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REPUTATIONS AND CREDIT RATINGS: EVIDENCE FROM COMMERCIAL MORTGAGE-BACKED SECURITIES

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Abstract

How do changes in a rating agency's reputation affect the ratings market? 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 compared to other raters. This coincided with a partial recovery in the number of deals S&P was hired to rate. Our findings are consistent with the view that an agency can regain market share after suffering reputational damage by issuing more optimistic ratings.

JEL Classification: G20, G24, G28

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

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

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

ABSTRACT. How do changes in a rating agency's reputation affect the ratings market? 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 compared to other raters. This coincided with a partial recovery in the number of deals S&P was hired to rate. Our findings are consistent with the view that an agency can regain market share after suffering reputational damage by issuing more optimistic ratings.

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

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"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, as it seeks to rebuild its once dominant market share in the rating of commercial mortgage-backed securities (CMBS)" ("S&P criticized over changes to CMBS ratings standards" by Adam Tempkin, Reuters, October 5, 2012.)

There is a conflict of interest at the heart of the production of credit ratings: issuers—who prefer high ratings—generate much more revenues for rating agencies than users of ratings—who want accurate ratings. Despite this conflict, credit ratings are used widely—by investors, regulators, and in financial contracting.[1] An interpretation of this fact is that the underlying conflicts of interest can be contained by reputational incentives (Bolton, Freixas, and Shapiro 2012; Bouvard and Levy 2013; Mathis, McAndrews, and Rochet 2009): credit rating agencies need to maintain reputations for accuracy and reliability vis-à-vis investors in order to sustain their ability to charge issuers for their ratings in the future. This view of ratings markets implies that rating agencies, more than most firms, depend on their reputations. A key implication is that rating agencies whose reputations are hurt should lose business and change their competitive behavior.

In this paper, we examine the hypothesis that changes in rating agency reputation have an impact on the ratings market. We are interested in the behavioral response to a loss of reputation: does a rating agency compromise its quality if it is on the defensive? For whom? By how much? We address these questions by tracking market dynamics after an agency suffered reputational damage. The setting of our study is the commercial mortgage-backed securities (CMBS) market in the US. In July 2011, following questions from investors, S&P reported "inconsistencies" in their rating methodology for fusion CMBS, securities issued against a collateral pool which combines large and small commercial mortgage loans and which constitute around one third of the US CMBS market. One day later, S&P unexpectedly withdrew its preliminary ratings on a fusion CMBS deal that was in the final stages. Without the ratings, the deal failed to close, leaving the

[1] See White (2010) for an overview. Examples of the wide-spread use of credit ratings include investment mandates (Baghai, Becker, and Pitschner 2018) and loan pricing. Ratings are employed for calculating capital requirements and in financial regulations.

issuer holding commercial mortgages it did not wish to own, and investors with nothing to invest in.

The reputational damage in this event primarily concerns S&P's perceived ability (among both investors and issuers) to provide timely CMBS ratings. To be able to use this episode as a laboratory, we need the reputational damage sustained by S&P (for rating fusion CMBS) to have been large. Indeed, this appears to be the case: the withdrawal of the ratings was very poorly received by issuers and investors. The event was called "unprecedented within the CMBS market" (Bloomberg), a "curveball" to CMBS investors (Credit Suisse Fixed Income Research), and it sent the "commercial mortgage securities market into turmoil and scuttled the deal for weeks, angering investors and issuers" (Wall Street Journal). Subsequent to the collapsed deal, S&P was not hired to rate any fusion CMBS deal for a period of fourteen months.

We interpret this as clear evidence that S&P's competitive position was weakened following this episode. Unlike a start-up agency with no market share, S&P had the necessary staff, models, data, and organization to recover market share quickly. They also had NRSRO status, making their ratings useful for regulatory purposes. Thus, S&P had an opportunity to (try to) attract issuers' business by issuing favorable ratings. A motivation to grab market share is precisely what many theories of "accuracy reputations" suggest is likely to compromise ratings quality (e.g., Bolton, Freixas, and Shapiro 2012).[2] Thus, we wish to examine the hypothesis that S&P issued higher ratings relative to other agencies in order to attract business.

In September 2012, S&P implemented a new rating methodology for fusion CMBS, and subsequently started winning business in this segment again. We compare S&P's ratings on newly issued fusion CMBS tranches to the ratings of its two main competitors, Moody's and Fitch, before the mistake and after the issuance of new standards a year later. Because we compare ratings issued by different agencies for the same tranche, our methodology is unaffected by any variables

[2] A parallel hypothesis is that a weakened producer may reduce its prices in the product market (Klein and Leffler 1981). We do not observe prices, so we cannot test this. However, the implications for the financial system of inaccurate ratings are arguably more important than those of higher prices for ratings services. Also, 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).

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 once again rated fusion CMBS, the agency's ratings on individual tranches were between 0.1 and 0.3 notches higher (relative to those of Moody's and Fitch).[3] This is consistent with an attempt by S&P to regain market share following the reputational shock by catering to issuers through higher ratings. 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.

In addition to the effect on the level of ratings of individual tranches, we find that the portion of AAA (an important determinant of CMBS deals' cost of capital) increased in S&P-rated fusion 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.

While fusion CMBS are similar to other types of CMBS in many ways (e.g., contractual features, financial properties, and regulatory treatment), there are also important differences. Fusion CMBS deals are rated using different methodologies than other types of CMBS (e.g., SEC 2013 and Flynn and Ghent 2016). They are also usually rated by other employees: we document that most CMBS analysts at S&P tend to specialize in either fusion or non-fusion CMBS. We also show that most issuers specialize in fusion CMBS or non-fusion CMBS, instead of issuing both. Finally, we present evidence that most mutual funds that invest in CMBS tranches either buy fusion or other types of CMBS, rather than investing in both. Thus, despite their similarities, fusion deals differ from other CMBS types in rating methodology, analyst staffing, issuing entities, and investor clienteles. In line with these differences, non-fusion CMBS was not affected by S&P's problems in fusion CMBS. Based on this, we design a 'placebo' test.[4] Repeating our tests of ratings levels for non-fusion CMBS as a placebo, we find no change in S&P's ratings. The absence of

[3] For comparison of magnitudes, Becker and Milbourn (2011) find that a one standard deviation increase in competition is associated with a 0.2 notch change in corporate credit ratings.

