there is a unique opportunity for competition to improve ratings. Additionally, we find that the increase in incumbent ratings from competition is larger in structured finance than what Becker and Milbourn (2011) report for corporate bonds.

The finding that entrants cater to issuers and, in part, that competition leads to more lax and inflated ratings, is a result of the issuer-pays fee scheme used by our sample of CRAs.[2] Our paper thus also contributes to the literature documenting the problems with this 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, and Strobl and Xia (2012) use the investor-paid CRA Egan-Jones to document that S&P's ratings are more inflated in situations in which they face a greater conflict of interest as a result of their issuer-pays business model. Similarly, Cornaggia and Cornaggia (2013) compare Moody's with investor-paid Rapid Ratings and find that the latter provides more timely and accurate ratings. Xia (2014) empirically shows that the entry of an investor-pays CRA improves the quality of ratings.

The remainder of the paper proceeds as follows. The next section explains theoretical predictions about the effect of competition on the rigor of 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] 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.

2 Background

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

That increased competition should lead to worse rating quality is not obvious from either a theoretical or empirical standpoint. Much of the theory (e.g., Bolton, Freixas, and Shapiro (2012), Camanho, Deb, and Liu (2012)) suggests that the effect of competition depends on the reputation of the incumbents. 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.

Give the unclear theoretical predictions, the effect of competition on ratings is an empirical question, but the empirical results to date are mixed. Becker and Milbourn (2011) and Cohen and Manuszak (2013) use data from prior to the financial crisis and find that increases in Fitch's market share are associated with more generous credit ratings. Similarly, Behr, Kisgen, and Taillard (2014) find that rating quality decreased after the SEC introduced a NRSRO certification process in 1975 that restricted competition. In contrast, Doherty, Kartasheva, and Phillips (2012) find that when S&P entered the insurance rating market it actually applied *stricter* rating standards than the incumbent A.M. Best.[3]

[3]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.

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

In contrast, rating catering arises when CRAs issue ratings that are higher than their private information dictates for the purpose of garnering more business. Unlike shopping, catering always implies some degree of rating inflation, and it is therefore a channel that is distinct from shopping. While Bolton, Freixas, and Shapiro (2012) and Sangiorgi and Spatt (2013) allow for the possibility of rating catering, to our knowledge only Camanho, Deb, and Liu (2012) have modeled the effect of competition with catering but with no possibility of shopping.

2.2 Our Setting

The work closest in spirit to our paper, Becker and Milbourn (2011). Becker and Milbourn also study an asset class and time period in which the incumbents' reputation was solid and the benefit to inflating ratings was high due to the size of the market. In contrast, our setting is one in which competition has the best chance of leading to higher quality ratings for two reasons.

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

in the model of Camanho, Deb, and Liu (2012).

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

We also analyze how the entrants compete and show clearly that they do so by being more generous, thus providing evidence of 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 structured finance. The magnitude of our point estimates regarding the effect of competition on incumbent ratings suggest that, indeed, competition may have even more deleterious effects in structured finance, and perhaps other similar asset classes, than in corporate bonds.

3 Data

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

We include all CMBS except ReREMIC deals, CDOs, or agency multi-family deals. ReREMICs are more akin to CDOs than traditional CMBS as they are resecuritizations of existing CMBS tranches. Because they are resecuritizations, they have very different struc-

tures from the other CMBS in our sample and Bloomberg does not provide data to control for the collateral quality in these deals. Furthermore, ReREMICs primarily include securities issued before the financial crisis making them difficult to compare with CMBS backed exclusively by collateral originated after the financial crisis. Bloomberg usually classifies multi-family deals backed by the Government Sponsored Entities (GSEs) as collateralized mortgage obligations (CMOs) such that there are few in our sample to begin with. However, we drop any deals that have agency-backed flags.

Table 1 summarizes the securities in our sample. Our sample contains 2,488 securities from 287 separate deals. A CRA often rates particular securities within a deal rather than every security within a deal. The average security is rated by at least 2 CRAs and some are rated by 4. Moody's and Fitch each rate more than half the securities, S&P rates a third, and Dominion Bond Ratings Service (DBRS) rates just over a quarter. Entrant 1 rates only 379 securities, whereas Entrant 2 rates 1,006, more than S&P. In total, more than half of the securities issued are rated by at least one entrant.

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

The size of the issues 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 trances) as missing for this variable. The mean size of a tranche is $165 million. 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. The mean level of subordination of a security in our sample is almost 20 percentage points. One security in our sample has 75 percentage points of subordination and some securities have no subordination at all. Because IO securities have no principal balance, they have no subordination.

The main measure of expected maturity in the CMBS market is the weighted average life (WAL) which Bloomberg provides in years. The WAL is calculated by projecting the principal repayment schedule and then calculating the number of years from issuance in which the average dollar of principal is paid off. It is similar to Macaulay's duration but includes only anticipated principal payments rather than scheduled principal and interest payments; see Davidson, Sanders, Wolff, and Ching (2003) for details. Because IO securities do not have a principal balance, they have no WAL. The WAL is calculated under particular assumptions about prepayment and default, and issuers usually provide a WAL in the prospectus supplement (Bloomberg populates its WAL field using these supplements). We use this measure to create categories of WAL: 13% of our securities have an expected WAL of less than 3 years, 15% have an expected WAL of 3 to 5 years, 7% have an expected WAL of 5 to 7 years, and the remainder have WALs of 7 years or more.

Previous studies on the effects of rating on yields typically use quarterly or monthly cross-sectional regressions of the yield or yield spread on rating indicators. A typical framework regresses the bond's spread to a comparable maturity treasury on a dummy variable indicating whether the bond is rated by the entrant or on the rating difference between the

entrant and the incumbents. The key feature of these studies (e.g., Kisgen and Strahan (2010) or Bongaerts, Cremers, and Goetzmann (2012)) is that they use a time series of bond yields and ratings and estimate many cross-sectional regressions.

The inability to access a time series of yields and/or spreads on CMBS makes it impossible to use such a cross-sectional approach. A time series of yields on individual CMBS is unavailable for two reasons. First, reporting requirements for structured products are much less standardized than for corporate bonds – there is nothing equivalent to TRACE for these asset classes with the exception of TBA agency securities since May 2011. As such, the vast majority of CMBS do not have current yield or spread information available in Bloomberg. Bloomberg has transactions prices for some of our tranches on some dates, primarily the senior tranches for dates near security issuance. For dates near security issuance, the security prices are extremely close to par making the spread a good measure of the return investors expected to earn.

The second challenge for getting a time series of yields for structured products is more fundamental than data disclosure requirements. Even were FINRA to disseminate the data it has collected on non-agency structured finance since May 2011, the majority of these products never trade after issuance.[4] Bessembinder, Maxwell, and Venkataraman (2013) report that only about 20% of structured products traded at all in the 21 month period from May 2011 to January 2013. While about half of corporate bonds also trade infrequently (see, for example, Edwards, Harris, and Piwowar (2007)), there is a far larger number of corporate bonds than CMBS.

We thus focus on estimating the effect of CRA entry on the yield at *issuance* of CMBS. Specifically, we use the initial coupon spread over comparable maturity Treasuries to proxy for the yield at issuance. To compute this spread, we use the WAL as the security's maturity

[4]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 onwards to three groups of researchers; see Atanasov and Merrick (2013), Bessembinder, Maxwell, and Venkataraman (2013), and Hollifield, Neklyudov, and Spatt (2013). Bloomberg contains modeled prices for many securities but average transactions prices for far fewer.

and subtract off the yield on a treasury of comparable maturity in the month the security is issued. The mean spread is 1.9 percentage points and the standard deviation of the spread is 1 percentage point.

The securities in our sample vary in the form of the coupons they pay and in their expected maturity. Floaters, which pay a constant fixed spread to one month LIBOR, comprise 13% of our sample. An additional 47% are variable rate securities other than floaters, and the remaining 40% are fixed rate.

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. On average, 32% of the loans in a pool are collateralized by retail property, 20% by office property, 15% by hospitality property, and about 1% by 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. On average, about 16% of loans in a given pool were originated in the New York MSA. Los Angeles, Chicago, Miami, and Houston comprise 4.7%, 2.9%, 2.4%, and 1.5% of loans, respectively.

We have three additional variables that describe the collateral, all of which are measured at origination of the loans. The first variable is the weighted average loan-to-value (*waltv*) the mean of which is 60%. Second, we have 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. The mean of *wadscr* is 2.2 and the minimum is 1.2. Third, we have the weighted average maturity (*wam*) of the loans backing the security. The mean *wam* is 96 months consistent with most commercial mortgages having terms of 7 to 10 years.

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.[5] We do so following the finding of He, Qian, and Strahan (2012) for the RMBS market that larger issuers often get more favorable ratings. The mean security is issued by an institution with $15 billion of annual CMBS issuance. There is substantial heterogeneity in annual issuance volume.

