Reputations and credit ratings—evidence from commercial mortgage-backed securities

Ramin P. Baghai and Bo Becker *

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ABSTRACT. We study the dynamics of credit ratings after Standard & Poor's (S&P) was shut out of a large segment of the commercial mortgage-backed securities (CMBS) ratings market following a procedural mistake. Exploiting the fact that most CMBS securities have ratings from multiple agencies, we show that S&P subsequently eased its standards, in particular for large deals and for deals from important issuers, relative to other agencies. This coincided with a partial recovery in volume. The results are consistent with the view that an agency can regain market share after suffering reputational damage by issuing optimistic ratings.

Keywords: Credit ratings, reputation, competition, information quality, commercial mortgage-backed securities

JEL Codes: G20, G24, G28

"The decision by Standard & Poor's to change the calculation of a key credit metric has left some investors accusing the agency of watering down standards […]. S&P last month announced a set of sweeping changes to its rating methodology after a blunder last year left the company effectively frozen out of the CMBS ratings business. […] '(This) just screams to me that they have to buy market share,' said Nilesh Patel, a managing director at Prima Capital Advisors, an investment firm specializing in high-quality CMBS." ("S&P criticized over changes to CMBS ratings standards" by Adam Tempkin, Reuters, October 5, 2012.)

"These proceedings involve misconduct by S&P in 2012 concerning its criteria for rating conduit/fusion Commercial Mortgage Backed Securities ("CF CMBS") and related research. After being frozen out of the market for rating CF CMBS in late 2011, S&P sought to re-enter the market in 2012 by publishing new ratings criteria […]." (Securities and Exchange Commission, 2015, "In the Matter of Standard & Poor's Rating Services", Administrative Proceeding File No.: 3-16346.)

Most investment decisions in credit markets involve delegation, which hinges on regulation and contracts to limit risk-taking. In this context, both regulators and investors typically rely on credit ratings.[1] A prerequisite for well-functioning fixed income markets is therefore that ratings provide accurate signals of credit quality. However, while ratings are of central importance to investors, most of credit rating agencies' revenues derive from issuers. This generates a fundamental conflict of interest. This conflict has been fully or partially contained in those markets where agencies have a long track record of producing reliable, accurate ratings, and where ratings are used for a range of purposes. A standard interpretation of this fact is that the impact of the underlying conflicts of interest can be limited by reputations (Bolton, Freixas, and Shapiro 2012; Bouvard and Levy 2013; Mathis, McAndrews, and Rochet 2009). One of the key implications of this view is that raters' actions depend on their reputation. In this paper, we examine the behavior of a rater whose reputation has been hurt. Specifically, we study the dynamics of market share and ratings of an agency that is shut out of a large part of the

[1] For example, credit ratings are used in investment mandates, in loan pricing, and in a range of other private contracts. They are also widely employed for calculating capital requirements and in financial regulations (see, e.g., White 2010).

commercial mortgage-backed securities (CMBS) ratings market after suffering reputational damage because of an important procedural mistake.

In July 2011, following questions from investors, S&P reported what they called "inconsistencies" in their rating methodology for fusion CMBS (fusion CMBS combine large and small mortgage loans and constitute around one third of the CMBS market). The agency responded by withdrawing its preliminary ratings on a fusion deal that was in the final stages. Without the ratings, the deal failed to close, leaving the issuer with a pool of mortgages and investors with nothing to invest in. This was poorly received by issuers and investors, and, subsequently, S&P was completely shut out of rating fusion CMBS deals for over one year. About a year later, in September 2012, S&P implemented a new rating methodology for fusion CMBS. Anecdotal evidence from market participants suggests that the new methodology was perceived to loosen standards for fusion CMBS (see Yoon and Neumann 2012 and Tempkin 2012).

We use this episode as a laboratory for examining how a weak reputation impacts raters' incentives in ratings markets. The shock suffered by S&P was due to an isolated, well-documented incident that permits a sharp comparison of ratings and market share before and after the event. The triggering incident was a procedural mistake, i.e., related to the process but not to the content of credit ratings. In this setting, reverse causality concerns are much reduced (compared to, e.g., a research design using variation in market share to identify effects on ratings). The procedural nature of the triggering event also meant that S&P had the ability and resources to recover market share—S&P already had the necessary staff, models, data, and organization at its disposal. A motivation to grab market share is precisely what reputational theories suggest may compromise ratings quality (e.g., Bolton, Freixas, and Shapiro 2012).

We compare S&P's ratings on newly issued fusion CMBS tranches to the ratings of its two main competitors, Moody's and Fitch. Because we compare different ratings of the same tranche, our methodology eliminates the impact of any variables that vary by tranche (e.g., the credit quality of the deal and its underlying asset pool, any characteristic of the issuer, and the contractual features of the tranche itself). We find that S&P assigned higher ratings when it

returned to the market in 2012. Specifically, when S&P was once again asked to rate new issues, S&P's ratings on new fusion CMBS tranches became between 0.1 and 0.3 notches higher (relative to those of Moody's and Fitch). This is consistent with an attempt by S&P to regain market share following the reputational shock by catering to issuers through higher ratings.[3] The higher ratings coincide with a recovery of S&P's market share. This recovery was partial, and it appears that by the end of our sample in 2014, S&P is still smaller than its peers.

Fusion CMBS constitute about a third of new CMBS issues. We exploit the issuance of other types of CMBS to construct a placebo test. Fusion CMBS deals are rated using different methodologies than other types of CMBS (SEC 2013 and Flynn and Ghent 2016). Further, examining analyst assignments, we document that most S&P analysts worked exclusively either on fusion or non-fusion CMBS. Thus fusion and non-fusion are separate in both methodology and staffing. This may explain why S&P's market share in non-fusion did not suffer from this event, nor increased when ratings standards shifted for fusion CMBS. Repeating out tests of ratings levels for non-fusion CMBS, we find no change in S&P's ratings. The absence of movement outside the fusion segment helps verify that the patterns we observe are causally connected: the large loss of business triggered a move toward more lenient ratings standards in fusion CMBS; subsequently, these standards generated a partial recovery in market share. Meanwhile, ratings and market share were unaffected elsewhere.

We also document that several ancillary predictions consistent with rating agencies' commercial interests driving more lenient ratings hold empirically. First, the increase in ratings is more pronounced for CMBS issuers that issue many CMBS securities, who presumably represent more important commercial relationships for rating agencies. Second, the effect is more pronounced for large deals, which likely represent more revenue for raters. Third, in addition to the effect on the level of ratings of individual tranches, we find that the portion of AAA (an important determinant of a CMBS deal's cost of capital) increased in S&P-rated fusion

[3] Thus, our results additionally confirm a more negative view of competition in ratings markets, in line with Becker and Milbourn (2011), in the CMBS setting. Our results also suggest a possible asymmetry: rating agencies with lower market shares may be more aggressive than more established firms. This is a prediction of both Hörner (2002), in a general setting, and Doherty et al. (2012) in the ratings context. It is also consistent with empirical evidence in Flynn and Ghent (2016).

CMBS deals after the reputational shock. This is consistent with S&P catering to issuers by enabling them to carve out a larger AAA piece.

Overall, our findings suggest that reputations matter to how rating agencies behave; that a weaker reputation is associated with a lower market share; and that a firm in such a position may compromise on long-term, difficult-to-observe quality (from the investor point of view) in order to increase revenue. Although our event reflects a specific incident in a particular market, these implications confirm more generally the power of reputational models to describe important economic phenomena.

Our paper is related to a large literature on the economics of reputations (e.g., Klein and Leffler 1981, Kreps and Wilson 1982). Arguably, we treat reputations somewhat more broadly than much of the theoretical literature on reputations. Most formal models define reputation narrowly as the posterior probability that investors and/or issuers assign to the rater being a certain type (see e.g., Mathis, McAndrews, and Rochet 2009, where that type is truthful). Realistically, these models may not cover all interesting reputational dynamics. First, a rating agency may have different reputations vis-à-vis different third parties (Frenkel 2015), and reputations may be multi-dimensional (e.g., for service quality or pricing as well as accuracy). In the case of structured products, rating agencies' preliminary rating input determines the way a pool is tranched into separate securities. This makes a predictable and timely rating production process important to both issuers and investors, beyond the level of ratings. Second, rating agencies may have different reputations over different products, as our event suggests. In this case, the amount of spillover across categories sheds light on how the reputational mechanism works. Third, many models do not allow for repairing a ruined reputation: once a firm is revealed to belong to the bad type, that firm's reputation can never be rebuilt.

The economics of reputations are intimately connected to competition. High competition generates price pressure and thus reduces future rents, limiting the value of maintaining a good reputation (Klein and Leffler 1981). Thus, competition can hurt. On the other hand, competition can also help: a lack of (potential) competitors means that buyers of a service have nowhere else to turn, reducing the benefit of maintaining a good reputation (Holmström 1999 and Hörner

2002). This second mechanism may be especially important for services that are necessary to the buyers because there are few substitutes, like credit ratings. Prior empirical evidence on competition and ratings quality is somewhat mixed, consistent with competing mechanisms.[4] The CMBS market, which we study, has recently been characterized by increased competition for ratings business, with new raters entering this market after the financial crisis. As much regulatory emphasis has been put on increasing competition among rating agencies, understanding how reputations underpin ratings quality in a high-competition environment is particularly important.

Finally, our paper is related to prior work on the ratings of structured securities and their role in the financial crisis. The largest failures of credit ratings concerned excessively positive ratings on structured assets (e.g., Benmelech and Dlugosz 2009, Griffin and Tang 2011, He, Qian and Strahan 2012, Gordy and Willeman 2012). Few of the defaults concerned CMBS. However, like other structured products, CMBS securities are tranches of differing seniority issued against a common pool of assets. For CMBS, the pool consists of one or more commercial property mortgages. The CMBS market provides important funding for real estate in the US, and, like other structured finance markets, relies heavily on credit ratings (Stanton and Wallace 2012).

The rest of the paper is organized as follows. Section I discusses the institutional background. Section II describes the main data sources, the variable construction, our empirical strategy, and the main results. Section III includes some robustness tests and additional discussion. Finally, Section IV concludes.

I. Institutional background

A. An overview of CMBS

[4] Becker and Milbourn (2011) report that corporate bond ratings, largely used by institutional investors, became inflated and less precise when competition increased. Flynn and Ghent (2016) analyze the entry of new credit rating agencies into the CMBS market and find that the new entrants issue higher ratings than incumbents. On the other hand, Doherty, Kartasheva and Phillips (2012) find evidence of improved insurance ratings (a service targeted mainly at consumers buying life insurance) when a prior monopoly was challenged. These differing results may reflect variation in the nature of ratings users in these markets, or the difference between starting from one versus from several incumbents.

A mortgage-backed security (MBS) is a bond whose interest and principal payments originate from a pool of mortgages. If the pool backing an MBS consists of residential mortgages, the securities are called residential mortgage-backed securities (RMBS). Alternatively, these mortgages may be secured by commercial property (such as apartments, office buildings, shopping malls, warehouses, and hotels), in which case the securities are called CMBS. Compared to RMBS asset pools, which can contain hundreds of residential mortgages, CMBS asset pools usually consist of relatively few loans, due to the large size of commercial mortgages.[5] CMBS are an important source of funding for commercial real estate-related loans in the US; in 2015, for example, non-agency CMBS worth $101 billion were issued (source: Commercial Mortgage Alert).

Through securitization, a pool of commercial loans is transferred into a deal structure through which CMBS are issued to investors. The process starts with a borrower entering into a loan agreement with a lender through a mortgage broker. Once there is sufficient mortgage collateral, an underwriter (bookrunner) creates a CMBS-issuing trust—usually set up as a real estate mortgage investment conduit (REMIC) structure for tax purposes. A master servicer is hired to process payments from the borrowers; its main task is to transfer the mortgage payments to the trustee, which pays the CMBS investors.[6]

Deal cash-flows are spliced into securities with different risk-return profiles ("tranching"), which are sold to investors. Tranching is the primary means through which credit enhancement is achieved in CMBS deals (unlike RMBS, government guarantees are uncommon in CMBS). The

[5] Other differences between CMBS and RMBS include: (1) CMBS have lower prepayment risk due to prepayment lockouts and penalties typically associated with commercial loans. (2) Many (but not all) RMBS are issued by government agencies whose explicit (or de facto) federal guarantee significantly reduces the credit risk for investors. (3) While residential mortgages are usually amortizing, commercial loans tend to have a single "bullet" payment of principal at maturity; this introduces the risk that the commercial borrower may be unable to refinance the loan at maturity ("balloon extension risk"). For details on these and other differences between CMBS and other securitized assets, see Goldman Sachs (2007).

[6] See CRE Finance Council (2013) for further details on the CMBS origination process.

CMBS tranches are typically rated by two agencies.[7] Collateral cash-flow, such as principal repayment of the underlying loans, is paid out sequentially, first to the highest rated ("senior") bonds, then to the lower rated ones. Possible losses are first borne by the non-rated "equity" tranche; when that tranche is wiped out, additional losses are applied to the lowest rated tranche, then the next junior tranche etc.