[4] Apart from non-fusion CMBS, residential mortgage-backed securities (RMBS) could constitute a reasonable comparison, but the volume of (private) RMBS was miniscule in our sample period. Other forms of structured securities (e.g., CLOs) are perhaps less obvious benchmarks, as they differ in more ways.

movement in S&P's market share 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.

Overall, our findings suggest that reputations matter for how rating agencies behave; that a weaker reputation is associated with a lower market share; and that a firm suffering a loss of reputation may compromise 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 the literature on the economics of reputations (e.g., Klein and Leffler 1981, Kreps and Wilson 1982). Most formal models of reputations define a reputation narrowly as the posterior probability that investors and/or issuers assign to the rater being a certain type. For example, Mathis, McAndrews and Rochet (2009) model reputation as the likelihood that investors and issuers assign to the rating agency being truthful. Such models provide important insights about inter-temporal trade-offs, but are not designed to cover all potentially interesting aspects of reputations. 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 and pricing as well as for 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 a given type, that firm's reputation can never be rebuilt. Despite these differences, we believe that the main implications of standard single-dimensional reputational models of ratings are likely to remain applicable in our setting: an agency which has a weaker standing with issuers may have to compromise its future accuracy and issue favorable (biased) ratings to win business today.

The economics of reputations are closely 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).[5] Thus, competition may be detrimental to the quality of ratings observed in the market. 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.[6] 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 high 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. 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

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[5] See also Kreps and Wilson (1982), Milgrom and Roberts (1982) and Fudenberg and Levine (1989). For the general importance of corporate reputations, see e.g. Weigelt and Camerer (1988).

[6] 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.

the main results. Section III includes some robustness tests and additional discussion. Finally, Section IV concludes.

I. Institutional background

A. An overview of CMBS

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.[7] 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.[8]

Deal cash-flows are spliced into securities with different risk-return profiles ("tranching"), and are then sold to investors. Tranching is the primary means through which credit enhancement

[7] 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).

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

is achieved in CMBS deals (unlike RMBS, government guarantees are uncommon in CMBS). The CMBS tranches are typically rated by two agencies.[9] 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).[10] Finally, there may be interest-only (IO) bonds. These 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.[11]

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 ratings as part of the so-called

[9] Between 2000 and 2014, there were 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. Between 2000 and 2014, every fusion deal had at least two raters.

[10] 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.

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

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.

While fusion CMBS are similar to other types of CMBS in many ways (e.g., contractual, legal, and institutional setting; regulation), there are also important differences. First, due to the specific characteristics of their asset pools, fusion CMBS deals are rated using different methodologies than other types of CMBS (e.g., SEC 2013 and Flynn and Ghent 2016). Second, rating analysts specialize in certain types of CMBS. Figure 2, Panel A, illustrates this point. It shows the number of fusion CMBS deals and other types of deals ("non-fusion") rated by each S&P rating analyst between 2000 and 2014; larger markers indicate more analysts rating the same number of fusion and non-fusion deals. Out of 60 primary analysts rating 298 CMBS deals, 37 analysts (62%) exclusively rate either fusion or non-fusion deals, not both.[12] This is consistent with a significant degree of analyst specialization. Third, CMBS issuers tend to specialize in fusion deals or non-

[12] We collect the names of primary rating analysts from CMBS pre-sale reports contained in S&P's Capital IQ database. First, 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 closed between 2000 and 2014 and for which S&P provides initial ratings. Out of these 757 CMBS deals, we can retrieve pre-sale reports for 298 deals; 178 of these deals are of the fusion type.

fusion deals, as shown in Panel B of Figure 2. The figure plots, by issuer, the log of the total face value (in $ million) of fusion deals against the log of the total face value of non-fusion deals closed between 2000 and 2014. The log values are rounded to the nearest integers; larger markers indicate more observations. Over that period, 92% of the 219 issuers specialize in fusion deals or non-fusion deals, but not both.[13] Fourth, most mutual funds that invest in CMBS tranches either buy fusion CMBS or other types of CMBS, rather than investing in both. To illustrate this point, Panel C plots, by mutual fund portfolio and year, the log of the market value (in $ million) of fusion tranches held against the log of the market value of non-fusion tranches held. As in Panel B, the log values are rounded and larger markers indicate more observations. The sample only includes portfolios that contain at least one CMBS tranche in a given year.[14] Out of 1,826 such mutual funds, 1,067 (58%) only hold fusion CMBS bonds or non-fusion CMBS bonds during the entire 2008 – 2014 period, but never both. Finally, there is evidence that the SEC treats fusion CMBS as a well-defined, separate segment of the CMBS market.[15] In sum, fusion deals differ from other CMBS types in rating methodology, analyst staffing, issuing entities, and investor clienteles. Overall, these points help explain why fusion CMBS effectively constitute a separate market segment (see e.g., SEC 2013 and Flynn and Ghent 2016).

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[13] We consider all non-agency CMBS deals with US collateral that are closed between 2000 and 2014; this amounts to 1,243 deals. The data are from Commercial Mortgage Alert. For the purposes of the figure, we group issuers from the database manually based on their names to avoid double-counting. For example, while "Banc of America Commercial Mortgage Inc.," "Banc of America Commercial Mortgage Securities Inc.," and "Banc of America Commercial Mortgage Trust" appear as individual issuers in the database, we treat them as one issuer under the designation "Banc of America."