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 of deals.[6] The second category is large loan or single loans, which are deals backed by only a few or one large loan. 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.

[5]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.

[6]For more information about the institutional structure of the conduit/fusion CMBS market, see An, Deng, and Gabriel (2011).

4 The Entrants' Ratings

Both entrants are Nationally Recognized Statistical Rating Organization (NRSROs).[7] The first resulted from the acquisition of a small investor-paid NRSRO by a large investment advisory services firm that subsequently converted the entity to an issuer-pays model. The conversion occurred after its acquisition in March 2010 (SEC (2012)) and, because we are interested in studying issuer-paid ratings, we drop the small number of ratings (17 securities in total) by this entrant prior to its conversion. Entrant 1 also receives revenue from data services it provides to CMBS investors. Entrant 1 has plans to expand into the RMBS market and rated its first RMBS deal in late 2013 (Morningstar Credit Ratings, 2013). Entrant 1 provides corporate credit ratings as well but is not an NRSRO for corporate ratings.

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

Reflecting the belief that competition improves the quality of credit ratings, the SEC permitted both entrants to remain NRSROs, despite them deriving a large share of their CMBS rating revenue from a handful of issuers, because it was consistent with the SEC's

[7]See Beaver, Shakespeare, and Soliman (2006), Kisgen and Strahan (2010), Bongaerts, Cremers, and Goetzmann (2012), Bruno, Cornaggia, and Cornaggia (2013), and Opp, Opp, and Harris (2013) regarding the importance of certification for CRAs.

goal of enhancing competition (SEC (2011, 2012)). 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.[8] Through the first half of 2014, it rates 56% of CMBS, giving it the third largest market share in rating CMBS deals ahead of S&P. Given Entrant 2's forward momentum in gaining market share, it likely poses a greater threat to incumbent CRAs than Entrant 1.

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

The differences between both entrants' ratings and those of S&P, Moody's, and Fitch are all positive and statistically significant at the 1% level, indicating that the entrants rate the same security more generously. On average, Entrant 1 rates securities one grade higher than the three main incumbents, and these differences are statistically significant. There is no significant difference between Entrant 1's ratings and those of DBRS. Entrant 1 rates IO securities 3.1 grades higher than the average of the four main incumbents. It rates non-IO securities only 0.4 grades higher than the average of the incumbents although the difference is still highly statistically significant. Entrant 2 is somewhat less generous 1, although on average it still rates a security 0.4 grades higher than incumbents. The differences between Entrant 2's ratings and those of Fitch, Moody's, and S&P are positive and significant at

[8]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.

the 1% level. DBRS rates slightly higher, on average, than Entrant 2. Entrant 2's higher ratings than the incumbents are much more pronounced for IO tranches where it rates an average of 2.6 grades higher. It rates non-IOs only 0.04 grades higher on average although the difference is statistically significant at the 5% level. There is no obvious time series pattern to the differences in the differences in the ratings of the incumbents and the entrants over time. A table summarizing the rating differences over time is in an appendix available from the authors.

Figures 2 and 3 show that the differences in the ratings between the entrants and the incumbents are concentrated in the AAA tranches. The figures plot the average rating of the incumbents against the rating of the entrant for each security rated by both an entrant and an incumbent. If the entrant's ratings were similar to the incumbents', the dots would line up along the 45 degree line. If the differences between entrants and incumbents were simply a result of differences of opinion with the entrants not generally having a rosier view overall, we would observe the dots in Figures 2 and 3 randomly scattered around the 45 degree line. Consistent with the statistics in Table 4, however, the entrant's ratings are usually above the 45 degree line in both Figure 2 and Figure 3. In particular, the entrants frequently issue AAA ratings to securities that the three main incumbents give AA, A, or even BBB ratings. There are only two instances in which one of the three main incumbent CRAs issues a AAA rating to a security and the entrant rates it lower than AAA. The entrants do not win business on securities they would rate lower than the incumbents. As such, the entrants' dominant strategy is to rate higher as predicted by catering.

4.1 Selection or Catering?

We have shown that the difference between the entrants' and incumbents' ratings persist after controlling for security characteristics. It is possible, though, that such differences arise due to selection effects. To determine whether this is the case, we look at three possible types of selection. First, we consider whether the differences arise because issuers purchase

entrant ratings only after observing a low rating from one or more incumbents. Second, we examine whether the incumbents models are more precise than the entrants'. Third, we test whether entrants are more likely to rate issues from less reputable underwriting managers.

4.1.1 Selection due to low ratings from incumbents

It is possible that the difference arises 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 than the incumbents. If this is the case, the gap is not caused by any intent on the part of the entrants to gain business by rating lower than the incumbents.

To consider whether the gap is because incumbent ratings are low on securities that the entrants have the opportunity to rate, we estimate a model of predicted incumbent ratings and test whether an entrant is more likely to rate an issue if the incumbent rates low. That is, we first estimate

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

where i indexes the security, j indicates the deal type, and t indicates the year of issuance. The controls include dummies for the year of issue, deal type dummies, collateral characteristics, dummies for the coupon type (fixed rate, floating rate, or variable rate), and the *ex ante* WAL of the security in categories. We then generate predicted ratings for each security ($predictavgratingincumbent_{i,j,t}$) the incumbent rates and compute the "error" in average incumbent ratings:

$$avgincumerror_{i,j,t} = avgratingincumbent_{i,j,t} - predictavgratingincumbent_{i,j,t} \tag{2}$$

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 test whether a security is only rated by an entrant if the incumbent rates low based on unobservables by estimating

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

and

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

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

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

4.1.2 Are entrant ratings noisier?

Another potential reason that the entrants' ratings might *appear* systematically higher than the incumbents, even if the entrants do not necessarily *rate* systematically higher, is if the entrants have noisier rating models. One can imagine a situation in which the entrants issue

ratings that are less systematic than those of the incumbents and, in a tie breaker situation, the issuer chooses to purchase only the ratings from the entrant if they are greater than or equal to the incumbent. While this channel is not entirely distinct from catering, since it too implies that the entrants can only win business by rating higher than the incumbents, it implies a less deliberate strategy on the part of the entrants than simply having a methodology that results in 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 onwards when all five CRAs are active. We exclude year of issue dummies and the total amount of issuance of the sponsor in these estimations because the stated methodologies of the rating agencies are invariant to the year of issue and how much business the issuer has to offer the CRA. Table 6 presents the R^2s from these regressions. The R^2s are similar across CRAs indicating that the entrants ratings are similar in precision to those of the incumbents. Column 4 reports the results for IO securities. The R^2's are much lower for these securities. However, the fit of the model for Entrant 2 is not lower than the average fit of the model for the incumbents.

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

character. The results are also similar when we estimate the model separately by deal types for the October 2012 onwards subsample (not reported).

4.1.3 Do More or Less Reputable Deal Managers go to Entrants?

Doherty, Kartasheva, and Phillips (2012) find that, after S&P entered the insurance market, higher quality issuers solicited ratings from S&P. We examine whether there is a similar effect following entry into the CMBS market. We use downgrades to securities as a proxy for reputation to examine whether managers of deals that suffered more (or more severe) downgrades *prior* to the entrants becoming active are more inclined to seek entrant ratings on new securities, i.e., on securities they issued *after* entry.[9] To construct measures of reputation, we find all securities with rating changes from Moody's, S&P, and Fitch between 2007 and 2010, and select only those that were issued between 2000 and 2010. We further restrict this set of securities by choosing only those from managers that are active post-entry (2011-2014:Q2).

Our measures of reputation are based on the proportion of securities issued from 2000-2010 that were downgraded by the incumbents from 2007-2010. This is the same measure of reputation that Hartman-Glaser (2013) suggests based on his theoretical model. We use the proportion of securities, rather than the dollar amount of downgraded securities as a percentage of deal size, because Bloomberg often reports the size of IO securities as the total deal size.[10] Specifically, we examine five measures: (1) the percentage of securities downgraded by any incumbent; (2) the percentage of securities downgraded by two or more incumbents; (3) the percentage of securities downgraded by 7 or more notches (the mean downgrade size for all three incumbents is roughly 6.5 notches), which we refer to as a "severe" downgrade; (4) the percentage of securities downgraded from investment-grade to high yield by any incumbent; and (5), the percentage of securities downgraded from investment-grade to high yield by two or more incumbents. As such, we say that reputation

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

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

becomes "worse" as these measures become larger in size.