AAA-rated CMBS are the bonds that constitute the top tranches in a CMBS deal with the highest level of credit enhancement. The subordinated tranches are typically categorized into mezzanine bonds (investment grade, but subordinated to the senior bonds), junior (high-yield or B-piece) bonds (below investment grade), and the first loss piece (most junior security in a deal).[8] Finally, there may be interest-only (IO) bonds which are securities that receive the excess interest in a CMBS deal, calculated as the difference between the coupon on the underlying commercial mortgage collateral and the coupons on the other bonds comprising the CMBS transaction.[9]

The process of rating a CMBS deal starts with issuers privately announcing a potential CMBS transaction to raters several months before the planned sale of the securities to investors. Raters perform a preliminary analysis and provide feedback to the issuers, including the minimum credit enhancement (level of subordination) suggested for a given tranche to obtain a certain rating. Based on this private information from the raters, issuers choose the agencies that will rate the deal; agencies may be retained for only some tranches of a deal. Once hired, the rating agency analyzes the commercial properties and loans in detail and subsequently drafts a report with key credit quality metrics for the deal. The transaction is then announced to investors and the rater publishes the preliminary ratings as well as the justifications for the

[7] Between 2000 and 2014, there have been 2,017 non-agency CMBS deals, according to data from the Commercial Mortgage Alert database. The median deal employs two raters, but around 25% of the deals use three or, in rare cases, more, raters.

[8] Subordination levels indicate the fraction of bonds in a deal that may be issued given a certain rating. For example, a AAA-rated tranche may have 30% subordination, which implies that 30% of the principal of the mortgage pool is structured below that tranche and that 30% of the pool's principal may be wiped out before the given AAA-rated tranche takes a loss.

[9] For further details on CMBS deal structure, see CRE Finance Council (2013).

ratings as part of the so-called presale report, which is distributed to investors. Final ratings are issued after the transaction closes.

CMBS can be categorized into four main types depending on the number of mortgages in the asset pool and the level of diversification of the underlying collateral (e.g., Goldman Sachs 2007). A 'conduit' deal includes many, smaller mortgages. A 'large' CMBS deal consists of a single mortgage. A 'single' deal consists of several mortgages with a single borrower, such as a real estate investment trust (REIT). Finally, 'fusion' deals have mixed pools which typically combine large loans with a more diversified set of small conduit loans, and are sometimes called 'conduit fusion' deals to indicate the similarity to plain conduit deals. Figure 1 illustrates the mix of CMBS types over the 2000-2014 period. The figure shows that CMBS issuance in the US declined from around 200 deals annually between 2005 and 2007 to less than 50 deals at the peak of the financial crisis in 2008. Subsequently, the CMBS market slowly recovered, reaching 141 deals in 2014. Since 2011, fusion CMBS deals accounted for more than a third of total deals. In terms of value, the total face value of all US fusion CMBS deals closed in 2014, for example, amounted to $57 billion.

The CMBS market is effectively segmented according to such broad categories of CMBS (see e.g., SEC 2013 and Flynn and Ghent 2016). For example, raters employ different methodologies for rating different CMBS types, which is reflected in the specialization of ratings analysts in specific types of CMBS. Figure 2 illustrates this point; in this figure, we summarize individual S&P analyst assignments across two broad categories, namely, fusion CMBS deals and other types of deals ("non-fusion"). Out of 60 primary analysts rating 298 CMBS deals between 2000 and 2014, 37 analysts (62%) exclusively rate either fusion or non-fusion deals, not both.[10] This is consistent with a significant degree of analyst specialization, and helps explain why fusion CMBS constitute a separate market segment.

[10] We collect the names of primary rating analysts from CMBS pre-sale reports contained in S&P's Capital IQ. Specifically, using information from Commercial Mortgage Alert, we obtain the description (including categorization of deals into fusion, single borrower etc.) of all non-agency CMBS deals with US collateral that are issued between 2000 and 2014 and for which S&P provides initial ratings. Out of these 757 CMBS deals, we can retrieve pre-sale reports (which contain analyst names) for 298 deals; 178 of these deals are of the fusion type.

Exhibit 1 illustrates the structure of a typical CMBS fusion deal ("JPMCC 2008-C2"). The issuer in the example is the J.P. Morgan Chase Commercial Mortgage Securities Trust. The deal closed on the 8th of May, 2008, and it has a total principal of $1,166 million. The assets of the deal, according to the initial SEC filings, consist of 79 fixed rate mortgage loans secured by first liens on 107 commercial properties and 11 housing community properties. The bookrunner on the deal is J.P. Morgan, and the master servicer is Midland Loan Services. The deal is rated by Moody's and Fitch. As can be seen from Exhibit 1, nine out of the 26 bonds in the deal are rated AAA (corresponding to $994 million of the deal principal). The first seven AAA tranches (A-1 to A-SB) have the highest levels of subordination (30%); such bonds are sometimes referred to as the "super-duper" classes. The other two AAA-rated tranches have, respectively, 20% and 14.75% subordination levels, making them "junior-AAA" classes. There is also heterogeneity in the expected maturity and coupon rate of the individual bonds (matching maturity features and expected cash flows of the asset pool). One tranche (A-4FL) pays floating rate coupons (this also matches collateral, i.e. mortgages with floating interest). There is also a AAA-rated interest only strip, tranche X(IO). There are many lower rated tranches, but these are small: only 10% of principal value is investment grade below AAA, and only 3% of principal is high yield. Finally, there is a small non-rated equity tranche that absorbs first losses, worth 2% of the principal.

B. The July 2011 incident and S&P's subsequent market share flatline

There are several determinants of the credit quality of a commercial mortgage, including the quality of the property, borrowers, and tenants; the loan to value ratio; and the debt service coverage ratio, or DSCR. The DSCR is the ratio of a property's annual net operating income to its total annual debt service (principal and interest). For the purposes of rating CMBS, the annual debt service is calculated by multiplying a so-called loan constant by the loan balance. In December 2010, S&P's CMBS Analytical Group changed the loan constant to be applied in certain CMBS deals. Specifically, S&P went from calculating DSCRs using a loan's actual debt service and hence actual loan constant to using a "blended" constant. This generally resulted in higher DSCRs, which in turn led to lower model-implied losses from defaults and hence lower

credit enhancement requirements (SEC 2015a). The new methodology underlay several fusion CMBS transactions that S&P rated during the first six months of 2011.[11]

While the ratings issued on these deals were based on the new assumption, presale reports did not disclose the use of the modified DSCR methodology. This inconsistency between the information provided in presale reports and the actual rating methodology also affected GSMS 2011-GC4, a $1.5 billion fusion CMBS deal that was in its final stages in July 2011. On the 27th of July 2011, following questions from investors, S&P's senior management announced a review of its fusion CMBS ratings criteria that "was prompted by the discovery of potentially conflicting methods of calculation in use." On the 28th of July 2011, in a move that was described as a "curveball" to CMBS investors (Ustun, Jousseaume, and Chew 2011) and as "unprecedented within the CMBS market" (Mulholland 2011), S&P withdrew its ratings on GSMS 2011-GC4. Neumann (2012) reports that the "unusual step sent the commercial mortgage securities market into turmoil and scuttled the deal for weeks, angering investors and issuers." Without ratings, the deal could not close and was scuttled by the issuers, Goldman Sachs and Morgan Stanley.

According to Tempkin (2012), the "debacle badly eroded S&P's credibility, and left it effectively frozen out of the sector." Indeed, our data suggest that S&P was completely shut out of the fusion CMBS segment for more than one year following the reputational shock. Figure 3 illustrates this point. Panel A shows completed fusion CMBS deals between 2008 and 2014 and indicates the involvement of S&P, Moody's, and/or Fitch in a given deal. The figure illustrates that between mid-2008 and mid-2010, there was no issuance of fusion CMBS, after which issuance slowly resumed. Between January 2008 and July 2011, S&P rated 11 completed fusion CMBS deals, somewhat fewer deals than Fitch and Moody's. Importantly, after the July 2011 incident, S&P was frozen out of the fusion CMBS segment. The next time S&P was able to secure a fusion deal was in September 2012, after publishing new ratings criteria (see discussion below). By contrast, Panel B of Figure 3, in which we plot non-fusion CMBS deals, shows that all

[11] These fusion CMBS were MSC 2011-C1, JPMCC 2011-C3, and JPMCC 2011-C4. In its order against S&P (see SEC 2015a), the SEC notes that the following deals also employed S&P's modified methodology: FREMF 2011-K701, FREMF 2011-K11, and FREMF 2011-K13. These deals are Freddie Mac's "multifamily mortgage loan securitizations". Following the classification in the Commercial Mortgage Alert database (which underlies the empirical analysis in this paper), we classify these deals as non-fusion CMBS.

three raters were rating some non-fusion CMBS deals throughout the same period. This suggests that S&P's market share loss was confined to the fusion CMBS segment, in which the event described above occurred. This is consistent with segmentation between deal types in the CMBS market (e.g., SEC 2013, Flynn and Ghent 2016) and with the fusion-specific nature of S&P's mistake. We provide a more detailed discussion of the evolution of S&P's market share in Sections II and III below.

After it had lost significant market share to its competitors in the fusion CMBS segment, S&P appears to have been determined to re-enter the market (e.g., SEC 2015b). The agency published new ratings criteria on September 5, 2012, and advertised them to issuers and investors. These new criteria included changes to S&P's fusion CMBS rating methodology, such as a modification in the calculation of the capitalization rate as well as the introduction of "qualitative overlays" that provided rating analysts with more discretion in setting the level of credit enhancement. These changes in the rating methodology were described as lenient by some market participants (see e.g., Yoon and Neumann 2012 and Tempkin 2012).

S&P's attempts to regain market share that it had lost following the reputational shock quickly bore fruit. A few weeks after the publication of the new ratings criteria, S&P was hired by JP Morgan to rate the fusion transaction JPMCC 2012-C8 (settlement date: 18th of October, 2012). Somewhat unusually, three additional agencies were asked to rate the deal, "a peculiar signal that some investors saw as an effort by JP Morgan to quell concerns about S&P's presence" (Tempkin 2012).[12] Figure 4 summarizes the time-line of events discussed in this section.

[12] The events described above were the subject of two orders issued by the SEC against S&P. These orders maintain that some elements of S&P's conduct were fraudulent: the inconsistencies related to the December 2010 changes of the DSCR calculation and the failure to properly disclose changes in the methodology to investors; the associated failures of internal controls; and the allegedly false and misleading statements made by S&P in connection with the 2012 ratings criteria change. As a result, S&P was prohibited from rating fusion CMBS for a period of twelve months starting in January 2015. Furthermore, S&P paid approximately $58 million to settle the SEC's charges. S&P also settled related cases by the NY Attorney General and Massachusetts Attorney General for $12 million and $7 million, respectively. For more details, see the SEC press release from January 21, 2015, entitled "SEC Announces Charges Against Standard & Poor's for Fraudulent Ratings Misconduct".

II. Main analysis

In this section, our aim is to shed light on the strategy employed by S&P to regain market share in the fusion CMBS segment following the July 2011 reputational shock. In particular, we test whether S&P's attempt to re-enter the fusion CMBS segment after July 2011 was associated with a change in the level of its ratings. To this end, we compare S&P's ratings to those assigned on the same securities by other raters. We consider ratings on new CMBS deals in our main analysis, as these ratings are arguably the most relevant for issuers of debt securities (the initial ratings impact pricing and deal terms). In robustness tests (see Section III), we also investigate ratings on seasoned tranches. Next, we first discuss the data used. We then describe the empirical strategy and the results.