[14] Data on mutual fund holdings are from the CRSP Mutual Fund database. The database contains quarterly holdings data; we use information on the last filing in a given year. Information on newly issued and seasoned CMBS, including CUSIPs (which are used to link CMBS tranches to mutual fund holdings) and deal types, are from the Moody's Default Risk Service Structured Finance database. To identify fusion deals, we use deals designated as "CMBS - Conduit / Fusion" within Moody's database. The sample period is 2008 to 2014.

[15] This is apparent from the SEC's press release of January 21, 2015 (emphasis ours): "One order, in which S&P made certain admissions, addressed *S&P's practices in its conduit fusion CMBS ratings methodology*. S&P's public disclosures affirmatively misrepresented that it was using one approach when it actually used a different methodology in 2011 to rate six conduit fusion CMBS transactions and issue preliminary ratings on two more transactions. As part of this settlement, S&P agreed to take a *one-year timeout from rating conduit fusion CMBS*. Another SEC order found that after being frozen out of the *market for rating conduit fusion CMBS* in late 2011, S&P sought to re-enter that market in mid-2012 by overhauling its ratings criteria."

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 May 8, 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. The new methodology underlay several fusion CMBS transactions that S&P rated during the first six months of 2011.[16]

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 July 27, 2011, following questions from investors, S&P's senior management announced in a press release that it is "reviewing the application of [its] conduit/fusion criteria […] The review was prompted by the discovery of potentially conflicting methods of calculation in use." On July 28, 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 compares S&P's monthly market share in the fusion CMBS segment to that of Moody's between 2008 and 2014. The figure illustrates that between mid-2008 and mid-2010, there was no issuance of fusion CMBS, after which issuance slowly resumed. Importantly, the figure illustrates that after the July 2011 incident (represented by the first dashed vertical line), S&P was frozen out of the fusion CMBS segment. S&P was able to regain some market share in September 2012, after publishing new ratings criteria (represented by the second dashed vertical line). By contrast, Panel B of Figure 3, in which we plot S&P and Moody's market shares in non-

[16] 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" (non-guaranteed certificates).

fusion CMBS deals, shows that both 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 S&P lost all new business in the fusion CMBS segment, the firm appears to have been determined to re-enter the market (e.g., SEC 2015b). New ratings criteria were published 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 appears to have been effective. 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: October 18, 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).[17] Figure 4 summarizes the time-line of events discussed in this section.

II. Main analysis

[17] 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 some 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".

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.[18] 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.[19]

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 assigned by S&P in fusion deals after July 2011 to ratings before; we identify biases in the ratings

[18] Extending the pre-event period beyond 2008 does not significantly affect the results.

[19] 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.

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:

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

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 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). *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. *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 the rater and the specific tranche. Since the variables *Post July 2011* and *S&P* are subsumed by the tranche 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.[20]

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 therefore 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 event; we examine this assumption in Section III.

[20] The results are robust to double-clustering by deal and by month.

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

$$Market\ share_{r,t} = \alpha \cdot S\&P_r \cdot Post\ Q2\ 2011_t + \beta \cdot S\&P_r + \gamma \cdot Post\ Q2\ 2011_t + \Psi_{r,t} + \varepsilon_{r,t} \quad (2)$$

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. *Post Q2 2011* is a dummy variable taking the value of one after the second quarter of 2011. *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 other 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 there are three raters in our sample). The sample average 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 the reputational shock in July 2011, does S&P cater to issuers through more optimistic ratings? We first examine this question graphically in Figure 5. Each 'dot' in the figure represents the average (across all tranches of a given deal) rating difference between S&P and Moody's and/or Fitch. The rating difference of a tranche is 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 compared to the other raters. The first dashed vertical line corresponds to July 28, 2011, when S&P retracted its ratings on the deal GSMS 2011-GC4; the second vertical line indicates September 5, 2012, when S&P published new CMBS ratings criteria. The two solid horizontal lines in the figure denote the average rating differences before and after the July 2011 event. Panel A of Figure 5 shows fusion deals. 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).[21] 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 heterogeneity in deal types underlying this plot), 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 model).

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

Both regressions also include rater 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 many 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 the very safest securities in a CMBS deal. 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 which excludes the most senior tranches from every deal, which are the tranches with the highest level of subordinated assets (on average, 5.2 tranches per fusion deal).[22] 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 fifth (column 1, specification with deal and seniority fixed effects) or a fourth (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 manifest primarily in the subordinated, riskier tranches.[23]

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[22] Additionally, note that interest only (IO) tranches had to be dropped in these regressions (321 unique tranches, or 477 tranche-rater observations). IO tranches draw cash flow from "excess interest" on various other tranches, and therefore have unclear seniority (consequently, the level of subordination for IO tranches is not reported in the CMBS Alert database which we employ in this analysis).

[23] 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) reports 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*

The rating 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 in turn influence others 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.

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 columns 1 and 2 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.[24] We then estimate regressions separately for issuers with above median market share (column 1) and for those with median market share or below (column 2). 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. However, comparing the

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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."

[24] As in Figure 2B, we group issuers from the Commercial Mortgage Alert database manually based on their names to avoid double-counting. For example, "Banc of America Commercial Mortgage Inc." and "Banc of America Commercial Mortgage Securities Inc." appear as individual issuers in the database, while we treat them as one issuer ("Banc of America"). Issuers with no issuance in a year are assigned a zero market share in that year.

coefficients across specifications 1 and 2, we find that the effect is not statistically different for large issuers compared to small issuers. In columns 3 and 4 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 (column 3) and equal to or below (column 4) the sample median face value. We find that S&P's ratings are only higher than those of the other two raters in the group of large deals. However, as in the case of issuer market shares, comparing coefficients to each other instead of to zero, we find that the effect is not statistically different when comparing small deals to large deals. In sum, we do not find a statistically significant effect of deal size or issuer size. We note that the statistical power may be limited in these subsamples, given the relatively small number of deals.