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

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

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

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

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

4.2 Market Valuation of Entrant Ratings

Given that the entrants are much more likely to issue AAA ratings, a natural question to ask is whether the market discounts these ratings. To test whether investors treat AAA ratings

from entrants and incumbents differently, we estimate

$$cpnspread_{i,j,t} = \alpha_0 + \alpha_1 AAAentrantonly_{i,j,t} + \alpha'_{\mathbf{x}} Controls_{i,j,t} + \epsilon_{i,j,t} \tag{7}$$

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

$$cpnspread_{i,j,t} = \beta_0 + \beta_1 AAAtwowithentrant_{i,j,t} + \beta'_{\mathbf{x}} Controls_{i,j,t} + \epsilon_{i,j,t} \tag{8}$$

on the set of securities rated by exactly two CRAs where both ratings are AAA. In equation (7), $AAAentrantonly$ takes a value of 1 if only an entrant rates it AAA. In equation (8), $AAAtwowithentrant$ takes a value of 1 if at least one of the two AAA ratings is from an entrant.

In equations (7) and (8), i indexes the security, j indicates the deal type, and t indicates the year of issuance. The controls include dummies for the year of issue, deal type dummies, collateral characteristics, dummies for the coupon type (fixed rate, floating rate, or variable rate), and the *ex ante* WAL of the security in categories. If investors perceive the entrants' ratings to be a less reliable indicator of quality than the incumbents', they will demand a higher return for an issue rated AAA by only an entrant ($AAAentrantonly = 1$). Similarly, if investors find incumbent ratings more credible than those of entrants, it will treat a security rated AAA by less than two incumbents ($AAAtwowithentrant = 1$) riskier than a security rated AAA by two incumbents. A finding that $\alpha_1 > 0$ or $\beta_1 > 0$ thus indicates that investors do not treat ratings from entrants and incumbents equally.

Column 1 of Table 8 contains the results of estimating (7) 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 (7) 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 8 present the findings from estimating (8) 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 (8) 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.

4.3 Are Entrant Ratings Substitutes for Incumbent Ratings?

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

Figure 1 shows that Moody's and Fitch do not seem to lose business as a result of the

entrants appearance. However, S&P's market share declines substantially relative to the period before 2008. As the gap between entrant and incumbent ratings is highest for S&P (see Table 4), the finding that it is only S&P that gets displaced by the entrants further supports that the entrants are able to win business by giving systematically higher ratings.

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

4.4 Are the Incumbents Excessively Conservative?

One possible explanation for the higher ratings of the entrants is that the incumbents are excessively conservative because of their experience in the financial crisis. 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, e.g., Coval, Jurek, and Stafford (2009)) that structured finance securities necessarily involve defaults more clustered in time than those on other kinds of bonds.

Thus far, the CMBS issued in our sample have performed too well to use the cross-section of performance of either the security or collateral to assess relative rating accuracy. Summary statistics regarding the performance of both the securities and the underlying collateral are in an appendix available from the authors. 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.[11] There are have also been few rating upgrades or downgrades by incumbent CRAs. Given that subprime and Alt-A RMBS deals issued in the subprime boom also performed well until at least mid-2006, it is difficult to conclude from the solid early performance that the securities are being rated too conservatively, however.

One way we can assess whether the non-IO securities that the incumbents rate below *AAA* are conservatively rated is by comparing the yields of CMBS with corporate bonds. Figure 4 shows that spreads on CMBS that the incumbents rate below *AAA* are almost uniformly higher than spreads on corporate bonds. This suggests that the market actually perceives these securities as riskier than corporate bonds of a given rating rather than that the incumbent CRAs are being too stringent.

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 respond to the threat or whether the issuers are issuers are able to shop more successfully when there are more CRAs. The incumbents may value their reputations enough that they ignore the competitive pressures, especially because the entrants compete only in structured finance products, which comprise a small fraction of the incumbents' overall business.

5.1 Identification Approach

To test whether entry into the CRA market affects incumbents' ratings, we exploit differences in the market share of the entrants over time and over subsegments of the CMBS market. As Table 3 illustrates, there is substantial variation in which types of CMBS the entrants

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

are active in. 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 over the business cycle in CMBS ratings and the fact that some CMBS types may be riskier than others.

We estimate

$$\begin{aligned} avgratingincumbent_{i,j,t} &= \alpha_0 + \alpha_1 entrant1share_{j,t} + \alpha_2 entrant2share_{j,t} \\ &+ \alpha'_{\mathbf{x}} Controls_{i,j,t} + \epsilon_{i,j,t} \end{aligned} \tag{9}$$

where 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.

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

The specification implied by (9) assumes the effect each independent variable has on incumbent ratings is the same along all notches. This may not be true, however, as ratings are ordinal in nature. For example, the entrants' market share may have more of an effect on whether an incumbent rates a security $AA+$ vs. AAA than on whether it rates a security $A+$ vs. $AA-$. We thus follow Becker and Milbourn (2011) in estimating (9) using both OLS and an ordered probit. The latter preserves the ranking of the different ratings but does not impose a linearity assumption.

Given our finding that most of the entrants' more lenient ratings are concentrated in the AAA tranches, as well as the importance of the AAA tranches for issuers more generally, we also examine whether the entrants altered the tranches that the incumbents rated AAA. In particular, we are interested in whether the entrants' propensity to rate tranches AAA

affected the level of subordination of the tranches that the incumbents rated AAA. We estimate

$$\begin{aligned} Subordination_{i,j,t}^{AAA} &= \beta_0 + \beta_1 entrant1 share_{j,t} + \beta_2 entrant2 share_{j,t} \\ &\quad + \alpha_{\mathbf{x}}' Controls_{i,j,t} + \epsilon_{i,j,t} \end{aligned} \tag{10}$$

In estimating (10), 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 $\beta_2 < 0$.

In our setting, the results from estimating equations (9) and (10) cannot distinguish between whether any change in the incumbents' ratings is due to catering or shopping. Theoretical work shows that incumbent ratings will certainly increase in response to competition if there is rating shopping and, often, rating catering is exacerbated by competition. To distinguish between whether any change in the number of ratings is due to rating catering or rating shopping, we augment equations (9) and (10) with the total number of ratings (*nratings*) the issue receives. The total number of ratings is a proxy for the degree of shopping with more ratings implying more shopping. While we cannot observe undisclosed rating shopping, our assumption is that the total number of ratings is correlated with the amount of undisclosed rating shopping. If, after controlling for the amount of shopping, $\alpha_1 > 0$ or $\alpha_2 > 0$, or $\beta_1 < 0$ or $\beta_2 < 0$, some of the decrease in the stringency in ratings is due to the CRAs catering to the issuers rather than the responses of the entrants to the greater capacity to shop for ratings.

5.2 Results

5.2.1 Average Incumbent Ratings

Table 9 presents the results from estimating 9 by OLS and by ordered probit on the non-IO securities. The coefficients on both entrants' share individually are statistically significant

at the 5% level when we cluster the standard errors by deal in both the OLS and ordered probit results. We cluster the standard errors by deal because there is likely correlation among ratings within a deal. The economic magnitude of the effect for non-IO tranches is such that a 10 percentage point increase in Entrant 2's market share raises the average incumbents' rating by roughly 0.3 grades. As Entrant 2 increased its overall market share from 0 to 56% (see Table 3), the effect is economically important since it implies an increase in average ratings by incumbents of more than one and a half grades. The magnitude of the coefficient on Entrant 1's share is slightly higher and implies that a 10 percentage point increase in market share results in a 0.5 grade higher average incumbent rating.

Table 10 presents the estimation effects of entry on incumbent IO ratings by OLS and by ordered probit. In Column 1, the coefficient on *entrant1share* is positive but far from statistically significant. The coefficient on *entrant2share* is positive and statistically significant at the 5% level in the OLS regressions (Column 1) and at the 10% level in the ordered probit regressions (Column 3). The economic magnitude is such that a 10% increase in Entrant 2's market share raises the average incumbent rating by half a grade.

The magnitudes of the effects are larger than those found by Becker and Milbourn (2011) in the corporate market, particularly for the IO securities. Becker and Milbourn find that an increase of 10 percentage points in entrant Fitch's market share raised incumbent ratings by 0.13 grades after controlling for year and industry fixed effects (the closest specification to ours given the differences between the markets). The larger response of incumbent ratings structured finance may be because issuers shop for ratings, and catering is likely more severe in this asset class because of the smaller number of issuers.

As expected, the level of subordination is strongly positively correlated with the average rating by the incumbents in Table 9: one additional percentage point is associated with an average rating of about 0.3 grades higher. Securities backed by loans with longer maturities have higher ratings, and an increase in the weighted average maturity of one year (12 months) increases the average rating by nearly 0.4 grades for the non-IO securities. Securities backed

by collateral with higher LTVs receive lower ratings in the non-IO sample, and larger tranches receive more favorable ratings.