A. Data

Our main analysis focuses on fusion CMBS deals between beginning of 2008 and end of 2014, approximately three-and-a-half years before and after S&P's procedural mistake in July 2011. We obtain data on deal details, including ratings, from Commercial Mortgage Alert, a commercial real estate finance trade publication. Ratings are assigned to each tranche of a deal, usually by several rating agencies, so each observation in our main sample is a tranche-rating. The database contains information on ratings assigned at the deal closing date. We identify the type of CMBS for each deal. For each tranche, we also identify the seniority ranking in its deal. We exclude government agency deals from the sample. Finally, we focus on ratings assigned by S&P, Moody's, and Fitch, the main raters in the CMBS market at the time.[13]

B. Empirical strategy

Most of our tests are aimed at studying S&P's market share and ratings following the reputational shock of July 2011. The first tests concern the level of ratings. We compare ratings

[13] S&P, Moody's, and Fitch are comparable in that they are large, well-established agencies with a long history of rating CMBS. During the latter part of the sample period we consider, the CMBS market experienced the entry and market share gain of several other raters: Morningstar, Kroll, and DBRS (Flynn and Ghent 2016). We do not include these raters in our analysis because our empirical methodology requires us to benchmark S&P's ratings to the ratings of other raters *in the same deals*, and prior to the event in July 2011, the fusion CMBS market was dominated by S&P, Moody's, and Fitch.

assigned by S&P in fusion deals after July 2011 to ratings before; we identify biases in the ratings assignment by benchmarking ratings by S&P to those issued by Moody's and/or Fitch on the same deals. Our baseline regression model is:

$$Tranche\ Rating_{i,j,r,t} = \alpha \cdot Ind(S\&P)_{i,j,r,t} \cdot Ind(Post\ July\ 2011)_t + \beta \cdot Ind(S\&P)_{i,j,r,t} + \gamma \cdot Ind(Post\ July\ 2011)_t + \Psi_{i,j,r,t} + \varepsilon_{i,j,r,t} \quad (1)$$

where *i* denotes the deal, *j* the tranche, *r* the rating agency, and *t* the month in which the deal closed. *Tranche Rating* is the rating of a tranche at the time of deal closure; we assign numerical values to the alphanumeric tranche ratings, with a value of one denoting the highest credit rating ("AAA" in the case of S&P and Fitch, "Aaa" in the case of Moody's). *Ind(Post July 2011)* is a dummy variable that takes the value of one if the deal is closed in August 2011 or later, zero otherwise. *Ind(S&P)* is a dummy variable indicating that a rating is by S&P; the variable is zero if a rating is by Moody's or Fitch. Finally, we employ a set of fixed effects $\Psi_{i,j,r,t}$ to control for unobserved heterogeneity. Our main specification includes fixed effects for rater, year-quarter, and the specific tranche. Since the variables *Ind(Post July 2011)* and *Ind(S&P)* are subsumed by the time and rater fixed effects, respectively, the coefficients β and γ are not identified and not reported. We report standard errors that are adjusted for clustering of the error terms $\varepsilon_{i,j,r,t}$ at the deal level.

The tranche fixed effects alleviate concerns related to omitted or imperfectly measured variables specific to a given tranche of a given deal (such as the credit quality of the bond). We identify possible ratings biases after the July 2011 event through differences in ratings across agencies *within* a given tranche. Our tests can thus be interpreted as difference-in-differences estimates, where the ratings issued by S&P after July 2011 are compared to ratings issued by S&P on earlier fusion deals, and relative to the ratings assigned by the "control group" consisting of Moody's and Fitch. With reference to regression equation (1), the relevant difference-in-differences coefficient is α. The identifying assumption is that absent the July 2011 event, ratings by S&P of new issues would have related to Fitch's and Moody's ratings of the same tranches the same way as before the crisis; we examine this assumption in Section III.

We estimate the change in S&P's market share following the reputational shock using the following model:

$$Market\ Share_{r,t} = \alpha \cdot Ind(S\&P)_r \cdot Ind(Post\ July\ 2011)_t + \beta \cdot Ind(S\&P)_r + \gamma \cdot Ind(Post\ July\ 2011)_t + \Psi_{r,t} + \varepsilon_{r,t} \quad (2)$$

where *r* denotes the rating agency and *t* the year-quarter. *Market Share* is the percentage of new deals in a given year-quarter that a given rater is involved in; because a deal can employ more than one rater, market shares in this sense can add up to more than 100% if summed across raters in a given year-quarter. *Ind(Post Q2 2011)* is a dummy variable taking the value of one after the second quarter of 2011. *Ind(S&P)* takes a value of one if an observation refers to S&P, zero if it refers to Moody's or Fitch. Finally, $\Psi_{r,t}$ is a matrix containing rater and year-quarter fixed effects. In these regressions, we report standard errors that are adjusted for clustering of the error terms $\varepsilon_{r,t}$ at the year-quarter level.

C. Summary statistics

Summary statistics are reported in Table 1. The sample consists of CMBS deals closed between 2008 and 2014. Panel A describes fusion deals, which are the main focus of our analysis, while Panel B is for non-fusion deals, which we employ in placebo tests. In both panels, we present summary statistics for two samples: one for the ratings analysis, and one for the analysis of market shares. In the ratings sample of Panel A, there are 3,678 observations at the tranche-rater level, corresponding to each rating for every tranche of 153 unique fusion CMBS deals. The average *Tranche Rating* is approximately equal to five on the numerical scale, which corresponds to an "A+" rating on S&P's and Fitch's alphanumeric rating scale and an "A1" on Moody's scale. About 13% of the ratings assigned are by S&P (S&P was involved in 32 fusion deals over the sample period). There are 84 observations in the market share sample of Panel A (there are 28 year-quarters in the 2008-2014 period, and we have three raters in our sample). The sample mean of *Market Share* is about 45%, which suggests that each of the three raters is involved in about half of the fusion deals during the sample period.

Panel B reports summary statistics for non-fusion CMBS deals. The sample for the ratings analysis corresponds to a total of 2,622 observations. In this sample, as in Panel A, the average *Tranche Rating* is also 5 (A+). Around 37% of the ratings assigned in the non-fusion sample are by S&P. In the market share sub-sample, the average *Market Share* is 42%.

D. Main results

To re-gain lost market share after July 2011, does S&P cater to issuers through more optimistic ratings? We first examine this question graphically in Figure 5. The figure reports the difference between the *Tranche Rating* assigned by S&P and the average rating assigned by Moody's and/or Fitch in the same tranches. A negative "rating difference" therefore suggests that S&P is more optimistic with regard to a given tranche than the other raters. Larger circles in the graph indicate a larger number of tranches that exhibit the same "rating difference" in deals that close on the same date. The dashed vertical line denotes the 27th of July 2011, the day when S&P announced the discovery of potentially conflicting methods of calculation in its fusion CMBS ratings models. Panel A of Figure 5 shows fusion deals. Remarkably, between January 2008 and July 2011, there was no ratings disagreement between S&P, Moody's and Fitch on any tranche of *any* fusion deal. However, after July 2011, S&P was, by and large, more optimistic than its competitors (by about a tenth of a notch, on average).[14] We compare this to non-fusion deals in Panel B of the figure. While there was somewhat more disagreement in non-fusion ratings between different agencies (reflecting the more heterogeneous types of deals in the "non-fusion" segment), these rating differences are not statistically different from zero on average. Furthermore, there is no statistically significant difference between ratings assigned by S&P and the other raters in non-fusion deals when we compare the post July 2011 period to the period before.

Table 2 reports results of regressions that examine this issue more formally. Column 1 reports coefficients from a regression model that employs deal and seniority fixed effects. Column 2 reports results from regressions that include tranche fixed effects (this is our base-line

[14] The average rating difference between S&P and the other raters post July 2011 is statistically significantly different from zero at the 1% level. Furthermore, the difference between the average rating difference before July 2011 and afterwards is also statistically significant at the 1% level.

model). Both regressions also include rater and time (quarter-year) fixed effects. The coefficient estimate for S&P post-event (α in equation (1)) is negative and statistically significant (at the 5% level or higher) in both regressions. This suggests that after the July 2011 mishap, S&P assigned, on average, more optimistic ratings in new fusion deals than Moody's and Fitch. The magnitude of this effect is about a tenth of a notch on average.

US commercial mortgages are generally very safe. This implies that a lot of the claims issued against (somewhat diversified) mortgage pools inherently have very low risk. This, in turn, means that most of the stock of CMBS securities (by value) are AAA-worthy. There is little room for disagreement or bias among these securities. Because of this, the regressions reported in Table 2 may not capture the extent of ratings bias for the securities where it matters, as it includes all the very safe tranches. We therefore re-estimate the coefficients of our regressions using a sub-sample in which we exclude tranches for which all raters assign the highest rating (that is, AAA or Aaa). In these tests, we effectively focus on so-called *Mezzanine CMBS* (the middle tranches of a CMBS structure ranging from AA+ to BBB-) and the *B-Piece* (or *high yield*) *CMBS*, tranches rated BB+ and lower. Results are reported in Table 3. In these specifications, the difference-in-differences coefficient is larger in absolute terms compared to the estimates reported in Table 2. According to Table 3, S&P assigns higher ratings—that is, ratings closer to AAA—than its competitors by about a fourth (column 1, specification with deal and seniority fixed effects) or a fifth (column 2, specification with tranche fixed effects) of a notch after the July 2011 reputational shock. Table 3 suggests that S&P's optimism relative to the other raters appears to primarily manifest in the subordinated, riskier tranches.[15]

[15] Our results are consistent with anecdotal evidence suggesting that S&P's ratings on new deals following the July 2011 event are higher than those of its competitors, especially in the lower-ranked tranches. Referring to the first fusion CMBS deal (JPMCC 2012-C8) that S&P rates after the July 2011 event and the 2012 criteria change, Tempkin (2012) writes for Reuters*: "'This was one of the weaker deals in the market, so we didn't participate,' said a New York-based CMBS portfolio manager at one of the largest insurance companies in the country. He said he was shocked that S&P had lowered credit enhancement for lower-ranked slices versus a previous deal. Two other agencies on the JP Morgan deal told IFR that S&P was not the most conservative of the raters of the transaction, which they said was unusual for an agency trying to repair its damaged image. The average loan-to-value (LTV) that S&P assigned to the deal—82%—was lower than that of the other three agencies by at least 14 percentage points. A lower LTV implies lower financial risk to buyers of the bonds. S&P also graded a lower-ranking tranche in the deal at double-B, while the three others had it at single-B."*

The ratings difference that opened up when S&P returned to the CMBS market (between 0.1 and 0.25 notches) is unlikely to impact investors directly. Nevertheless, there are several reasons why this effect may matter to financial markets. First, many smaller agencies have weaker reputations than S&P, and the amount of upward pressure manifested in ratings may therefore be higher in other situations than the one we study. The advantage of our study is that it offers a before-and-after comparison (whereas most agencies with weak reputations are new entrants, with a limited or non-existent track record). Second, one biased agency may influence others in turn to issue higher ratings (see Griffin, Nickerson, and Tang 2013). If this effect operates in our sample, it will reduce the coefficient estimates (which compare the affected agency to its peers), thus underestimating the true extent of upward bias. Third, the amount of competition in CMBS ratings has been rising in the years after our sample ends, and this may exacerbate any negative effects of competition going forward. Finally, the modest overall effect may conceal important heterogeneity. We next turn to investigating cross-sectional differences in how the reputational shock to S&P affected ratings.

Prior research has documented that large issuers (He, Qian, and Strahan 2012) and issuers that provide more securitization business to rating agencies (Efing and Hau 2015) receive higher ratings. It is therefore plausible that the effects on S&P's ratings that we document for the post July 2011 period are more pronounced if a CMBS issuer or a deal is more important, perhaps because the deal is big or the issuer has considerable market share. We test this hypothesis in Table 4.

In Panel A of Table 4, we split the sample according to issuers' shares in the CMBS market in the previous calendar year. Specifically, we annually divide the total face value of CMBS deals attributable to an issuer over the total face value of CMBS deals sold by all issuers.[16] We then estimate regressions separately for issuers with above median market share (columns 1 and

[16] We use the definition of issuer from the CMBS database, which is the name of the issuing entity, exactly as it is shown on the prospectus.

2) and for those with below median market share (columns 3 and 4).[17] Consistent with our conjecture, we find that S&P's ratings are only higher than those of Moody's and Fitch for deals by "important" issuers, that is, those with a relatively high market share in the CMBS market. The difference-in-differences coefficient is negative and statistically significant according to the regressions in columns 1 and 2. In contrast, it cannot be ruled out at traditional levels of statistical significance that the effect is zero for fusion deals from issuers with below median market share (columns 3 and 4). In Panel B of Table 4, we distinguish between deals according to their presumed importance to the raters. We proxy deal importance by splitting the sample into fusion deals with a face value (in 2009 US dollars) above (columns 1 and 2) and below (columns 3 and 4) the sample median face value. Consistent with our results in Panel A, we find that S&P's ratings are only higher than those of the other two raters in the group of large deals. Overall, the evidence presented in Table 4 is consistent with the findings of He, Qian, and Strahan (2012) and Efing and Hau (2015).