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 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:

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

where i denotes the deal and t the month 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. *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. *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 (the method of securities distribution, such as Rule 144A offerings and SEC-registered deals); region where the deal is distributed (for fusion deals, this is only US); region of collateral (for fusion deals, only US). Since the variable *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, consistent with our previous findings on ratings levels, 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 (such as 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 *S&P*, an indicator for S&P, and *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: (i) 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; (ii) 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 (*S&P × 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 (*S&P × (Post Q2 2011, Pre Q3 2012)*). The difference between these

two coefficients is statistically 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: in column 1, we use the whole sample period available in the CMBS Alert database, from 1997 (which is the first year with a fusion CMBS deal) to 2014. We employ 2010 to 2012 in column 2, and 2009 to 2013 in column 3. 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 2). 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.[25]

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

[25] 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.

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 formally 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 that we would not expect to be affected by S&P's procedural mistake and compare ratings and market shares before and after July 2011. This test also serves as a more formal means to confirm that fusion deals constitute a separate segment of the CMBS market. Panel A examines ratings, while Panel B examines market shares in the non-fusion CMBS segment. In both panels, column 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, when considering non-fusion CMBS deals, 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.[26]

[26] The tests reported in Table 8 yield equivalent results (that is, a statistically insignificant difference-in-differences coefficient) when the sample period is extended to 1985 (the first year that a non-fusion deal occurs in the CMBS Alert database).

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 study 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.[27] 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 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

[27] 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.

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: 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:

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

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. *(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. *(Post 5 September 2012)* takes the value of one after September 5, 2012. *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 × 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 (the statistical significance of the coefficients of interest is virtually unchanged when we double-cluster by deal and month).

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.[28]

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 after it suffered reputational damage 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.

A clean method for identifying whether S&P or the other incumbents changed standards would be to consider the ex post default performance of ratings. Due to the strong US business cycle, we found that this approach is not useful at this point. We collected data on defaults for fusion CMBS issued between 2008 and 2014.[29] 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)

[28] We note that in the regressions reported in Table 9, the coefficients on the variables *(Post 5 September 2012)* and *(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, *(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.

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

have occurred;[30] therefore, this way of assessing the ex post performance of the ratings is so far impractical.

However, we believe that the evidence is most consistent with a change in S&P's standards for two reasons. First, the new fusion CMBS criteria that S&P employed from September 2012 were described by market participants as lenient and as intended to increase market share by catering to issuers (e.g., Yoon and Neumann 2012; Tempkin 2012). Second, if other raters became 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 other types of CMBS, see Panel A of Table 8) and precisely after S&P is shut out of that market segment. It may also seem surprising if Fitch and Moody's changed their standards simultaneously. We conclude that the simplest explanation consistent with the data is that S&P changed its standards.

IV. Conclusions

In this paper, we study reputational dynamics and ratings quality. In 2011, S&P committed a procedural mistake related to inconsistencies in its fusion CMBS ratings model. The agency's market share in rating new fusion CMBS deals dropped to zero as 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 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. Subsequently, S&P regained some of the market share it had 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.

We have not established to what extent investors `see through' the rating inflation we document. Does it impact pricing in the CMBS market? Examining this in the secondary market

[30] 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.

may be a topic for future work. That said, we believe ratings inflation is important *even if there is no price impact*. Credit ratings serve a fundamental role in allowing contracting on credit quality, for example in investment mandates and loan and bond covenants. This function of ratings will suffer from ratings bias regardless of price impact.

Does our study point to any policies for maintaining the quality of issuer-paid credit ratings? Broadly, like prior work on credit ratings, our results point to the potential problems with competition between rating agencies. Regulators appear to adhere to a more positive 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."[31] 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."[32] Our results indicate that under certain circumstances, the quality of ratings may be compromised by a desire of an agency to (re)gain market share.

[31] Preamble of the Credit Rating Agency Reform Act of 2006 (Public Law 109–291, 109th Congress).

[32] ESMA technical document entitled "Competition and choice in the credit rating industry" (document ESMA/2015/1879 published on December 18, 2015).

References

Baghai, Ramin P., Bo Becker, and Stefan Pitschner, 2018, "The Private Use of Credit Ratings: Evidence from Investment Mandates", working paper.

Becker, Bo, 2011, *Kroll Bond Rating Agency*, HBS 212-034, Boston, MA: Harvard Business School Publishing.

Becker, Bo and Todd Milbourn, 2011, "How Did Increased Competition Affect Credit Ratings?", *Journal of Financial Economics*, 101(1), 493-514.

Benmelech, Efraim, and Jennifer Dlugosz, 2009, "The alchemy of CDO credit ratings", *Journal of Monetary Economics*, 56, 617-634.

Bolton, Patrick, Xavier Freixas, and Joel Shapiro, 2012, "The credit ratings game", *Journal of Finance*, 67, 85-111.

Bouvard, Matthieu, and Raphael Levy, 2013, "Two-sided reputation in certification markets", working paper.

CRE Finance Council, 2013, "CMBS E-Primer - A comprehensive overview of commercial mortgage backed securities", CRE Finance Council Education Series.

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 Financial Economics*, 106, 308-330.

Efing, Matthias and Harald Hau, 2015, "Structured debt ratings: Evidence on conflicts of interest", *Journal of Financial Economics*, 116, 46-60.

Flynn, Sean, and Andra Ghent, 2016," Competition and Credit Ratings After the Fall", working paper.