5.2.2 Subordination for Securities Rated AAA by an Incumbent

Table 11 contains the results from estimating equation (10). Column 1 shows that, for tranches that at least one incumbent has rated AAA, a higher market share for Entrant 2 is associated with less subordination. A 10 percentage point increase in the market share of Entrant 2 lowers subordination by 0.75 percentage points, and this is statistically significant at the 5% level. The change in Entrant 2's overall market share from the beginning to the end of our sample thus reduced subordination by about 4 percentage points. To put this in perspective, the difference in the level of subordination for a security rated AAA on average vs. one rated $AA+$ on average is less than three percentage points. Entrant 1's share has a stronger effect on subordination, and it too is significant at the 5% level. In particular, a 10 percentage point increase in Entrant 1's market share lowers subordination by nearly a full percentage point.

Tranches with longer WALs have lower levels of subordination. Additionally, variable rate tranches actually have less subordination than fixed or floating rate tranches. Both of these results contrast with the effect of WAL and tranche type in the average rating regressions. Consistent with the results in Table 9, a higher average LTV requires more subordination for a AAA rating. The maturity of the underlying loans variable indicates that securities backed by collateral with longer maturities require less subordination, consistent with the effect of *wam* in Table 9.

5.2.3 Shopping or Catering?

Comparing the results for the non-IO securities in Table 9 when we do not include *nratings* (Columns 1 and 3) and when we include this variable (Columns 2 and 4) suggests that rating shopping is driving some of the inflation in incumbent ratings. The magnitude of the

coefficients on *entrant1share* and *entrant2share* fall when moving from Columns 1 and 3 to 2 and 4 in Table 9. The magnitude of catering is larger for Entrant 1, who is much more generous than Entrant 2 in its rating of non-IO securities relative to the incumbents. Thus, there is evidence for both shopping and catering in the non-IO sample.

In the IO sample in Table 10, none of the coefficients on the entrant shares are statistically significant after controlling for rating shopping. In contrast, the coefficient on *nratings* is highly significant in both the non-IO and the IO samples, and its magnitude is much larger in the IO sample. Adding *nratings* to the model increases the fit by about 50% in the IO sample, while it has little effect on the overall fit in the non-IO sample.

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

There is little evidence that rating shopping affects the subordination of the AAA tranches, however. In Table 11, the coefficients on *entrant1share* and *entrant2share* change little when *nratings* is added to the model. The coefficient on the number of ratings is positive, indicating that more rating shopping actually increases the amount of protection of the AAA tranches, but far from statistically significant.

6 Conclusions

We have studied the entry of two CRAs on the level of ratings in structured finance. The entrants issue almost uniformly higher ratings and, in particular, rate many securities AAA that incumbents do not. The systematically higher ratings of the entrants indicate rating

catering on the part of the entrants. Furthermore, as the entrants' market share increases, the incumbents' ratings rise and the level of subordination provided to tranches rated AAA by the incumbents falls. The increase in the ratings of the incumbents is due to both rating catering on the part of the incumbent CRAs and to shopping by issuers. We find shopping to be responsible for all of the increase in ratings in the IO sample which we suggest are more complex to rate than securities that receive both principal and interest payments. In contrast, we find that the decrease in the level of subordination of AAA tranches is explained by catering rather than shopping.

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. The bias theoretical literature identifies from competition is upwards, however, such that there is less concern 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. As such, our results strongly suggest that, contrary to the stated belief of the SEC and the policy of European regulators, increasing competition among CRAs is likely to exacerbate, rather than reduce, any tendency the CRAs have to issue inflated ratings unless both the rating shopping and rating catering problem are solved.

References

Alp, Aysun, 2013. Structural Shifts in Credit Rating Standards. Journal of Finance, 63:6, 2435-70.

An, Xudong, Yongheng Deng, and Stuart Gabriel, 2011. Asymmetric Information, Adverse Selection, and the Pricing of CMBS. Journal of Financial Economics, 100, 304-25.

Ashcraft, Adam, Goldsmith-Pinkham, Paul and James Vickery, 2010. MBS Ratings and

the Mortgage Credit Boom. FRB of New York Staff Report No. 449.

Atanasov, Vladimir and John J. Merrick Jr., 2013. The Effects of Market Frictions on Asset Prices: Evidence from Agency MBS. Manuscript, College of William and Mary.

Bar-Isaac, Heski and Joel Shapiro, 2013. Ratings Quality Over the Business Cycle. Journal of Financial Economics, 108, 62-78.

Beaver, William H., Catherine Shakespeare and Mark T. Soliman, 2006. Differential Properties in the Ratings of Certified versus Non-certified Bond-rating Agencies. Journal of Accounting and Economics, 42, 303-34.

Becker, Bo and Todd Milbourn, 2011. How did Increased Competition Affect Credit Ratings? Journal of Financial Economics, 101, 493-514.

Behr, P., Kisgen, D. and J. Taillard, 2014. Did Government Regulations Lower Credit Rating Quality? Working paper,
SSRN $http://papers.ssrn.com/sol3/papers.cfm?abstract_id = 2412294$

Bessembinder, Hendrik, William Maxwell, and Kumar Venkataraman, 2013. Introducing Daylight to Structured Credit Products. Financial Analysts Journal, 69:6, 55-67.

Bolton, Patrick, Xavier Freixas, and Joel Shapiro, 2012. The Credit Ratings Game. Journal of Finance, 67:1, 85-111.

Bongaerts, Dion, K.J. Martijn Cremers, and William N. Goetzmann, 2012. Tiebreaker: Certification and Multiple Credit Ratings. Journal of Finance, 67:1, 113-52.

Boot, Arnoud W.A. and Anjan V. Thakor, 1993. Security Design. Journal of Finance, 48:4, 1349-78.

Bruno, Valentina, Jess Cornaggia, and Kimberly J. Cornaggia, 2013. Does Certification Affect the Information Content of Credit Ratings? Working paper,
SSRN http://dx.doi.org/10.2139/ssrn.1962840

Camanho, Nelson, Pragyan Deb, and Zijun Liu, 2012. Credit Rating and Competition. Working paper, Catolica Lisbon School of Business & Economics.

Cohen, Andrew and Mark D. Manuszak, 2013. Ratings Competition in the CMBS Market. Journal of Money, Credit and Banking, 45:1, 93-119.

Cornaggia, Jess, and Kimberly J. Cornaggia, 2013. Estimating the Cost of Issuer-Paid Credit Ratings. Review of Financial Studies, 26:9, 2229-69.

Coval, Joshua D., Jakub W. Jurek, and Erik Stafford, 2009. Economic Catastrophe Bonds. American Economic Review, 99:3, 628-66.

Davidson, Andrew, Anthony Sanders, Lan-Ling Wolff, and Anne Ching, 2003. Securitization: Structuring and Investment Analysis. Hoboken, NJ: Wiley.

DBRS, 2013. Rating Scales: Long Term Obligations Scale.

Doherty, Neil A., Anastasia V. Kartasheva, and Richard D. Phillips, 2012. Information Effect of Entry into Credit Ratings Market: The Case of Insurers' Ratings. Journal of Fi-

nancial Economics, 106, 308-30.

Edwards, Amy K., Lawrence E. Harris, and Michael S. Piwowar, 2007. Corporate Bond Market Transaction Costs and Transparency. Journal of Finance, 62:3, 1421-51.

FitchRatings, 2014. Definitions of Ratings and Other Forms of Opinion.

Griffin, John M., Jordan Nickerson, and Dragon Yongjun Tang, 2013. Rating Shopping or Catering? An Examination of the Response to Competitive Pressure for CDO Credit Ratings. Review of Financial Studies, 26:9, 2270-310.

Griffin, John M. and Dragon Tang, 2012. Did Subjectivity Play a Role in CDO Credit Ratings? Journal of Finance, 67:4, 1293-328.

Hanson, Samuel G. and Adi Sunderam, 2013. Are There too Many Safe Securities? Securitization and the Incentives for Information Production. Journal of Financial Economics, 108, 565-84.

Hartman-Glaser, Barney, 2013. Reputation and Signaling in Asset Sales. Manuscript, University of California (Los Angeles).

He, Jie (Jack), Jun 'QJ' Qian, and Philip E. Strahan, 2012. Are All Ratings Created Equal? The Impact of Issuer Size on the Pricing of Mortgage-Backed Securities. Journal of Finance, 67:6, 2097-137.

Hollifield, Burton, Artem Neklyudov, and Chester Spatt, 2013. Bid-Ask Spreads and the Pricing of Securitizations: 144a vs. Registered Securitizations. Manuscript, Carnegie Mellon

University.

Jiang, John (Xuefeng), Mary Harris Stanford, and Yuan Xie, 2012. Does it Matter Who Pays for Bond Ratings? Historical Evidence. Journal of Financial Economics, 105, 607-21.

Kanter, James, 2012. Finance Ministers Clear Way for Credit Rating Competition in Europe. New York Times, March 31.

Kisgen, Darren J. and Philip E. Strahan, 2010. Do Regulations Based on Credit Ratings Affect a Firm's Cost of Capital? Review of Financial Studies, 23, 4324-47.