Table 3 reports that S&P assigned higher ratings (compared to its competitors) in new deals brought to the market after the July 2011 reputational shock, with most of the rating differences materializing in the subordinated, riskier tranches. Mezzanine and high-yield CMBS bonds represent important funding for commercial real estate, so this is economically relevant. However, a key determinant of a CMBS deal's cost of capital is the portion of the deal that is rated AAA. While the scope for disagreement among raters on what constitute the safest and highest rated tranches in a CMBS deal is limited, S&P's ratings criteria change of September 2012 may have enabled issuers to carve out a larger fraction of the pool as AAA-rated tranches in S&P-rated deals. There is evidence that raters react to each other, making upward adjustments beyond their model when their competitor has more lenient assumptions, effectively increasing the percentage of AAA bonds in the deal when the other agency's model produces more (see Griffin, Nickerson, and Tang 2013). The methodology employed so far is not

[17] As we merge data from a given year with the previous calendar year's market share and some issuers may not have issued CMBS in the prior year, the total number of observations in Panel A of Table 4 is lower by 754 compared to the sample in Table 2.

well suited to investigate this. Instead, to determine if the portion of AAA increased in S&P-rated deals after July 2011, we employ the following regression model:

$$Percentage\ AAA_{i,t} =$$
$$\alpha \cdot Ind(S\&P)_{i,t} \cdot Ind(Post\ July\ 2011)_t + \beta \cdot Ind(S\&P)_{i,t} + \gamma \cdot Ind(Post\ July\ 2011)_t + \delta \cdot X'_{i,t} +$$
$$\Psi_{i,t} + \varepsilon_{i,t} \qquad (3)$$

where *i* denotes the deal and *t* the year-quarter in which the deal closed. In these tests, there is one observation per deal, reflecting information at the time of deal closure. *Percentage AAA* is the size of the AAA piece in a deal, calculated as the sum of the original face amount of all AAA-rated tranches divided by the sum of the face value of all the classes in the deal (times 100). A tranche is defined as AAA-rated when any rater (S&P, Moody's and/or Fitch) assigns to it the highest rating at issue. *Ind(Post July 2011)* is a dummy variable that takes the value of one if the deal is closed in August 2011 or later, zero otherwise. *Ind(S&P)* is a dummy variable indicating that a deal is (also) rated by S&P, while it is zero when S&P is not involved in the rating of a deal. Our main specification employs controls *X*: the number of loans in the pool, and the number of agencies rating the deal. We also employ a set of fixed effects $\Psi_{i,t}$ to control for unobserved heterogeneity. Our main specification includes fixed effects for: year-quarter; offering type, that is, the method of securities distribution, such as Rule 144A offerings and SEC-registered deals; region where the deal is distributed (for fusion deals, that is only US in the sample); region of collateral (for fusion deals, only US). Since the variable *Ind(Post July 2011)* is subsumed by the time fixed effects, the coefficient γ is not identified and not reported. We report standard errors that are adjusted for clustering of the error terms $\varepsilon_{i,t}$ at the year-quarter level.

In the sample of 153 fusion CMBS deals completed between 2008 and 2014, the average size of the AAA piece is 76% (87% in the 14 deals completed between 2008 and 2010, and 75% in the 139 deals between 2011 and 2014). For the 32 deals that S&P is involved in, the average size of the AAA piece is 80% over the sample period, while it is 75% for deals that S&P is not involved in. In Table 5, we study whether—for deals that involved S&P as a rater—the size of the AAA piece changed after the July 2011 event. In column 1, we report coefficients from a specification

that includes only time fixed effects, while column 2 reports coefficients from a regression with the full set of fixed effects and controls discussed above. In both regressions we find that after the July 2011 event, deals that involved S&P as a rater had a larger AAA piece by about 6 percentage points compared to deals on which S&P was not hired as a rater; these estimates are statistically significant at the 10% (column 1) and 5% (column 2) levels, respectively.

One possible explanation of these results is that after the reputational shock in July 2011, S&P caters more to issuers of fusion CMBS by enabling them to carve out a larger AAA piece. As a caveat, we note that this effect is not as well-identified as the evidence we provide on tranche ratings in earlier tests (Tables 2—4) where we are able to cross-sectionally compare ratings from different raters while controlling for unobserved tranche characteristics (like the "true" credit quality of the tranche) with fixed effects. Instead, we have one observation per deal in Table 5, ruling out the inclusion of deal fixed effects in the regressions. There is an advantage of this methodology, however: it can capture the net effect on equilibrium ratings, if S&P's behavior impacts other raters. To the extent that S&P would "drag" other raters with it, the relative methodology (Tables 2—4) may underestimate the impact of the event we study, but the results in Table 5 do not.

Were S&P's strategies to re-gain market share in the fusion CMBS segment successful? Figure 3, Panel A, shows that while S&P was initially shut out of the fusion CMBS segment for at least one year after its July 2011 setback, it was indeed able to regain some market share after the change in ratings criteria in mid-2012. We examine this question more formally in Table 6. The dependent variable is raters' *Market Share* in the fusion CMBS segment. In column 1, the coefficient of interest is the interaction between *Ind(S&P)*, an indicator for S&P, and *Ind(Post Q2 2011)*, a variable indicating the period after the July 2011 event. The coefficient estimate is significant at the 1% level and takes a value of -50.7, which implies that after the July 2011 event, S&P's market share in the fusion CMBS segment was lower, on average, by about 51 percentage points compared to the other raters and the period before mid-2011.

In the analysis of market shares, there are two distinct periods of interest: (1) the period between July 2011 (when S&P's procedural mistake took place) and September 2012 (when S&P

published new CMBS ratings criteria), during which S&P was not involved in rating any new fusion deal; (2) the period after September 2012 when S&P was finally able to secure new fusion deals. In column 2 of Table 6, we separately examine S&P's market share relative to its competitors during these two time periods. The two regression coefficients of interest which highlight the respective time periods are both negative and significant. However, the coefficient on the post-September 2012 interaction (*Ind(S&P) x Ind(Post Q2 2012)*) is smaller in absolute terms (that is, less negative) by about 28 percentage points than the coefficient on the interaction designating the period between mid-2011 and mid-2012 (*Ind(S&P) x Ind(Post Q2 2011, Pre Q3 2012)*). The difference between these two coefficients is significant at the 5% level. This confirms the interpretation that S&P dramatically lost market share after the July 2011 procedural mistake, and then managed to recover some, but not all, of that market share after issuing ratings which we found in our previous analysis (see Tables 2—4) to be higher than those of its competitors.

Did the more issuer-favorable ratings *cause* the recovery of market share? This seems plausible, but is difficult to confirm. Perhaps S&P changed their pricing, or other contract terms. S&P's higher ratings post September 2012 may not have been the (sole) cause of S&P's market share increase.

III. Robustness and discussion

A. Alternative sample periods

The sample period we consider in our tests is 2008 to 2014, approximately three-and-a-half years before and after the July 2011 procedural mistake of S&P. Our results are not sensitive to this choice of period. In Table 7, we re-run our main specification using alternative sample periods: 2010 to 2012 (column 1), and 2009 to 2013 (column 2). We find qualitatively similar results as those reported in Table 2; if anything, the point estimates of the difference-in-differences coefficient are larger when considering a shorter window around the July 2011 event (see column 1). This may suggest that S&P issued particularly high ratings early in its attempt to

regain market share, and perhaps to a lesser extent in subsequent years once its market share started to rise.[18]

The interpretation of our results on ratings rests on the identifying assumption that, absent the July 2011 reputational shock, ratings of S&P and Moody's / Fitch would have evolved similarly between 2011 and 2014. The concern could arise that, instead, ratings of S&P would have been different even absent the "treatment" of the July 2011 shock. One way to alleviate this concern is to compare ratings on fusion CMBS by S&P to ratings by Moody's and Fitch prior to the July 2011 shock. In Figure 5, Panel A, we see that ratings by S&P and the other two raters were identical in the pre-event period, i.e., prior to July 2011. This observation also lends support to the common trends assumption of our difference-in-differences test design.

***B. Placebo test*s**

As discussed in Section I, the CMBS market is effectively segmented according to broad deal types, and raters apply different methodologies for rating different types of CMBS (e.g., SEC 2013, Flynn and Ghent 2016). The procedural mistake at the center of our analysis involved ratings and disclosures for fusion CMBS transactions. This is consistent with the evidence in Figure 3 (discussed above), in the sense that the July 2011 mishap affected S&P's market share in the fusion CMBS segment, but not its market share in the non-fusion segment. Consequently, we focused our tests on the fusion CMBS market segment.

In Table 8, we test the identifying assumption that ratings and market shares do not vary systematically in other segments of the CMBS market. Specifically, we consider *non-fusion* CMBS deals as a placebo sample and compare ratings and market shares before and after July 2011 in this alternative CMBS segment that we would not expect to be affected by S&P's procedural mistake. This test also serves as a more formal means to verify that the CMBS market is segmented along deal types into a fusion and non-fusion segment. Panel A examines ratings, while Panel B examines market shares in the non-fusion CMBS segment. In both panels, column

[18] We note as a caveat that S&P only rated four fusion deals in 2012, all between October and December of that year. We also confirm that results remain significant if we drop the year 2012 from the 2008-2014 (or 2009-2013) sample period; we do not report these tests for the sake of brevity.

1 reports the regression results for the sample period 2010 to 2012, while columns 2 and 3 report the results for the 2009 to 2013 and 2008 to 2014 periods, respectively. In Panel A, the difference-in-differences coefficients are not significantly different from zero. That is, in the non-fusion CMBS segment, we find no statistically significant changes in the ratings assignment of S&P compared to the other raters after July 2011. Similarly, in Panel B, we find no difference in market share (trends) between S&P and the other raters after July 2011 compared to the preceding period.

Finally, we also examine whether the size of the AAA-piece changes in our set of "placebo" deals in which S&P is hired as a rater. In unreported tests that employ the same specifications as in Table 5 we find no significant change in the size of the AAA piece for non-fusion CMBS deals in which S&P is hired as a rater: the difference-in-difference coefficient corresponding to α in equation (3) is not statistically different from zero.

C. Seasoned ratings

In our main analysis, we find that S&P catered to issuers by assigning higher ratings in new deals following the CMBS ratings criteria change on September 5, 2012. Thereafter, S&P re-gained market share. Issuers of structured debt securities care about ratings at issue as these affect the prices at which their securities can be sold. However, to ascertain that the new rating criteria of September 2012 did indeed result in a more lenient ratings policy overall, we will now consider ratings on both new and seasoned fusion CMBS tranches. We employ a dataset that contains rating changes by S&P and Moody's on both new and seasoned US fusion CMBS deals between 2008 and 2014.[19] To be included in the sample, a tranche (i) has to have a CUSIP security identifier, (ii) must have at least one rating assigned (upgrade, downgrade, new rating, or affirmation) by both Moody's and S&P during the 2008-2014 sample period, and (iii) must

[19] We obtain Moody's ratings on tranches of new and seasoned fusion CMBS deals from Moody's Default Risk Service Structured Finance database. S&P data are from Capital IQ and from the regulatory disclosures section of S&P's website (disclosures of rating histories according to Rule 17g-7(b)). For the purposes of this analysis, we only consider ratings between AAA and C (and the equivalent ratings on Moody's rating scale). To identify fusion deals, we rely on deals designated as "CMBS - Conduit / Fusion" within Moody's Default Risk Service Structured Finance database.

experience at least one rating change by at least one of the two raters between 2008 and 2014. 2,405 tranches of 209 fusion CMBS deals are included in the resulting sample.

Figure 6 reports rating changes for seasoned tranches over the 2008-2014 sample period. Specifically, for each rater, it shows upgrades as a fraction of total rating changes. We report three sample periods: before the July event (2,377 rating changes by S&P; 3,390 rating changes by Moody's), after the event but before the ratings criteria change in September of 2012 (S&P rating changes: 622; Moody's rating changes: 919), and after the criteria change (S&P: 733, Moody's: 1,357). The figure shows that before the ratings criteria change, the fraction of upgrades on seasoned fusion CMBS tranches was broadly similar for both raters. However, the likelihood of an upgrade by S&P (compared to Moody's) becomes considerably higher—by about 10 percentage points—after the criteria change.

Table 9 examines this issue more formally in a regression framework; Panel A reports summary statistics and Panel B shows the regression results. As in Figure 6, we split the sample into three periods of interest. First, the period before July 28, 2011 (S&P withdraws ratings on GSMS 2011-GC4); the period between July 28, 2011 and September 5, 2012 (S&P publishes new CMBS ratings criteria), during which S&P is not involved in rating any new fusion deal; and, finally, the period after September 5, 2012, when S&P applied the new ratings criteria. We estimate the following regression model:

$$Upgrade_{i,j,r,t} = \alpha \cdot Ind(S\&P)_{i,j,r,t} \cdot Ind(Post\ 28\ July\ 2011, Pre\ 6\ September\ 2012) + \beta \cdot Ind(S\&P)_{i,j,r,t} \cdot Ind(Post\ 5\ September\ 2012) + \gamma \cdot Ind(Post\ 28\ July\ 2011, Pre\ 6\ September\ 2012)_t + \delta \cdot Ind(Post\ 5\ September\ 2012) + \Psi_{i,j,r,t} + \varepsilon_{i,j,r,t} \quad (4)$$

where i denotes the deal, j the tranche, r the rating agency, and t the date on which the rating change is observed. *Upgrade* is a dummy variable equal to one if a rating change results in a higher rating; it takes the value of zero if the rating change leads to a lower rating. *Ind(Post 28 July 2011, Pre 6 September 2012)* is a dummy variable that takes the value of one if the rating change is observed between July 28, 2011 and September 5, 2012. *Ind(Post 5 September 2012)* takes the value of one after September 5, 2012. *Ind(S&P)* is a dummy variable indicating that a rating

change is by S&P; the variable is zero for rating changes by Moody's. We employ a set of fixed effects $\Psi_{i,j,r,t}$ to control for unobserved heterogeneity. In the specification reported in column 1 of Panel B, we include fixed effects for the rater, the year-quarter of the rating change, and fixed effects for each tranche. The specification reported in column 2 contains rater fixed effects and fixed effect for each tranche in each quarter; these *tranche x year-quarter* fixed effects permit us to account for unobserved or imprecisely measured variables at the tranche level (even if they are time-varying), such as the "true" credit quality of a tranche at a given point in time. We report standard errors that are adjusted for clustering of the error terms $\varepsilon_{i,j,r,t}$ at the deal level.