Frenkel, Sivan, 2015, "Repeated Interaction and Rating Inflation: A Model of Double Reputation", *American Economic Journal: Microeconomics*, 7(1), 250-280.

Fudenberg, Drew, and David K. Levine, 1989, "Reputation and Equilibrium Selection in Games with a Single Patient Player", *Econometrica*, 57, 251-268.

Goldman Sachs, 2007, "Introduction to Mortgage-Backed Securities (MBS) and Other Securitized Assets", Goldman Sachs Asset Management paper.

Gordy, Michael B., and Søren Willeman, 2012, "Constant Proportion Debt Obligations: A Postmortem Analysis of Rating Models", *Management Science*, 58(3), 476-492.

Griffin, John M., Jordan Nickerson, and Dragon Y. Tang, 2013, "Rating Shopping or Catering? An Examination of the Response to Competitive Pressure for CDO Credit Ratings", *Review of Financial Studies*, 26(9), 2270-2310.

Griffin, John M., and Dragon Y. Tang, 2011, "Did Credit Rating Agencies Make Unbiased Assumptions on CDOs?", *American Economic Review: Papers & Proceedings*, 101(3), 125-130.

He, Jie, Jun 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*, 47(6), 2097-2137.

Holmström, Bengt, 1999, "Managerial Incentive Problems: A Dynamic Perspective", *Review of Economic Studies*, 66(1), January, 169–82.

Hörner, Johannes, 2002, "Reputation and Competition", *American Economic Review*, 92(3), 644-663.

Klein, Benjamin, and Keith B. Leffler, 1981, "The role of market forces in assuring contractual performance", *Journal of Political Economy*, 89(4), 615–641.

Kreps, David M, and Robert Wilson, 1982, "Reputation and imperfect information", *Journal of Economic Theory*, 253-279.

Mathis, Jerome, James McAndrews, and Jean-Charles Rochet, 2009, "Rating the raters: Are reputation concerns powerful enough to discipline rating agencies?", *Journal of Monetary Economics* 56, 657-674.

Milgrom, Paul, and John Roberts, 1982, "Predation, Reputation, and Entry Deterrence," *Journal of Economic Theory*, 27, 280-294.

Mulholland, Sarah, 2011, "S&P Slammed by Wall Street Over Pulled Mortgage Ratings", *Bloomberg*, July 29.

Neumann, Jeannette, 2012, "S&P's Methods Under Lens", *Wall Street Journal*, June 24.

Securities and Exchange Commission, 2013, "Annual Report on Nationally Recognized Statistical Rating Organizations", December 2013.

Securities and Exchange Commission, 2015a, "In the Matter of Standard & Poor's Rating Services", Administrative Proceeding File No.: 3-16348.

Securities and Exchange Commission, 2015b, "In the Matter of Standard & Poor's Rating Services", Administrative Proceeding File No.: 3-16346.

Stanton, Richard, and Nancy Wallace, 2012, "CMBS Subordination, Ratings Inflation, and Regulatory-Capital Arbitrage", working paper.

Tempkin, Adam, 2012, "S&P criticized over changes to CMBS rating standards", *Reuters*, October 5.

Ustun, Serif, Sylvain Jousseaume, and Tee Chew, 2011, "CMBS Market Watch Weekly", *Credit Suisse Fixed Income Research*, 29 July 2011.

Weigelt, Keith, and Colin Camerer, 1988, "Reputation and Corporate Strategy: A Review of Recent Theory and Applications", *Strategic Management Journal*, 9(5), September-October, 443-454.

White, Larry, 2010, "The Credit Rating Agencies", *Journal of Economic Perspectives*, 24(2), 211-226, Spring.

Yoon, Al, and Jeannette Neumann, 2012, "S&P Moves to Revamp its CMBS Rating System", *Wall Street Journal*, June 4.

Exhibit 1. 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 May 8, 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 other types of 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). *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. *S&P* is a dummy variable indicating that a rating is by S&P; the variable takes a value of zero if a 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. *Post Q2 2011* is a dummy variable taking the value of one after the second quarter of 2011; *(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; *Post Q2 2012* takes a value of one after the second quarter of 2012. *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
Post July 2011	3,678	0.796	0.403	0	1
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
Post Q2 2011	84	0.500	0.503	0	1
S&P	84	0.333	0.474	0	1
(Post Q2 2011, Pre Q3 2012)	84	0.143	0.352	0	1
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
Post July 2011	2,622	0.612	0.487	0	1
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
Post Q2 2011	84	0.500	0.503	0	1
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	
S&P × Post July 2011	-0.127**	-0.092***
	(0.064)	(0.031)
Deal F.E.	x	
Seniority F.E.	x	
Rater F.E.	x	x
Tranche F.E.		x
Observations	3,678	3,678
Number of deals	153	153
Adjusted R-squared	0.938	0.995

Table 3. S&P rating changes after July 2011, excluding securities with the highest level of seniority

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 the most senior tranches from every deal, which are the tranches with the highest level of subordinated assets. 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	
S&P × Post July 2011	-0.204***	-0.251***
	(0.077)	(0.060)
Deal F.E.	x	
Seniority F.E.	x	
Rater F.E.	x	x
Tranche F.E.		x
Observations	1,791	1,791
Number of deals	153	153
Adjusted R-squared	0.954	0.991

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 columns 1 and 2, the sample is divided based on issuers' market shares in the CMBS market in the previous calendar year; column 1 shows coefficients from a regression for deals by issuers with above median market share, while column 2 reports regressions for deals by issuers with median market share and below. In columns 3 and 4, 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.