Kroll Bond Ratings, 2011a. Kroll Bond Ratings Makes Official Debut With Multi-Media Marketing Campaign. Press Release, Kroll Bond Ratings, January 19, 2011.

Kroll Bond Ratings, 2011b. KBRA Assigns Final Ratings to BAMLL Trust 2011-FSHN. Press Release, Kroll Bond Ratings, July 14, 2011.

Kroll Bond Ratings, 2011c. Kroll Bond Rating Agency Issues CMBS Single Borrower & Large Loan Methodology. Press Release, Kroll Bond Ratings, August 9, 2011.

Kroll Bond Ratings, 2012a. U.S. CMBS Multi-Borrower Rating Methodology. Manuscript, Kroll Bond Ratings, February 23, 2012.

Kroll Bond Ratings, 2014. Rating Scales: Long-Term Credit. No date provided on html document; last accessed on August 18, 2014 at https://www.krollbondratings.com/ratings/scales.

Mathis, J., J. McAndrews and J.-C. Rochet, 2009. Rating the Raters: Are Reputation Concerns Powerful Enough to Discipline Rating Agencies? Journal of Monetary Economics, 56, 657-74.

Moody's Investors Service, 2009. Moody's Rating Symbols & Definitions.

Moody's Investors Service, 2012. Moody's Approach to Rating Structured Finance Interest-Only Securities.

Moody's Investors Service, 2014. Rating Symbols and Definitions.

Morningstar Credit Ratings, LLC, 2012. Form NRSRO Exhibit 2.

Morningstar Credit Ratings, LLC, 2013. Final Ratings Confirmation - Invitation Homes 2013-SFR1.

Opp, Christian C., Opp, Marcus M. and Milton Harris, 2013. Rating Agencies in the Face of Regulation. Journal of Financial Economics, 108, 46-61.

Sangiorgi, Francesco and Chester Spatt, 2013. Opacity, Credit Rating Shopping and Bias. Working Paper, Carnegie Mellon University.

SEC, 2011. Release No. 34-65339, September 14, 2011.

SEC, 2012. Release No. 34-66514, March 5, 2012.

Skreta, V. and L. Veldkamp, 2009. Ratings Shopping and Asset Complexity: A Theory

of Ratings Inflation. Journal of Monetary Economics, 56, 678-95.

Standard & Poor's, 2009a. Criteria— Structured Finance— CMBS: U.S. CMBS Rating Methodology and Assumptions for Conduit/Fusion Pools.

Standard & Poor's, 2009b. General Criteria: Understanding Standard & Poor's Rating Definitions.

Strobl, Gunter and Han Xia, 2012. The Issuer-Pays Rating Model and Ratings Inflation: Evidence from Corporate Credit Ratings. Working paper, University of Texas (Dallas).

Tempkin, Adam, 2012. S&P Criticized Over Changes to CMBS Ratings Standards. CNBC, Oct. 12. Available at http://www.cnbc.com/id/100140849 (last accessed August 19, 2014).

Xia, Han, 2014. Can Investor-Paid Credit Rating Agencies Improve the Information Quality of Issuer-Paid Rating Agencies? Journal of Financial Economics, 111, 450-68.

Table 1: Summary Statistics

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

Variable definitions in Table 1 are as follows: *nratings* is the total number of ratings the security received; *numericsp*, *numericmoodys*, *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). *cpnspread* is the annual spread at issuance (in %) that the security pays relative to a US treasury of comparable maturity. *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*, *indshare* capture the percentage of the loans backed by retail, office, hospitality, and industrial properties. *waltv* is the weighted average loan-to-value (LTV) of the loans (in %). *wadscr* is the weighted average debt service coverage ratio. *wam* is the weighted average maturity of the loans measured in months. *year* is the year of issuance of the security. *sponsortot* is the total $ volume (in millions) of CMBS issued by the lead sponsor of the deal in the year the security is issued. *typconduitfusion*, *largeloan*, 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.

Table 2: Rating Definitions for AAA

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

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

Table 3: Share of Securities Rated by Entrants

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

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

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

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

Table 5: Issues An Entrant Rates and Incumbent Ratings

	(1)	(2)	(3)	(4)
	Non-IO Securities		IO Securities	
avgincumerror	0.022		0.024	
	(0.015)		(0.020)	
incumlow		-0.12*		0.013
		(0.068)		(0.15)
tranchesize	-0.00028	-0.00024		
	(0.00033)	(0.00033)		
subordination	0.0041	0.0038		
	(0.0040)	(0.0040)		
floater	-0.39*	-0.38*		
	(0.20)	(0.20)		
variable	-0.073	-0.069	0.17	0.19
	(0.094)	(0.094)	(0.51)	(0.52)
wal3to5	0.18	0.18		
	(0.15)	(0.15)		
wal5to7	-0.0037	-0.0012		
	(0.18)	(0.18)		
walover7	0.13	0.11		
	(0.14)	(0.14)		
waltv	-0.0061	-0.0067	0.0027	0.0031
	(0.0093)	(0.0093)	(0.017)	(0.017)
wadscr	-0.033	-0.033	-0.062	-0.061
	(0.072)	(0.072)	(0.12)	(0.12)
wam	0.0031	0.0032	0.0079	0.0084*
	(0.0031)	(0.0031)	(0.0050)	(0.0051)
retailshare	0.010***	0.010***	0.0081	0.0078
	(0.0026)	(0.0026)	(0.0053)	(0.0053)
officeshare	0.0076***	0.0074***	0.0044	0.0043
	(0.0026)	(0.0026)	(0.0053)	(0.0053)
hospshare	0.0053*	0.0052*	0.0049	0.0048
	(0.0028)	(0.0028)	(0.0046)	(0.0046)
indshare	0.0097	0.0094	0.016	0.015
	(0.0099)	(0.0099)	(0.021)	(0.021)
sponsortot	3.9e-06	4.1e-06	-1.9e-07	-1.0e-07
	(4.9e-06)	(4.9e-06)	(9.9e-06)	(9.9e-06)
Constant	-6.16	-6.28	-7.13	-7.24
	(100)	(171)	(175)	(173)
Year of Issue FEs	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes
Observations	1,610	1,610	349	349
Pseudo-R^2	14%	14%	15%	14%

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

Table 6: Precision of Rating Models Across CRAs

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

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

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

	(1)	(2)	(3)	(4)	(5)
reputation	-0.39	-0.64	-0.49	-0.54	-0.68
	(0.89)	(1.23)	(1.52)	(1.75)	(2.58)
tranchesize	-0.00032	-0.00032	-0.00031	-0.00031	-0.00031
	(0.00037)	(0.00037)	(0.00037)	(0.00037)	(0.00036)
subordination	0.0048	0.0048	0.0049	0.0048	0.0048
	(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0048)
floater	-0.15	-0.15	-0.15	-0.15	-0.15
	(0.37)	(0.37)	(0.37)	(0.37)	(0.37)
variable	0.014	0.014	0.015	0.014	0.014
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
wal3to5	0.047	0.048	0.048	0.046	0.046
	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)
wal5to7	0.081	0.083	0.088	0.084	0.086
	(0.22)	(0.22)	(0.22)	(0.22)	(0.22)
walover7	0.025	0.026	0.026	0.025	0.026
	(0.12)	(0.13)	(0.12)	(0.12)	(0.12)
waltv	-0.0070	-0.0075	-0.0064	-0.0066	-0.0064
	(0.033)	(0.033)	(0.032)	(0.032)	(0.033)
wadscr	-0.087	-0.094	-0.081	-0.081	-0.079
	(0.19)	(0.19)	(0.19)	(0.19)	(0.19)
wam	0.0034	0.0029	0.0036	0.0037	0.0037
	(0.0091)	(0.0092)	(0.0092)	(0.0091)	(0.0092)
retailshare	0.011	0.012	0.011	0.011	0.011
	(0.0092)	(0.0092)	(0.0091)	(0.0092)	(0.0092)
officeshare	0.010	0.010	0.0098	0.0099	0.0098
	(0.0091)	(0.0091)	(0.0091)	(0.0091)	(0.0091)
hospshare	0.0023	0.0022	0.0022	0.0023	0.0023
	(0.0082)	(0.0083)	(0.0083)	(0.0082)	(0.0082)
indshare	0.016	0.016	0.015	0.015	0.015
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
sponsortot	-2.3e-06	-2.2e-06	-2.1e-06	-1.7e-06	-1.7e-06
	(0.000016)	(0.000016)	(0.000016)	(0.000016)	(0.000016)
Constant	0.24	0.35	0.15	0.14	0.12
	(2.79)	(2.83)	(2.80)	(2.80)	(2.82)
Year of Issue FEs	Yes	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes	Yes
SEs Clustered by Deal	Yes	Yes	Yes	Yes	Yes
Observations	1,430	1,430	1,430	1,430	1,430
Pseudo-R^2	10%	10%	10%	10%	10%