Across both specifications reported in Table 9, we find that the likelihood of tranches being upgraded by S&P, when compared to the likelihood of upgrades on the same tranches by Moody's, significantly increases after S&P's ratings criteria change on September 5, 2012, but not before. In terms of magnitude, considering the specification reported in column 2, an upgrade by S&P is about 11 percentage points more likely than an upgrade by Moody's after September 2012. Overall, the analysis of seasoned ratings shows that the ratings criteria change on September 5, 2012, results in a more lenient ratings policy for fusion CMBS, considering both new and seasoned tranches.[20]

D. Discussion

Our results suggest that after July 2011, S&P on average assigns higher ratings than the other raters on fusion CMBS deals. We interpret this as consistent with an attempt by S&P to regain market share by catering to issuers through higher ratings. However, by construction, we identify this bias only relative to the ratings of other agencies. Therefore, our results permit alternative interpretations. For example, one could argue that the modified ratings criteria that S&P employs after September 2012 allow it to better assess credit risk, and that, rather than S&P being too optimistic, it is the case that the other raters are too conservative than warranted.

[20] We note that in the regressions reported in Table 9, the coefficients on the variables *Ind(Post 5 September 2012)* and *Ind(Post 28 July 2011, Pre 6 September 2012)* are identified despite time fixed effects. This occurs because the data underlying these regressions is at a daily frequency and the time dummies absorb time-series variation at the quarterly level. For example, within Q3 2011, *Ind(Post 28 July 2011, Pre 6 September 2012)* switches from zero to one, so the coefficient can be estimated despite the year-quarter fixed effects.

A good way of addressing this concern would be to consider the ex post performance of the ratings by examining realized defaults. Unfortunately, this is not yet helpful. We collected data on defaults for fusion CMBS issued between 2008 and 2014.[21] As of September 2017, no defaults of *rated* tranches of fusion deals originated between 2011 and 2014 (the relevant "post-event" period in our setting) have occurred;[22] therefore, this way of assessing the ex post performance of the ratings is impractical in our case.

However, we believe that our interpretation of the evidence is more plausible than the alternatives for at least three reasons. First, the new fusion CMBS criteria that S&P employed from September 2012 have been specifically described by some market participants as lenient and as aimed at increasing market share by catering to issuers (e.g., Yoon and Neumann 2012; Tempkin 2012). Second, the cross-sectional tests discussed above are more consistent with the interpretation that S&P's ratings become more lenient with the purpose of regaining market share. If S&P is catering to issuers through higher ratings, one would precisely expect these effects to be stronger for larger deals and more important issuers, as we document in Table 4. Finally, if it is indeed other raters that become more conservative rather than S&P becoming more optimistic, this would beg the question why this occurs only in the fusion CMBS segment (we find no rating differences for non-fusion CMBS, see Panel A of Table 8) and precisely after S&P is shut out of that market segment.

IV. Conclusions

In this paper, we study reputations and ratings quality in a high competition environment. We consider a quasi-experimental setting in which a rater suffers reputational damage and, subsequently, sees its market share relative to its competitors drop to zero. Due to procedural mistakes related to inconsistencies in its fusion CMBS ratings model, S&P was shut out of that market segment for a period of more than one year. We use this setting to study S&P's response, that is, how the rater's attempts to regain market share affect ratings quality. To measure ratings

[21] We obtain data from Trepp, LLC. We use information from the database on cumulative losses for each fusion deal and tranche to determine if a default occurred.

[22] Some defaults of non-rated fusion tranches issued between July 2011 and December 2014 have occurred. As we focus our analysis on rated tranches, these defaults are not informative for our purposes.

bias, we compare S&P's ratings on specific tranches of fusion CMBS deals to the ratings that Moody's and Fitch assign on the same tranches. We employ an extensive set of fixed effects, including those for each rater and tranche, to control for unobserved heterogeneity. We find that after July 2011, S&P issues more optimistic ratings on average than the other raters, in particular in larger deals and deals from more important issuers; subsequently, S&P regains some of the market share it lost. Our results suggest that issuing optimistic ratings is a strategy that can be used by a rating agency with a weak reputation to gain market share in a market with strong competition.

Does our study point to any policies for maintaining the quality of issuer-paid credit ratings? Competition improves the quality of products and services in most markets. Regulators appear to adhere to this view when calling for more competition in the credit ratings market. For example, in the US, the primary purpose of the Credit Rating Agency Reform Act of 2006 is to "improve ratings quality for the protection of investors and in the public interest by fostering accountability, transparency, and competition in the credit rating industry".[23] Similarly, according to the European Securities and Markets Authority (ESMA), the main regulator of credit rating agencies in Europe, one "of the objectives of the EU's regulation of credit rating agencies (the CRA Regulation) is to stimulate competition in the credit rating industry".[24] Our results indicate that under certain circumstances, strong competition in the credit ratings market may impair the quality of ratings. Policymakers should therefore proceed with caution when introducing measures aiming to increase the number of rating agencies. Since the financial crisis, the amount of competition has increased substantially in the market for rating structured products, raising new questions of what quality of ratings can be expected in a market with seven or eight competitors (Flynn and Ghent 2016), suggesting that these concerns remain highly relevant.

[23] Preamble of the Credit Rating Agency Reform Act of 2006 (Public Law 109–291, 109th Congress).
[24] ESMA technical document entitled "Competition and choice in the credit rating industry" (document ESMA/2015/1879 published on the 18th of December 2015).

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Exhibit 1. An example of a fusion CMBS deal

This exhibit illustrates the structure of a typical CMBS fusion deal ("JPMCC 2008-C2"). The issuer is J.P. Morgan Chase Commercial Mortgage Securities Trust. The deal closed on the 8th of May, 2008. All information is as of the settlement date of the deal. *Sub* is the subordination level of a tranche (in percent). *Coupon* is the initial annual pay rate of the bonds (in percent). *Life* is the weighted average expected time to retirement of each class of securities (in years). The information on the deal structure is from Commercial Mortgage Alert, a commercial real estate finance trade publication.

Tranche	Face amount (mn $)	Rating (Moody's)	Rating (Fitch)	Sub (%)	Coupon (%)	Life (years)
A-1	23.4	Aaa	AAA	30	5.02	2.72
A-1A	65.1	Aaa	AAA	30	6.00	8.42
A-2	68.1	Aaa	AAA	30	5.86	4.53
A-3	105.5	Aaa	AAA	30	6.29	6.43
A-4	354.6	Aaa	AAA	30	6.07	9.42
A-4FL	145.0	Aaa	AAA	30	LIBOR + 1.5	9.42
A-SB	54.5	Aaa	AAA	30	0.13	6.73
A-M	116.6	Aaa	AAA	20	6.80	9.68
A-J	61.2	Aaa	AAA	14.75	6.80	9.68
B	14.6	Aa1	AA+	13.5	6.80	9.68
C	14.6	Aa2	AA	12.25	6.80	9.68
D	10.2	Aa3	AA-	11.38	6.80	9.68
E	10.2	A1	A+	10.5	6.80	9.74
F	13.1	A2	A	9.38	6.80	9.76
G	11.7	A3	A-	8.38	6.80	9.76
H	16.0	Baa1	BBB+	7	6.80	9.76
J	14.6	Baa2	BBB	5.75	6.80	9.76
K	14.6	Baa3	BBB-	4.5	6.80	9.76
L	8.7	Ba1	BB+	3.75	4.30	9.84
M	4.4	Ba2	BB	3.38	4.30	9.84
N	5.8	Ba3	BB-	2.88	4.30	9.84
P	4.4	B1	B+	2.5	4.30	9.84
Q	2.9	B2	B	2.25	4.30	9.84
T	4.4	B3	B-	1.88	4.30	9.84
NR	21.9	NR	NR	0	4.30	10.73
X(IO)	(1,165.9)	Aaa	AAA		variable	8.35

Table 1. Summary statistics

This table reports summary statistics for the variables underlying the analysis of ratings of new deals, as well as for the tests examining rater market shares. Panel A focuses on the sample of fusion CMBS deals, while the sample in Panel B consists of non-fusion deals (used in robustness tests). In the ratings analysis sample, each observation is measured at the tranche-rater level. *Tranche Rating* is the rating of a tranche at the time of deal closure; we assign numerical values to the alphanumeric tranche ratings, with a value of one denoting the highest credit rating ("AAA" in the case of S&P and Fitch, "Aaa" in the case of Moody's). *Ind(Post July 2011)* is a dummy variable that takes the value of one if the deal is closed in August 2011 or later, zero otherwise. *Ind(S&P)* is a dummy variable indicating that a tranche rating is by S&P; the variable takes a value of zero if a tranche rating is by Moody's or Fitch. In the market share analysis sample, there is one observation for each rater per year-quarter. *Market Share* is the percentage of deals in a given year-quarter that a given rater is involved in. *Ind(Post Q2 2011)* is a dummy variable taking the value of one after the second quarter of 2011; *Ind(Post Q2 2011, Pre Q3 2012)* is a dummy taking the value of one after the second quarter of 2011 but before the third quarter of 2012; *Ind(Post Q2 2012)* takes a value of one after the second quarter of 2012. *Ind(S&P)* takes a value of one if a market share observation refers to S&P, zero if it refers to Moody's or Fitch. We exclude Government Agency deals from the analysis. The sample spans the years 2008-2014. The data are from Commercial Mortgage Alert, a commercial real estate finance trade publication.

Panel A: Fusion deals

Rating analysis sample

	Obs.	Mean	Std. Dev.	Min.	Max.
Tranche Rating	3,678	4.569	4.669	1	16
Ind(Post July 2011)	3,678	0.796	0.403	0	1
Ind(S&P)	3,678	0.132	0.339	0	1

Market share analysis sample

	Obs.	Mean	Std. Dev.	Min.	Max.
Market share	84	44.799	40.617	0	100
Ind(Post Q2 2011)	84	0.500	0.503	0	1
Ind(S&P)	84	0.333	0.474	0	1
Ind(Post Q2 2011, Pre Q3 2012)	84	0.143	0.352	0	1
Ind(Post Q2 2012)	84	0.357	0.482	0	1

Panel B: Non-fusion deals

Rating analysis sample

	Obs.	Mean	Std. Dev.	Min.	Max.
Tranche Rating	2,622	5.154	4.353	1	16
Ind(Post July 2011)	2,622	0.612	0.487	0	1
Ind(S&P)	2,622	0.374	0.484	0	1

Market share analysis sample

	Obs.	Mean	Std. Dev.	Min.	Max.
Market share	84	42.410	17.406	12.121	87.500
Ind(Post Q2 2011)	84	0.500	0.503	0	1
Ind(S&P)	84	0.333	0.474	0	1

Table 2. S&P ratings changes after July 2011

This table reports the coefficients for regression models comparing initial ratings by S&P to those assigned by Moody's and/or Fitch for deals closed before and after July 2011. The sample consists of fusion deals. Each observation in the sample is measured at the tranche-rater level. The variables are defined in Table 1. Heteroskedasticity-robust standard errors, clustered by deal, are reported below coefficients. * denotes estimates that are significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

	(1)	(2)
	Tranche Rating	
Ind(S&P) x Ind(Post July 2011)	-0.127**	-0.092***
	(0.064)	(0.031)
Deal F.E.	x	
Seniority F.E.	x	
Tranche F.E.		x
Rater F.E.	x	x
Year-quarter F.E.	x	x
Observations	3,678	3,678
Number of deals	153	153
Adjusted R-squared	0.937	0.995

Table 3. S&P ratings changes after July 2011, excluding AAA-rated CMBS securities

This table reports the coefficients for regression models comparing S&P ratings to those assigned by Moody's and/or Fitch before and after July 2011. The sample consists of fusion deals. In the tests reported in this table, we omit observations of tranches for which the variable *Tranche Rating* takes a value of one for all raters rating that tranche, that is, tranches that are assigned the highest possible rating by all raters. Each observation in the sample is measured at the tranche-rater level. The variables are defined in Table 1. Heteroskedasticity-robust standard errors, clustered by deal, are reported below coefficients. * denotes estimates that are significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

	(1)	(2)
	Tranche Rating	
Ind(S&P) x Ind(Post July 2011)	-0.255**	-0.225***
	(0.099)	(0.072)
Deal F.E.	x	
Seniority F.E.	x	
Tranche F.E.		x
Rater F.E.	x	x
Year-quarter F.E.	x	x
Observations	1,743	1,743
Number of deals	153	153
Adjusted R-squared	0.900	0.984

Table 4. Sample splits by deal and issuer importance

This table reports the coefficients for regression models comparing S&P ratings to those assigned by Moody's and/or Fitch before and after July 2011. The sample consists of fusion deals. In Panel A, the sample is divided based on issuers' market shares in the CMBS market in the previous calendar year; columns 1 and 2 show regressions for deals by issuers with above median market share, while columns 3 and 4 reports regressions for deals by issuers with below median market share. In Panel B, the sample is divided into deals above and below the sample median deal face amount (the face value is in 2009 US dollars). Each observation in the sample is measured at the tranche-rater level. The variables are defined in Table 1. Heteroskedasticity-robust standard errors, clustered by deal, are reported below coefficients. * denotes estimates that are significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