	(1)	(2)	(3)	(4)
Sample:	> median market share	≤ median market share	> median deal size	≤ median deal size
Dependent variable:	Tranche rating			
S&P × Post July 2011	-0.113***	-0.070	-0.114***	-0.074
	(0.038)	(0.049)	(0.027)	(0.060)
Tranche F.E.	x	x	x	x
Rater F.E.	x	x	x	x
Observations	1,492	2,186	1,823	1,855
Number of deals	68	85	74	79
Adjusted R-squared	0.993	0.996	0.996	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. *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. *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. Data are from Commercial Mortgage 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	
S&P × Post July 2011	5.608*	5.565**
	(2.720)	(2.596)
S&P	-0.971	-0.608
	(0.723)	(0.718)
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 (fusion CMBS)

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	
S&P × Post Q2 2011	-50.653***	
	(16.125)	
S&P × (Post Q2 2011, Pre Q3 2012)		-70.417***
		(13.804)
S&P × 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 1997 to 2014, it is 2010 to 2012 in column 2, while the sample for column 3 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)	(3)
Sample period:	1997-2014	2010-2012	2009-2013
Dependent variable:	Tranche rating		
S&P × Post July 2011	-0.095***	-0.215***	-0.107***
	(0.031)	(0.054)	(0.034)
Tranche F.E.	x	x	x
Rater F.E.	x	x	x
Observations	18,293	1,154	2,251
Number of deals	481	51	96
Adjusted R-squared	0.999	0.997	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 issued 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 to 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	
S&P × Post July 2011	0.079	-0.006	-0.065
	(0.107)	(0.073)	(0.061)
Tranche F.E.	x	x	x
Rater F.E.	x	x	x
Observations	928	1,823	2,622
Number of deals	143	271	383
Adjusted R-squared	0.939	0.950	0.970

Panel B: Non-fusion market share

	(1)	(2)	(3)
Sample period:	2010 – 2012	2009 – 2013	2008 – 2014
Dependent variable:		Market share	
S&P × 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 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)). 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. *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. *(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. *(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
(Post 28 July 2011, Pre 6 September 2012)	9,398	0.164	0.370	0	1
(Post 5 September 2012)	9,398	0.222	0.416	0	1
S&P	9,398	0.397	0.489	0	1

Panel B: Regression results

	(1)	(2)
	Upgrade	
S&P × (Post 5 September 2012)	0.210***	0.108*
	(0.032)	(0.063)
S&P × (Post 28 July 2011, Pre 6 September 2012)	0.027	-0.039
	(0.030)	(0.059)
(Post 28 July 2011, Pre 6 September 2012)	0.098	-0.021*
	(0.072)	(0.011)
(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
Number of deals	209	209
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.

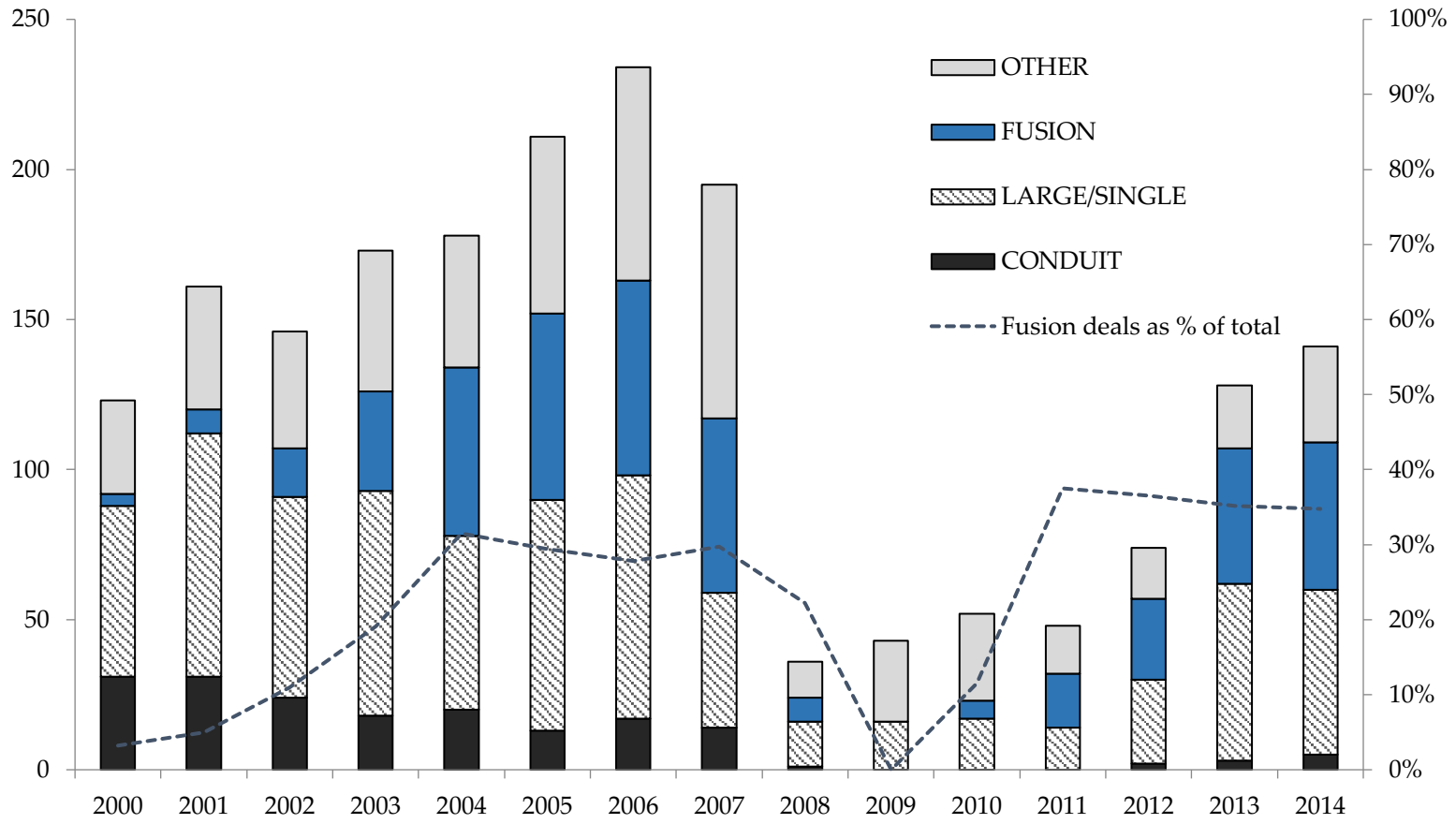
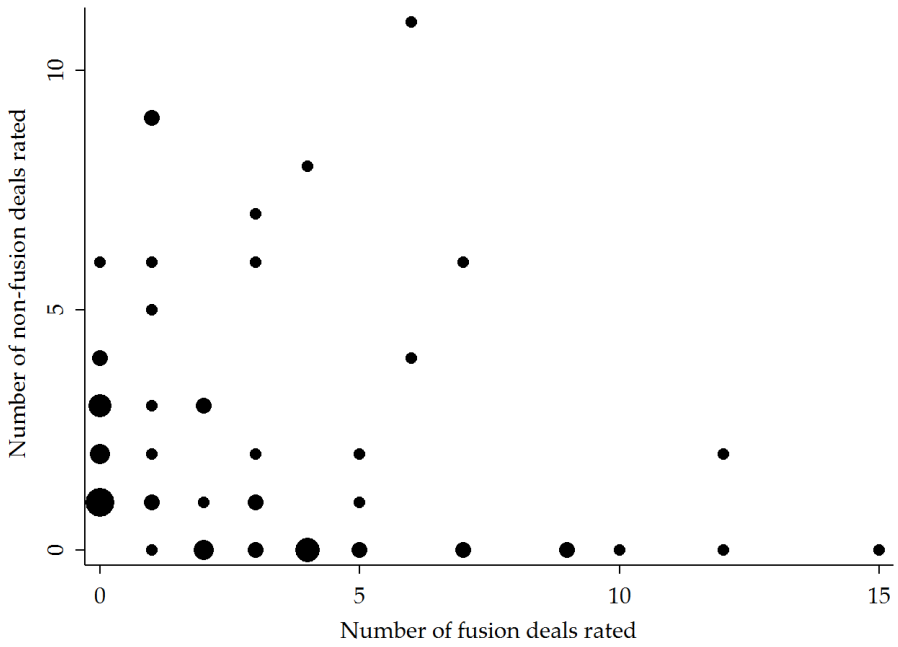