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

Table 8: AAA Yields and Securities Rated AAA by Entrants

	(1)	(2)	(3)	(4)
AAAentrantonly	0.18	0.39		
	(0.24)	(0.31)		
AAAtwowithentrant			0.19	0.23*
			(0.12)	(0.12)
tranchesize	-0.00044***	-0.00039***	-0.00052***	-0.00055***
	(0.000092)	(0.000088)	(0.00019)	(0.00018)
subordination	-0.011***	-0.0088**	-0.0061	0.00083
	(0.0034)	(0.0035)	(0.0065)	(0.0064)
floater	0.023		0.036	
	(0.13)		(0.40)	
variable	0.34***		0.38***	
	(0.045)		(0.11)	
wal3to5	0.46***	0.57***	0.40***	0.60***
	(0.043)	(0.040)	(0.096)	(0.090)
wal5to7	0.64***	0.66***	0.66***	0.74***
	(0.054)	(0.049)	(0.13)	(0.12)
walover7	0.62***	0.66***	0.60***	0.72***
	(0.039)	(0.035)	(0.087)	(0.079)
waltv	0.0100**	0.0017	0.0034	-0.0046
	(0.0040)	(0.0045)	(0.0080)	(0.0098)
wadscr	-0.036	-0.13**	-0.10	-0.23
	(0.034)	(0.054)	(0.061)	(0.16)
wam	0.0011	0.00050	0.0012	0.00010
	(0.0012)	(0.0011)	(0.0030)	(0.0027)
retailshare	-0.0024**	-0.0030***	-0.0058**	-0.0063**
	(0.00094)	(0.00095)	(0.0023)	(0.0025)
officeshare	-0.0047***	-0.0040***	-0.0058**	-0.0066***
	(0.00098)	(0.0010)	(0.0023)	(0.0024)
hospshare	0.0019	0.00012	0.0023	-0.000058
	(0.0012)	(0.0014)	(0.0026)	(0.0052)
indshare	0.0033	0.00035	-0.0046	0.00063
	(0.0038)	(0.0035)	(0.0096)	(0.0088)
sponsortot	-2.6e-06	-5.0e-07	-3.5e-06	-3.4e-06
	(1.8e-06)	(1.9e-06)	(4.4e-06)	(4.9e-06)
Constant	0.95**	1.59***	1.47*	1.67*
	(0.38)	(0.43)	(0.80)	(0.87)
Year of Issue FEs	Yes	Yes	Yes	Yes
Deal Type FEs	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes
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.

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

	(1)	(2)	(3)	(4)
	OLS		Ordered Probit	
entrant1share	4.95**	4.41**	3.13**	2.97**
	(1.96)	(1.85)	(1.22)	(1.17)
entrant2share	3.34***	2.63**	1.82***	1.50**
	(1.09)	(1.09)	(0.67)	(0.66)
nratings		0.56***		0.31***
		(0.16)		(0.087)
tranchesize	0.0032***	0.0032***	0.013***	0.013***
	(0.00066)	(0.00067)	(0.0034)	(0.0035)
subordination	0.33***	0.32***	0.17***	0.17***
	(0.015)	(0.015)	(0.013)	(0.013)
floater	0.40	0.52	0.49	0.58
	(0.34)	(0.35)	(0.47)	(0.49)
variable	-0.42	-0.47*	-0.21*	-0.24**
	(0.26)	(0.26)	(0.12)	(0.12)
wal3to5	-0.21	-0.28	-0.56	-0.66
	(0.33)	(0.32)	(0.54)	(0.54)
wal5to7	0.33	0.29	-0.26	-0.31
	(0.35)	(0.34)	(0.68)	(0.69)
walover7	-0.61**	-0.65**	-1.36***	-1.44***
	(0.27)	(0.27)	(0.49)	(0.51)
waltv	-0.13***	-0.13***	-0.089***	-0.087***
	(0.031)	(0.029)	(0.018)	(0.017)
wadscr	0.15	0.18	0.068	0.075
	(0.22)	(0.21)	(0.12)	(0.12)
wam	0.032***	0.030***	0.023***	0.023***
	(0.0069)	(0.0069)	(0.0045)	(0.0044)
sponsortot	0.000014	0.000011	4.5e-06	2.8e-06
	(0.000011)	(0.000010)	(8.7e-06)	(8.5e-06)
Constant	14.7***	13.5***		
	(1.96)	(1.90)		
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
Std. Errors Clustered by Deal	Yes	Yes	Yes	Yes
Observations	1,610	1,610	1,610	1,610
R^2	79%	79%		
Pseudo-R^2			38%	38%

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

Table 10: Effect of Entrants' Market Shares on Incumbents' Average Rating, IO Securities

	(1)	(2)	(3)	(4)
	OLS		Ordered Probit	
entrant1share	1.63	-1.34	0.69	-0.38
	(4.36)	(3.89)	(1.38)	(1.35)
entrant2share	5.24**	2.36	1.07*	0.19
	(2.15)	(2.01)	(0.61)	(0.63)
nratings		2.25***		0.76***
		(0.37)		(0.13)
variable	2.41	0.67	1.14*	0.72
	(2.09)	(2.33)	(0.64)	(0.75)
waltv	0.027	0.042	0.0036	0.0088
	(0.042)	(0.047)	(0.012)	(0.013)
wadscr	0.21	0.38	0.075	0.13*
	(0.30)	(0.32)	(0.072)	(0.081)
wam	0.026**	0.018	0.0064*	0.0036
	(0.011)	(0.011)	(0.0037)	(0.0035)
sponsortot	-0.000043	-0.000038	-0.000012	-0.000012*
	(0.000027)	(0.000025)	(7.4e-06)	(7.4e-06)
Constant	6.27	5.13		
	(5.00)	(5.11)		
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
Std. Errors Clustered by Deal	Yes	Yes	Yes	Yes
Observations	349	349	349	349
R^2	22%	33%		
Pseudo-R^2			6%	10%

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

Table 11: Entrants' Market Shares and Subordination of Tranches Rated AAA by an Incumbent

	(1)	(2)
entrant1share	-9.80**	-10.2**
	(4.93)	(4.99)
entrant2share	-7.50**	-8.01**
	(3.05)	(3.25)
nratings		0.35
		(0.41)
tranchesize	0.0035***	0.0035***
	(0.0012)	(0.0012)
floater	0.56	0.62
	(0.76)	(0.74)
variable	-2.61***	-2.64***
	(0.53)	(0.53)
wal3to5	0.0094	-0.013
	(0.37)	(0.37)
wal5to7	-0.62	-0.63
	(0.49)	(0.50)
walover7	-1.72***	-1.72***
	(0.29)	(0.29)
waltv	0.24***	0.25***
	(0.081)	(0.082)
wadscr	0.098	0.12
	(0.54)	(0.54)
wam	-0.045***	-0.046***
	(0.016)	(0.015)
sponsortot	-0.000022	-0.000021
	(0.000025)	(0.000024)
Constant	5.14	4.47
	(6.38)	(6.39)
Year of Issue FEs	Yes	Yes
Deal Type FEs	Yes	Yes
Geog. Controls	Yes	Yes
Prop. Type Controls	Yes	Yes
Std. Errors Clustered by Deal	Yes	Yes
Observations	766	766
R^2	72%	72%