Panel A: Issuers with large vs. small market share

	(1)	(2)	(3)	(4)
Issuer Market Share:	> Median		< Median	
Dependent Variable:	Tranche Rating			
Ind(S&P) x Ind(Post July 2011)	-0.215***	-0.140***	-0.032	-0.028
	(0.060)	(0.034)	(0.126)	(0.065)
Deal F.E.	x		x	
Seniority F.E.	x		x	
Tranche F.E.		x		x
Rater F.E.	x	x	x	x
Year-quarter F.E.	x	x	x	x
Observations	1,419	1,419	1,505	1,505
Number of deals	64	64	57	57
Adjusted R-squared	0.955	0.993	0.928	0.995

Panel B: Large deals vs. small deals

	(1)	(2)	(3)	(4)
Deal Size:	> Median		< Median	
Dependent Variable:	Tranche Rating			
Ind(S&P) x Ind(Post July 2011)	-0.142**	-0.112***	-0.127	-0.042
	(0.067)	(0.021)	(0.128)	(0.089)
Deal F.E.	x		x	
Seniority F.E.	x		x	
Tranche F.E.		x		x
Rater F.E.	x	x	x	x
Year-quarter F.E.	x	x	x	x
Observations	1,830	1,830	1,848	1,848
Number of deals	62	62	91	91
Adjusted R-squared	0.930	0.996	0.947	0.994

Table 5. Size of AAA piece in fusion CMBS

In this table, we study the size of the AAA piece in new fusion CMBS deals. *Percentage AAA* is the size of the AAA piece in a deal, calculated as the sum of the original face amount of all AAA-rated tranches divided by the sum of the face value of all the classes in the deal (times 100). A tranche is defined as AAA-rated when any rater (S&P, Moody's and/or Fitch) assigns to it the highest rating at issue. *Ind(Post July 2011)* is a dummy variable that takes the value of one if the deal is closed in August 2011 or later, zero otherwise. *Ind(S&P)* is a dummy variable indicating that a deal is (also) rated by S&P, while it is zero when S&P is not involved in the rating of a deal. In these tests, there is one observation per deal, reflecting information at the time of deal closure. All data are from CMBS Alert. The sample period is 2008-2014. Heteroskedasticity-robust standard errors, clustered by year-quarter, are reported below coefficients. * denotes estimates that are significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

	(1)	(2)
	Percentage AAA	
Ind(S&P)	-0.971	-0.608
	(0.723)	(0.718)
Ind(S&P) x Ind(Post July 2011)	5.608*	5.565**
	(2.720)	(2.596)
Number of loans		0.050
		(0.032)
Number of raters in deal		0.103
		(0.972)
Year-quarter F.E.	x	x
Region where distributed F.E.		x
Region of collateral F.E.		x
Offering type F.E.		x
Observations	153	153
Adjusted R-squared	0.533	0.542

Table 6. Market share

In this table, we study S&P's market share relative to that of Moody's and Fitch in the fusion CMBS segment. The variables are defined in Table 1. In the sample underlying this analysis, there is one observation for each rater per year-quarter. Heteroskedasticity-robust standard errors, clustered by year-quarter, are reported below coefficients. * denotes estimates that are significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

	(1)	(2)
	Market Share	
Ind(S&P) x Ind(Post Q2 2011)	-50.653***	
	(16.125)	
Ind(S&P) x Ind(Post Q2 2011, Pre Q3 2012)		-70.417***
		(13.804)
Ind(S&P) x Ind(Post Q2 2012)		-42.747**
		(17.876)
Rater F.E.	x	x
Year-quarter F.E.	x	x
Observations	84	84
Adjusted R-squared	0.664	0.674

Table 7. Robustness: alternative sample periods

This table reports the coefficients for regression models comparing S&P ratings to those assigned by Moody's and/or Fitch before and after July 2011. The sample consists of fusion deals. The sample period underlying the regression in column 1 is 2010 to 2012, while the sample for column 2 is 2009 to 2013. The variables are defined in Table 1. Each observation in the sample is measured at the tranche-rater level. Heteroskedasticity-robust standard errors, clustered by deal, are reported below coefficients. * denotes estimates that are significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

	(1)	(2)
Sample Period:	2010-2012	2009-2013
Dependent Variable:	Tranche Rating	
Ind(S&P) x Ind(Post July 2011)	-0.215***	-0.107***
	(0.055)	(0.034)
Tranche F.E.	x	x
Rater F.E.	x	x
Year-quarter F.E.	x	x
Observations	1,154	2,251
Number of deals	51	96
Adjusted R-squared	0.996	0.995

Table 8. Robustness: placebo tests with non-fusion deals

This table reports placebo tests that focus on the sample of non-fusion deals. Panel A reports the coefficients for regression models comparing S&P ratings to those assigned by Moody's and/or Fitch before and after July 2011. Each observation in the sample is measured at the tranche-rater level. Panel B studies rating agency market shares. In both panels, the sample period underlying the regression in column 1 is 2010 to 2012, the sample for column 2 is 2009 to 2013, and the sample for column 3 is 2008-2014. The variables are defined in Table 1. Heteroskedasticity-robust standard errors are reported below coefficients. In Panel A, standard errors are clustered by deal, while in Panel B they are clustered by year-quarter. * denotes estimates that are significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

Panel A: Non-fusion deal ratings

	(1)	(2)	(3)
Sample Period:	2010-2012	2009-2013	2008-2014
Dependent Variable:		Tranche Rating	
Ind(S&P) x Ind(Post July 2011)	0.079	-0.006	-0.065
	(0.108)	(0.074)	(0.062)
Tranche F.E.	x	x	x
Rater F.E.	x	x	x
Year-quarter F.E.	x	x	x
Observations	928	1,823	2,622
Number of deals	143	271	383
Adjusted R-squared	0.935	0.948	0.969

Panel B: Non-fusion market share

	(1)	(2)	(3)
Sample Period:	2010-2012	2009-2013	2008-2014
Dependent Variable:		Market Share	
Ind(S&P) x Ind(Post Q2 2011)	-8.718	4.843	12.904
	(16.501)	(14.250)	(12.375)
Rater F.E.	x	x	x
Year-quarter F.E.	x	x	x
Observations	36	60	84
Adjusted R-squared	0.037	-0.086	-0.049

Table 9. Robustness: ratings of seasoned tranches

This table reports summary statistics (Panel A) and coefficients for regression models comparing S&P ratings to those assigned by Moody's on seasoned fusion CMBS tranches (Panel B). The sample period is 2008 to 2014. Moody's ratings on tranches of new and seasoned fusion CMBS deals are from Moody's Default Risk Service Structured Finance database. S&P data are from Capital IQ and from S&P's website (disclosures of rating histories according to Rule 17g-7(b)). For the purposes of this analysis, we only consider ratings between AAA and C (and the equivalent ratings on Moody's rating scale). To be included in the sample, a tranche has to have at least one rating assigned (upgrade, downgrade, new rating, or affirmation) by both Moody's and S&P during the 2008-2014 sample period and must experience at least one rating change by at least one of the two raters. *Upgrade* is a dummy variable equal to one if a rating change results in a higher rating; it takes the value of zero if the rating change leads to a lower rating. *Ind(S&P)* is a dummy variable indicating that a rating change is by S&P; the variable is zero if a rating change is by Moody's. *Ind(Post 28 July 2011, Pre 6 September 2012)* takes the value of one for rating changes between July 28, 2011 and September 5, 2012, and zero otherwise. *Ind(Post 5 September 2012)* takes the value of one after September 5, 2012, zero otherwise. Each observation in the sample is measured at the tranche-rater level. Heteroskedasticity-robust standard errors, clustered by deal, are reported below coefficients. * denotes estimates that are significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

Panel A: Summary statistics

	Obs.	Mean	Std. Dev.	Min.	Max.
Upgrade	9,398	0.137	0.344	0	1
Ind(Post 28 July 2011, Pre 6 September 2012)	9,398	0.164	0.370	0	1
Ind(Post 5 September 2012)	9,398	0.222	0.416	0	1
Ind(S&P)	9,398	0.397	0.489	0	1

Panel B: Regression results

	(1)	(2)
	Upgrade	
Ind(S&P) x Ind(Post 5 September 2012)	0.210***	0.108*
	(0.032)	(0.063)
Ind(S&P) x Ind(Post 28 July 2011, Pre 6 September 2012)	0.027	-0.039
	(0.030)	(0.059)
Ind(Post 28 July 2011, Pre 6 September 2012)	0.098	-0.021*
	(0.072)	(0.011)
Ind(Post 5 September 2012)	0.089	-0.251
	(0.089)	(0.185)
Rater F.E.	x	x
Tranche F.E.	x	
Year-quarter F.E.	x	
Tranche x Year-quarter F.E.		x
Observations	9,398	9,398
Adjusted R-squared	0.608	0.839

Figure 1. US CMBS issuance, 2000-2014

The figure shows the number of CMBS transactions in the US, excluding Government Agency deals (i.e., the sample is all US 'non-agency' issuance), for the 2000-2014 period. Securitizations are divided by year and type. 'Conduit' is a deal where the asset pool includes many small mortgages. 'Large/Single' refers to asset pools consisting of one mortgage, or of a group of mortgages with a single borrower. 'Fusion' represents mixed pools, which include both large and small mortgages. 'Other' refers to securitizations with unusual features, including asset pools with floating rate loans, seasoned collateral (i.e. loans that are not new at the time of securitizations) and re-securitizations.

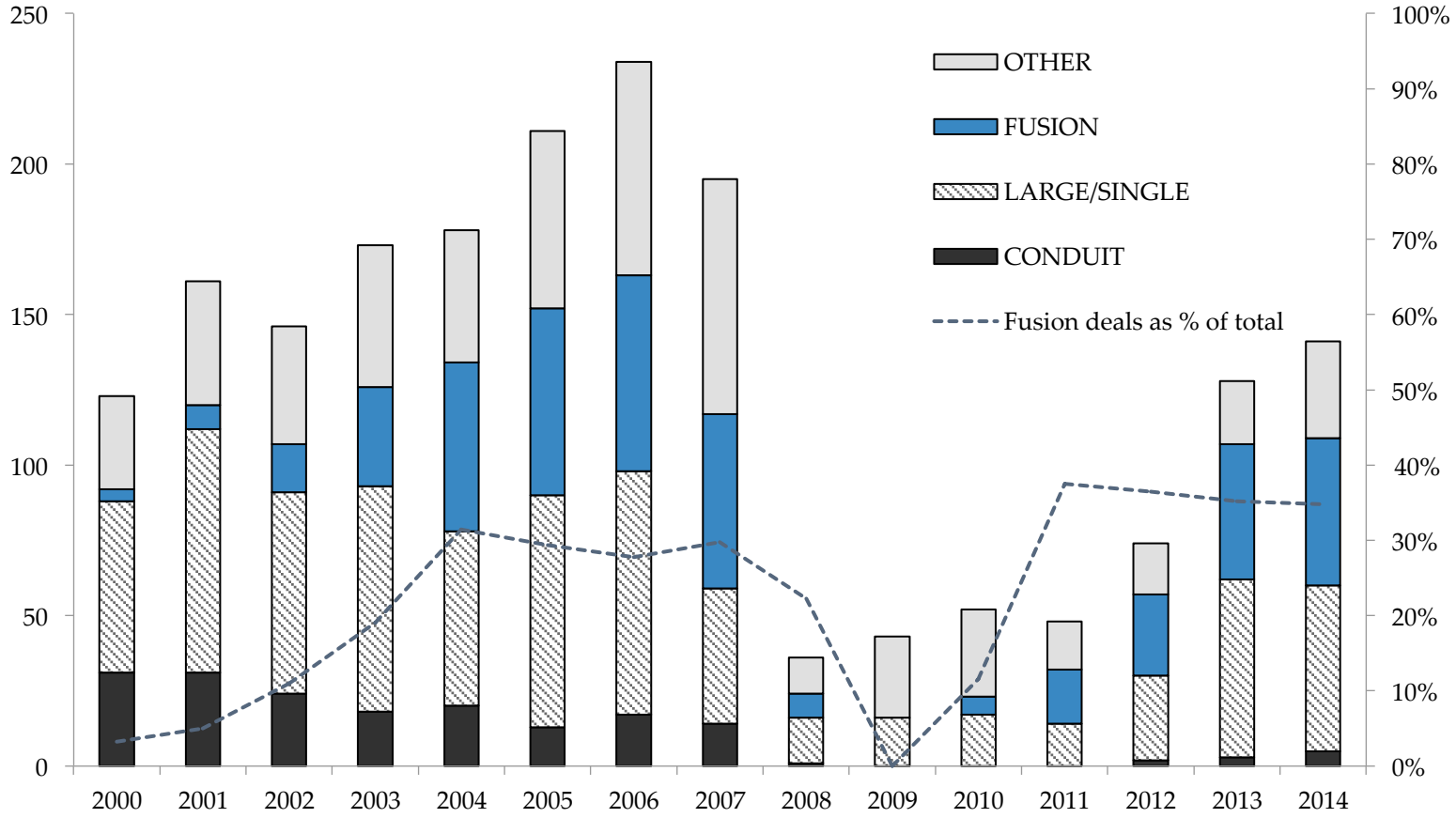


Figure 2. Rating analyst specialization in CMBS deals, 2000-2014

This figure illustrates the distribution of primary rating analysts from S&P across 298 fusion and non-fusion CMBS transactions closed between 2000 and 2014. Deal descriptions (including categorization of deals into fusion and other) are from Commercial Mortgage Alert; pre-sale reports (which contain analyst names) are obtained from S&P's Capital IQ.