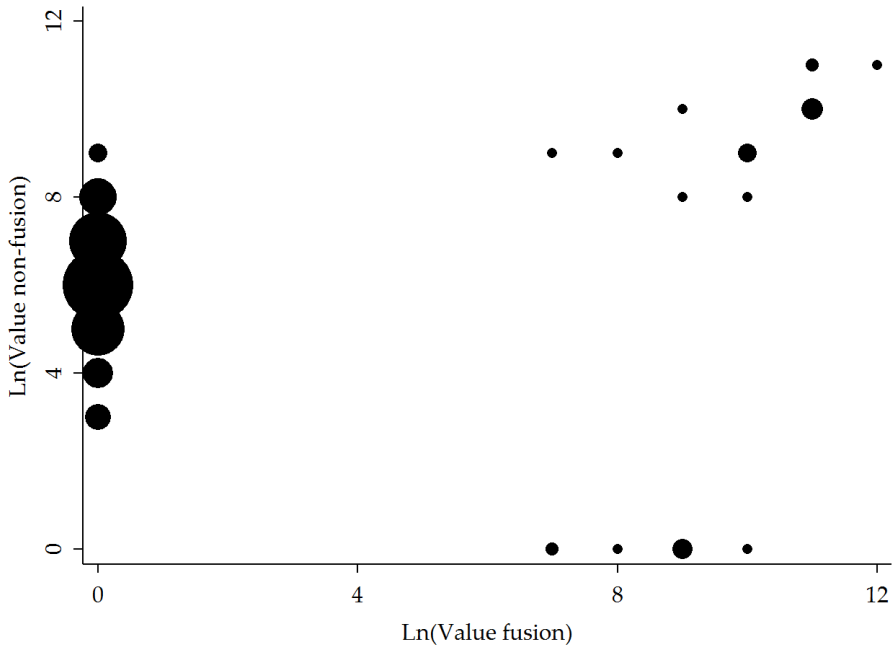
Figure 2. Comparing fusion and non-fusion CMBS deals: analysts, issuers, and investors

This figure compares fusion CMBS deals to other CMBS deal types with regard to analyst staffing (Panel A), issuing entities (Panel B), and investor clienteles (Panel C). In all three panels, larger markers indicate more observations. Panel A 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 and assignments) are obtained from S&P's Capital IQ. Panel B plots, by issuer, the log of one plus the total face value (in $ million) of fusion deals against the log of the total face value of non-fusion deals closed between 2000 and 2014; log values are rounded to the nearest integers. The data are from Commercial Mortgage Alert. Panel C plots, by mutual fund portfolio and year, the log of one plus the market value (in $ million) of fusion tranches held against the log of one plus the market value of non-fusion tranches held; log values are rounded to the nearest integers. The sample only considers portfolios that contain at least one CMBS bond in a given year. The sample period is 2008 to 2014. Data on mutual fund holdings are from the CRSP Mutual Fund database; data on CMBS securities is from the Moody's Default Risk Service Structured Finance database.