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

Figure 1: Share of Securities Rated by CRAs over Time

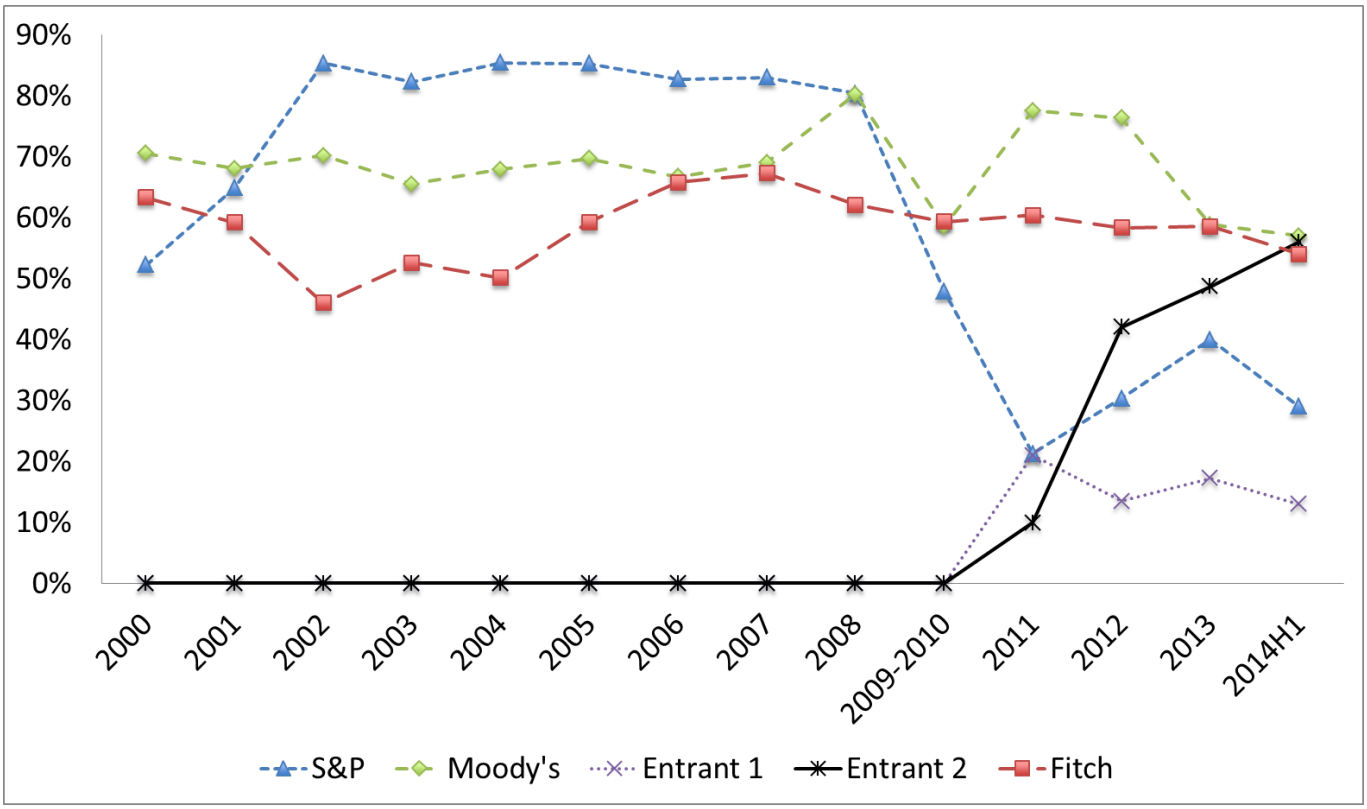
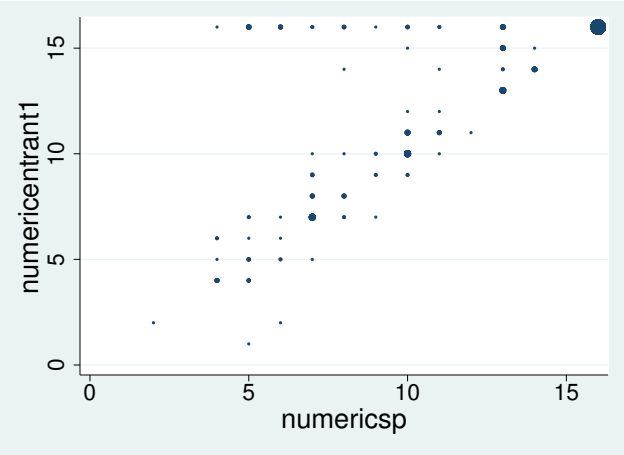
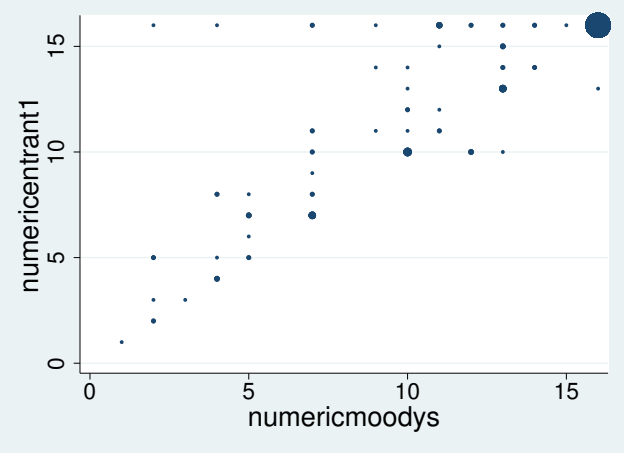


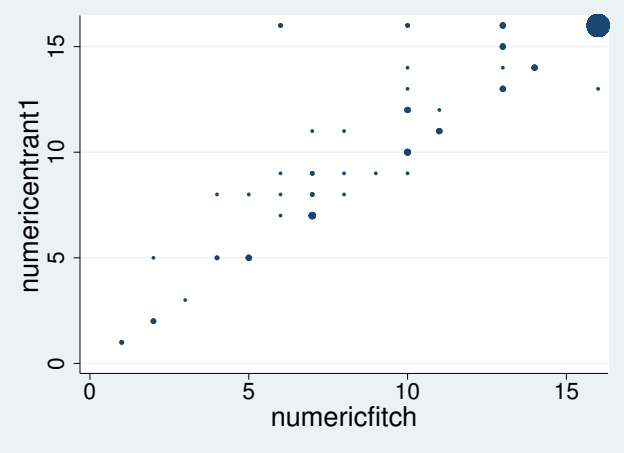
Figure 2: Entrant 1 vs. Other CRA's Ratings
Numeric Ratings: 16=AAA, 1=B-



(a) S&P

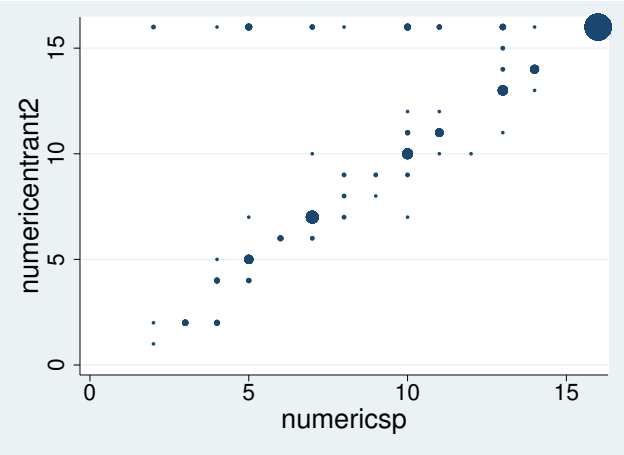


(b) Moody's

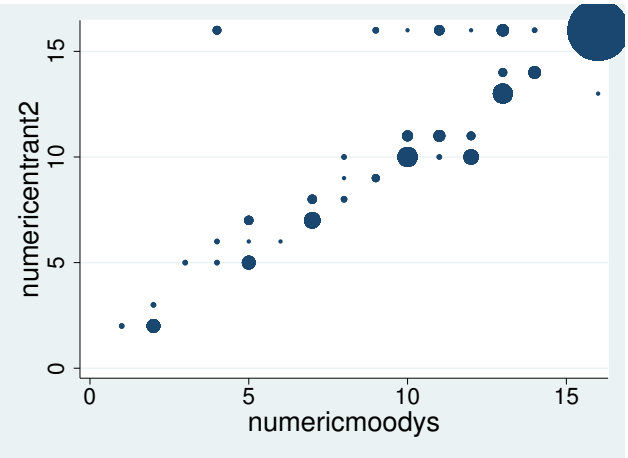


(c) Fitch

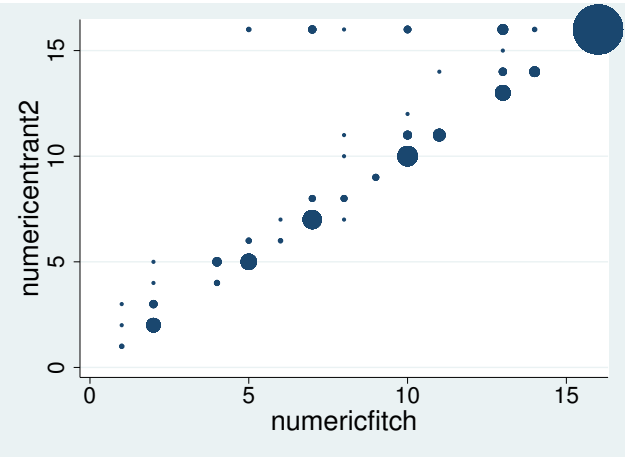
Figure 3: Entrant 2 vs. Other CRA's Ratings
Numeric Ratings: 16=AAA, 1=B-