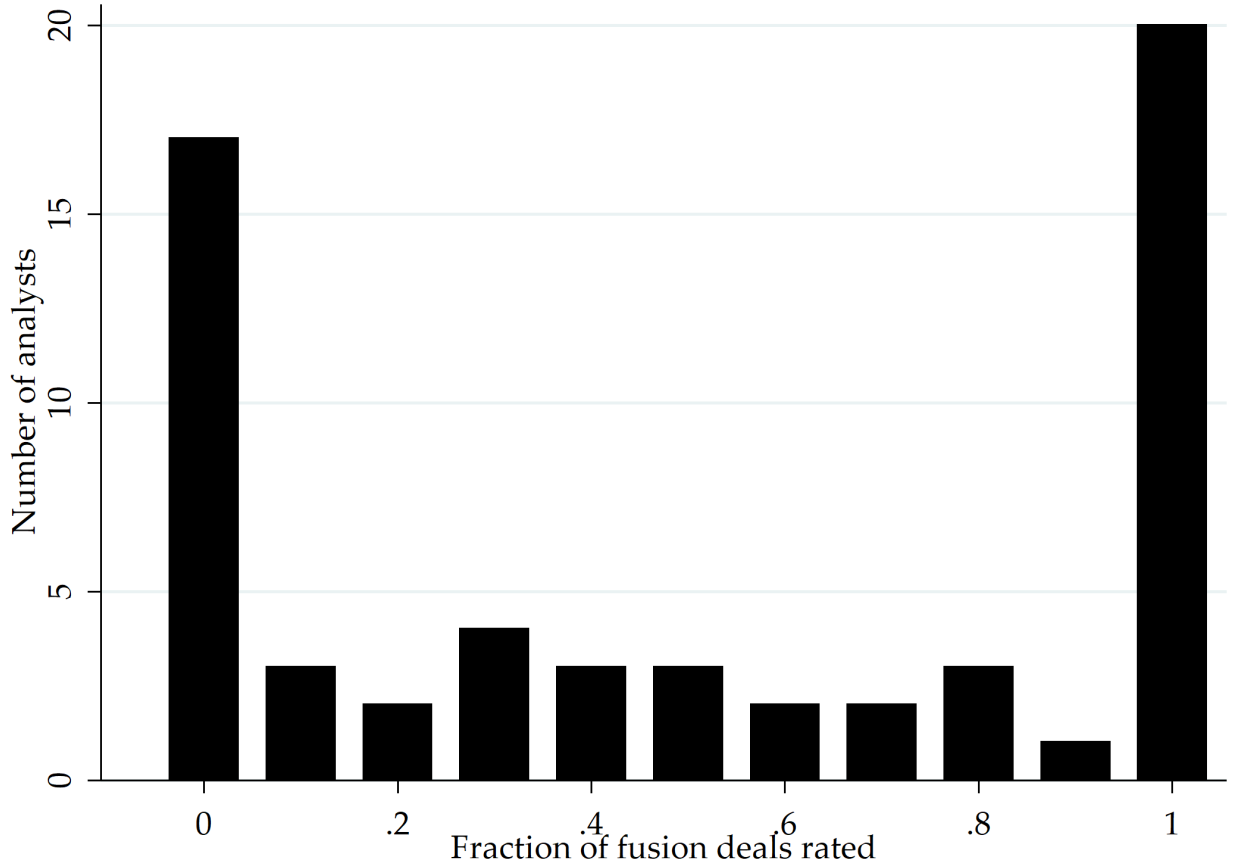
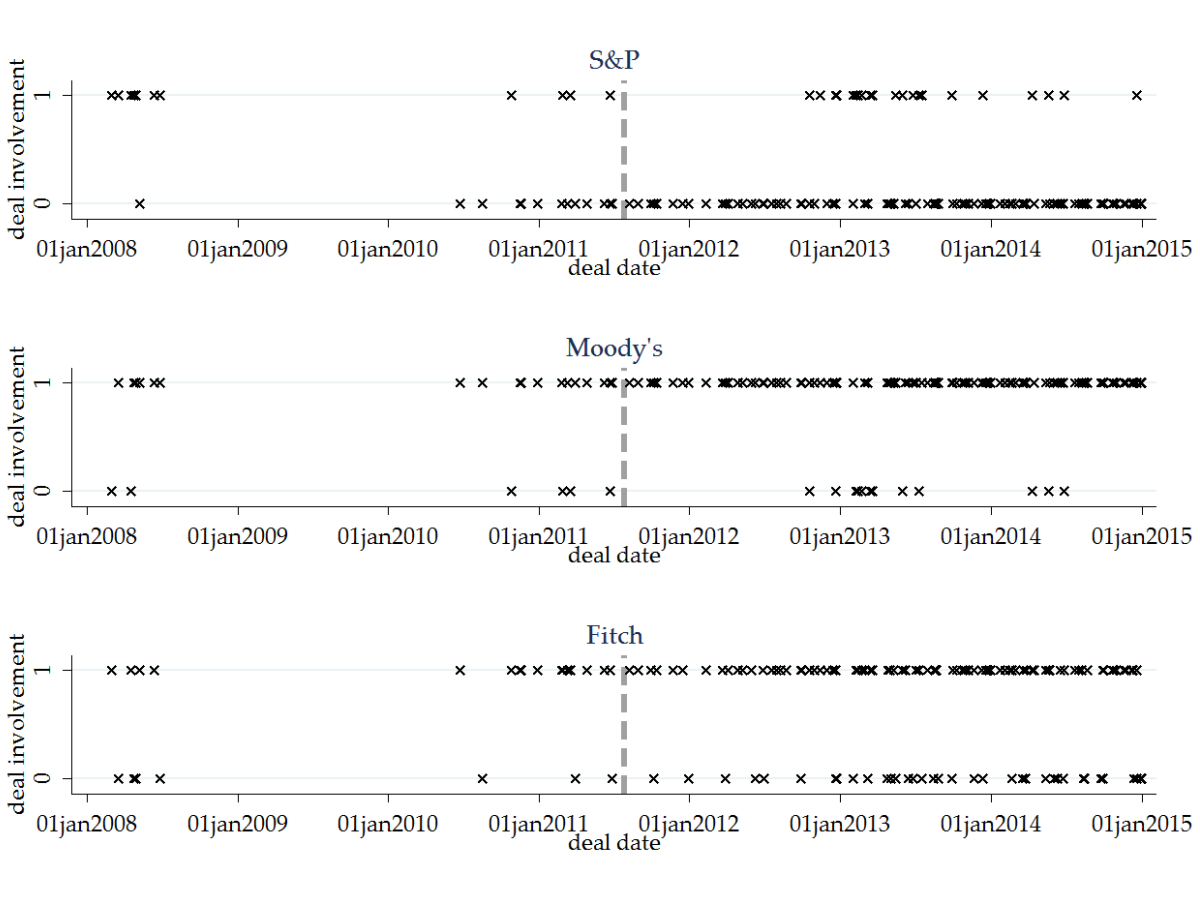


Figure 3. Deal involvement, 2008-2014

The figure shows involvement of S&P, Moody's, and Fitch in CMBS deals over the 2008-2014 period. Each marker 'x' in the figure corresponds to a CMBS deal. A marker on the line corresponding to "deal involvement = 1" indicates that a given rater is rating at least one tranche in the deal, while a marker on the line "deal involvement = 0" indicates that the rater is not involved in the deal. The dashed vertical line corresponds to the 27th of July 2011. Panel A shows fusion CMBS deals, while Panel B shows non-fusion CMBS deals.

Panel A: Fusion



Panel B: Non-Fusion

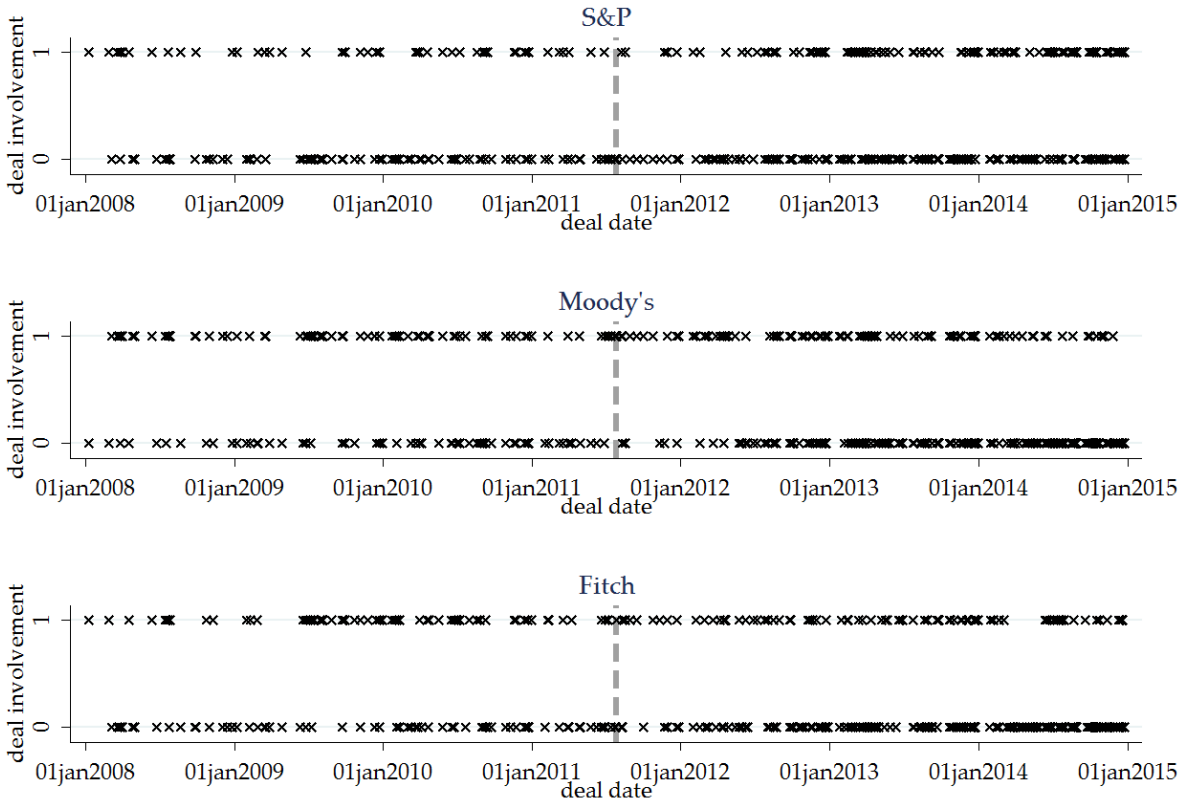


Figure 4. Time-line of events

The figure illustrates the time-line of events related to S&P's reputational shock as discussed in Section I.B.