(a) S&P

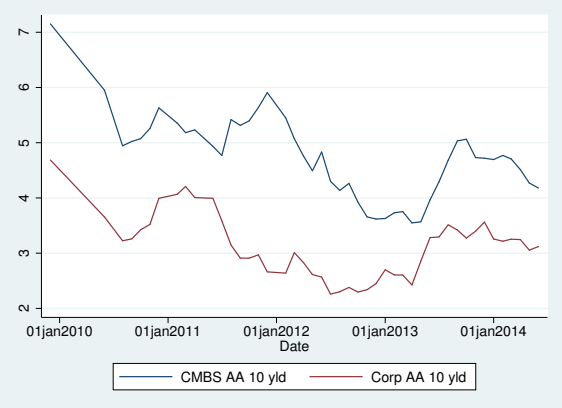


(b) Moody's

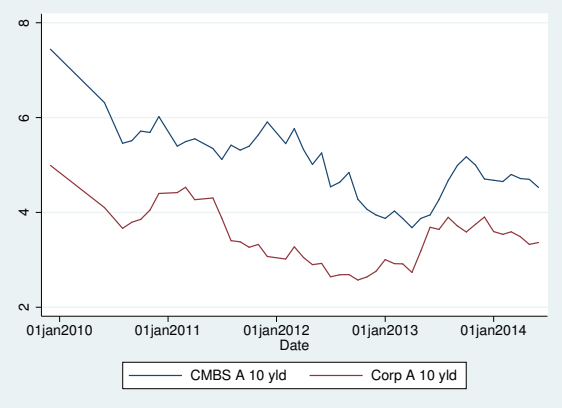


(c) Fitch

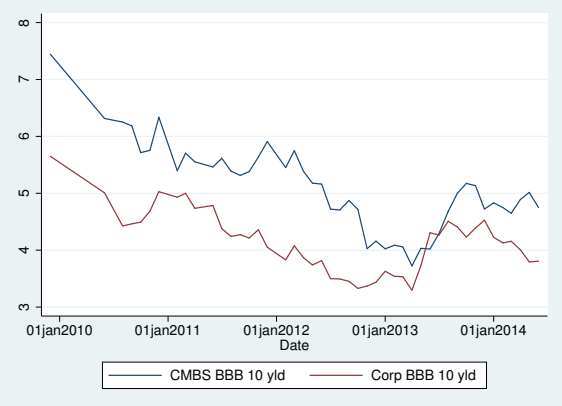
Figure 4: Interest Rates on CMBS vs. Corporates



(a) AA



(b) A



(c) BBB

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

A Historical Context

To provide a broader context for our estimation sample and to explore differences in securities issued before and after the crisis, Table A.1 summarizes CMBS securities rated by one or more of Moody's, S&P, and Fitch during the period 2000-2008.[12] As this encompasses the boom years of 2003-2007, the securities issued during this period display marked differences with those in our estimation sample. Because DBRS is excluded from the historical sample, we perform comparisons based only on ratings by Moody's, S&P, and Fitch. Unreported t-tests indicate that, with the exception of *variable* and *waltv*, all differences between the samples in Table A.1 (historical) and the 2009-2014Q2 sample excluding DBRS ratings are significant at the 1% level.

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

The average subordination level is over 7 percentage points lower in the historical sample. However, it displays significant variation over time, as illustrated in Table A.2. Average subordination levels for all securities and for the set of AAA-rated securities decrease monotonically from 2000 to 2004, but then flatten out from 2005 to 2010 before increasing again starting in 2011. This pattern could occur for at least two reasons. First, Stanton and Wallace (2012) report that deal managers began re-tranching the principal balance in AAA-

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

rated securities in 2004, and that this practice contributed to a sudden spike in subordination levels for the shortest maturity AAA tranches. Second, the underlying characteristics of the securities in deals may have changed over time.

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

$$Subordination_{i,j,t} = \alpha_0 + \gamma_{\mathbf{x}}^{'} PeriodDummies + \alpha_{\mathbf{x}}^{\prime} Controls_{i,j,t} + \epsilon_{i,j,t} \qquad (11)$$

where $Subordination_{i,j,t}$ is the level of subordination of security j rated by CRA i at time t, and *PeriodDummies* are indicators for whether the security was issued during (1) 2000-2003 (*firstpd*), (2) 2004-2008 (*secondpd*), or (3) 2009-2013 (*thirdpd*), respectively. The variables included as controls are listed in Table A.3. Equation 11 is estimated for both the full sample of securities (columns 1 and 2), and for the AAA-rated subsample only (columns 3 and 4).

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

Overall, there are meaningful differences, both statistically and economically, between the pre- and post-crisis sample of CMBS securities and their ratings. After the financial crisis, the CRAs required more subordination for securities after controlling for differences

in security characteristics. By beginning our estimation sample in 2009, we avoid variation caused by changes in the ratings landscape before and after the financial crisis.

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

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

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

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

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

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

	All Securities		***AAA-rated securities***	
	(1)	(2)	(3)	(4)
secondpd	0.54**	0.54	2.40***	2.40***
	(0.24)	(0.40)	(0.38)	(0.61)
thirdpd	7.36***	7.36***	9.94***	9.94***
	(0.28)	(0.43)	(0.41)	(0.57)
tranchesize	0.022***	0.022***	0.0051***	0.0051***
	(0.00043)	(0.0011)	(0.00044)	(0.00046)
floater	2.11***	2.11**	0.93*	0.93
	(0.55)	(0.91)	(0.53)	(0.60)
variable	-4.63***	-4.63***	-0.89***	-0.89**
	(0.20)	(0.37)	(0.27)	(0.38)
wal3to5	-1.02**	-1.02	0.16	0.16
	(0.45)	(0.78)	(0.43)	(0.40)
wal5to7	-0.65	-0.65	-0.26	-0.26
	(0.49)	(0.65)	(0.44)	(0.35)
walover7	-10.0***	-10.0***	-3.15***	-3.15***
	(0.41)	(0.64)	(0.39)	(0.36)
waltv	0.12***	0.12*	0.19***	0.19***
	(0.014)	(0.060)	(0.024)	(0.055)
wadscr	-1.01***	-1.01	-1.79***	-1.79**
	(0.24)	(0.63)	(0.37)	(0.86)
wam	0.028***	0.028***	-0.0082	-0.0082
	(0.0038)	(0.011)	(0.0062)	(0.010)
retailshare	-0.017***	-0.017**	-0.031***	-0.031***
	(0.0046)	(0.0079)	(0.0070)	(0.012)
officeshare	-0.013***	-0.013	0.011	0.011
	(0.0047)	(0.0081)	(0.0072)	(0.011)
hospshare	-0.026***	-0.026	0.083***	0.083***
	(0.0075)	(0.021)	(0.012)	(0.025)
indshare	-0.059***	-0.059***	-0.058***	-0.058**
	(0.012)	(0.017)	(0.019)	(0.029)
sponsortot	0.000033***	0.000033***	0.000041***	0.000041***
	(4.1e-06)	(9.1e-06)	(5.0e-06)	(0.000011)
Constant	11.6***	11.6**	10.9***	10.9**
	(1.23)	(4.75)	(2.14)	(5.02)
Year of Issue FEs	No	No	No	No
Deal Type FEs	Yes	Yes	Yes	Yes
Geog. Controls	Yes	Yes	Yes	Yes
SEs Clustered by Deal	No	Yes	No	Yes
Observations	8,522	8,522	3,214	3,214
R-squared	53%	53%	37%	37%

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

B Additional Empirical Results

B.1 Rating Differences over Time

Table B.4: Entrant vs. Incumbent Ratings on Same Issues Over Time

Year	Entrant Rating	Incumbent Average	difference	N	T-stat
Panel A: Entrant 1 vs. Incumbents					
2011	12.36	11.93	0.43	72	2.7
2012	13.20	12.51	0.69	74	2.9
2013	12.77	11.36	1.41	173	6.8
2014H1	12.92	12.16	0.76	60	2.6
All Years	12.80	11.82	0.98	379	8.1
Panel B: Entrant 2 vs. Incumbents					
2011	12.68	11.59	1.09	34	2.3
2012	12.60	12.11	0.49	231	3.9
2013	12.57	12.35	0.22	490	4.5
2014H1	13.02	12.36	0.66	251	4.2
All Years	12.69	12.27	0.42	1006	7.4

B.2 Reputation and Selection of Entrant Ratings, IO Tranches

Table B.5: Reputation and Selection of Entrant Ratings, IO Securities

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

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

B.3 Security Performance

Tables B.6 and B.7 report summary statistics performance for the securities in our estimation sample. Given the low degree of seasoning (most bonds are issued beginning in 2011), we do not observe anything meaningful in the way of principal losses and/or interest shortfalls. Table B.6 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.7 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.6: 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.7: 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.4 Loan-Level Collateral Performance

In addition to interest shortfalls and/or principal losses for the bonds, we are also interested in the performance of the underlying collateral. Every deal in our sample is comprised of a single collateral group, so we measure the performance at the deal level. Our data contains the most recent[13] 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.[14]

Tables B.8 and B.9 report deal-level summary statistics[15] for these measures, by year of issuance. 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.8: 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.

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

[14]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.

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

Table B.9: 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.