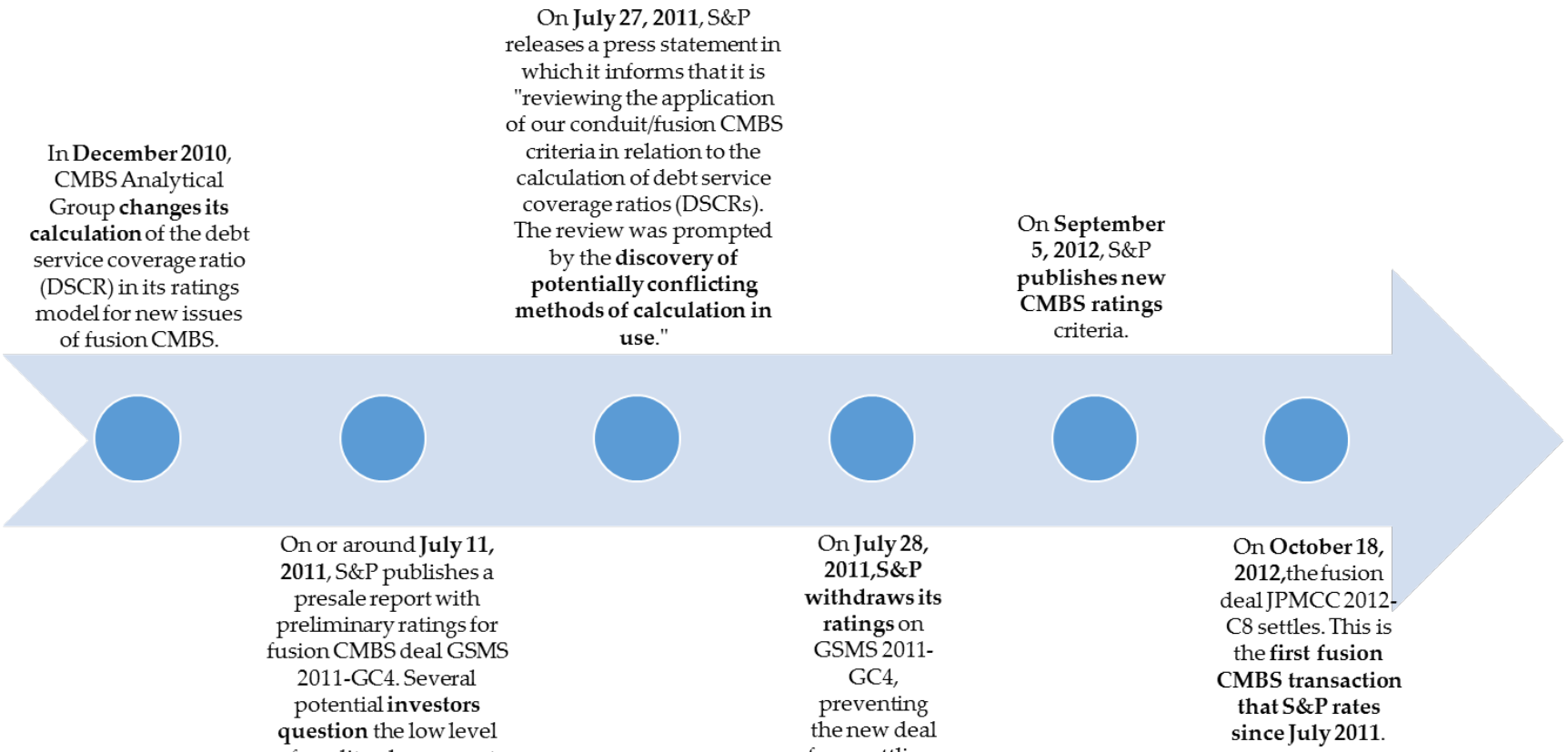
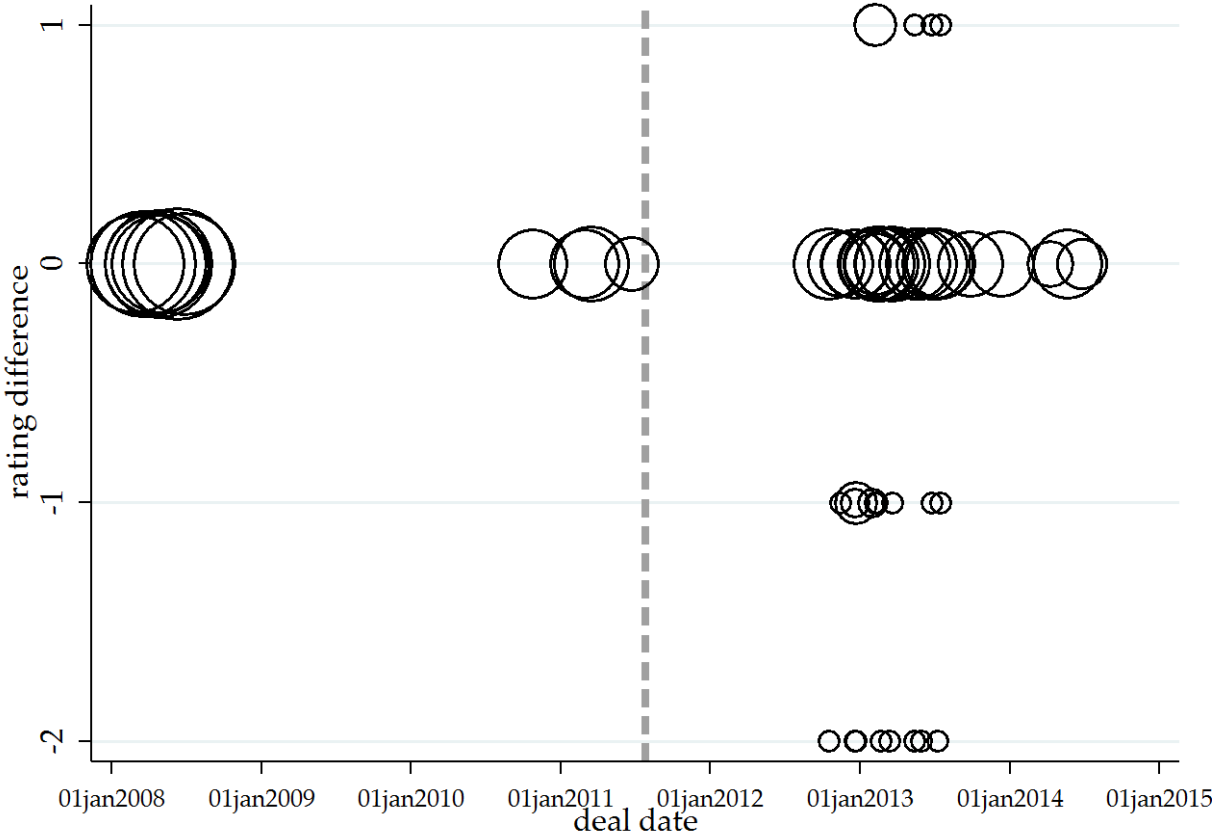


Figure 5. Tranche ratings, 2008-2014

The figure reports the difference between the *Tranche Rating* assigned by S&P and the average *Tranche Rating* assigned by Moody's and/or Fitch. Larger circles on the graph indicate a larger number of tranches corresponding to a given rating difference on a given deal closing date. The dashed vertical line corresponds to the 27th of July 2011. Panel A shows fusion deals only, while Panel B shows non-fusion deals. The sample period is 2008-2014.

Panel A: Fusion



Panel B: Non-Fusion

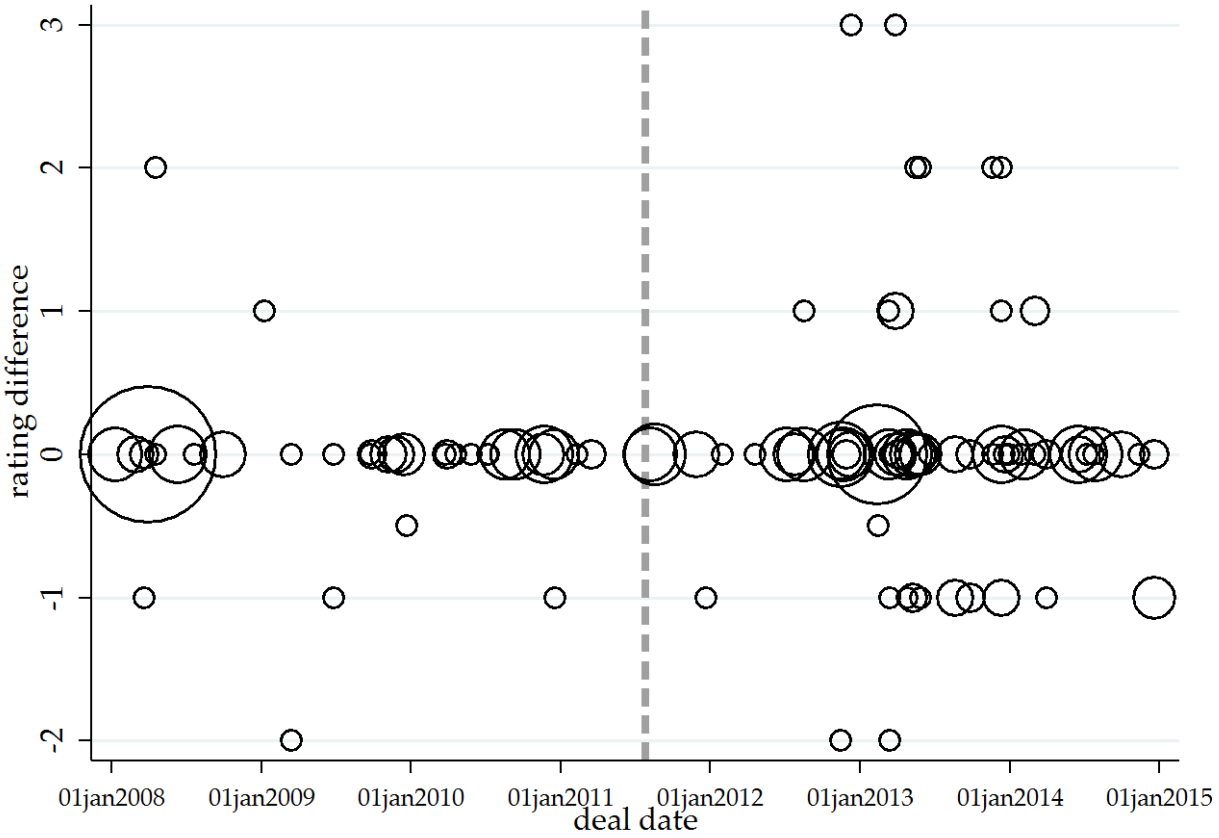
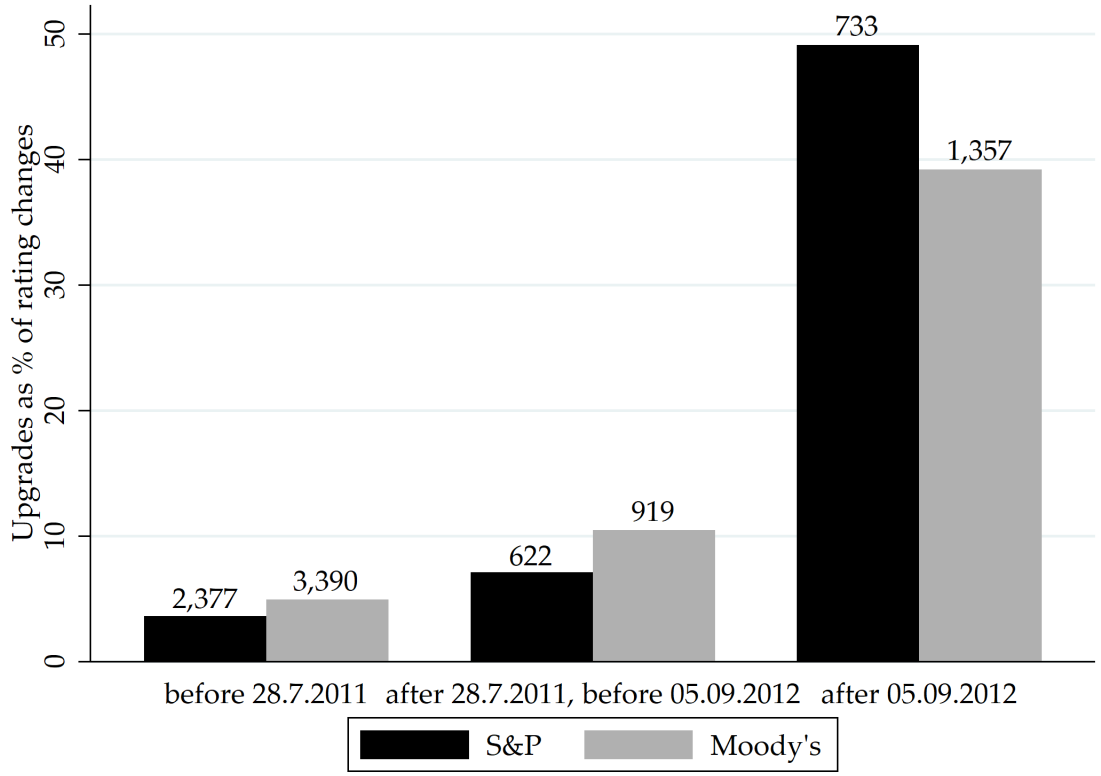


Figure 6. Ratings upgrades on seasoned fusion CMBS tranches, 2008-2014

This figure reports rating changes for seasoned fusion CMBS tranches over the 2008-2014 period. For each rater, we show upgrades as a fraction of total rating changes; the number of total rating changes are displayed above the bars. We report three sample periods: before the July 2011 reputational shock, after the event but before the ratings criteria change in September of 2012, and after the criteria change. Moody's ratings on tranches of new and seasoned fusion CMBS deals are from Moody's Default Risk Service Structured Finance database. S&P data are from Capital IQ and from S&P's website (disclosures of rating histories according to Rule 17g-7(b)). For the purposes of this analysis, we only consider ratings between AAA and C (and the equivalent ratings on Moody's rating scale). To be included in the sample, a tranche has to have at least one rating assigned (upgrade, downgrade, new rating, or affirmation) by both Moody's and S&P during the 2008-2014 sample period and must experience at least one rating change by at least one of the two raters.


Upgrades as % of rating changes
0
10
20
30
40
50
2,377
3,390
622
919
733
1,357
before 28.7.2011
after 28.7.2011, before 05.09.2012
after 05.09.2012
S&P
Moody's