Panel A: Rating analysts



Panel B: Issuers



Panel C: Investor (mutual fund) holdings

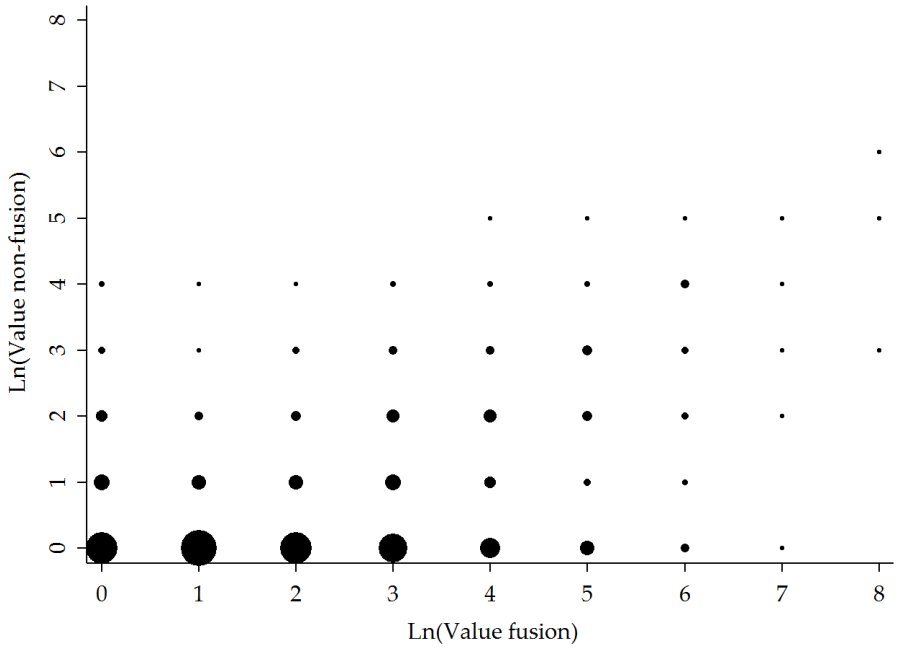
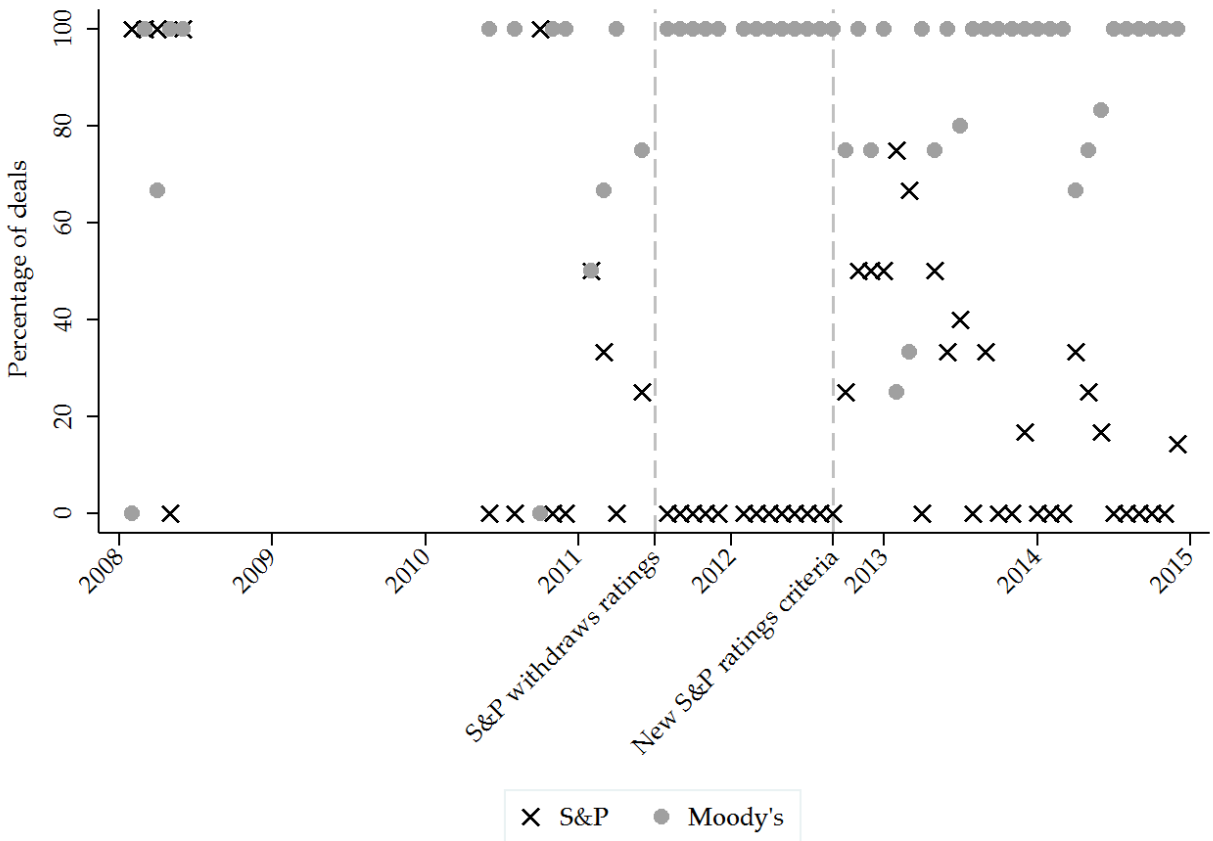


Figure 3. CMBS market shares of S&P and Moody's, 2008 – 2014

The figure shows the monthly CMBS market shares of S&P and Moody's over the 2008 – 2014 period. Panel A shows fusion CMBS deals, while Panel B shows non-fusion CMBS deals. The first dashed vertical line corresponds to July 2011, the month in which S&P retracted its ratings on the deal GSMS 2011-GC4; the second vertical line indicates September 2012, when S&P published new CMBS ratings criteria.

Panel A: Fusion



Panel B: Non-fusion

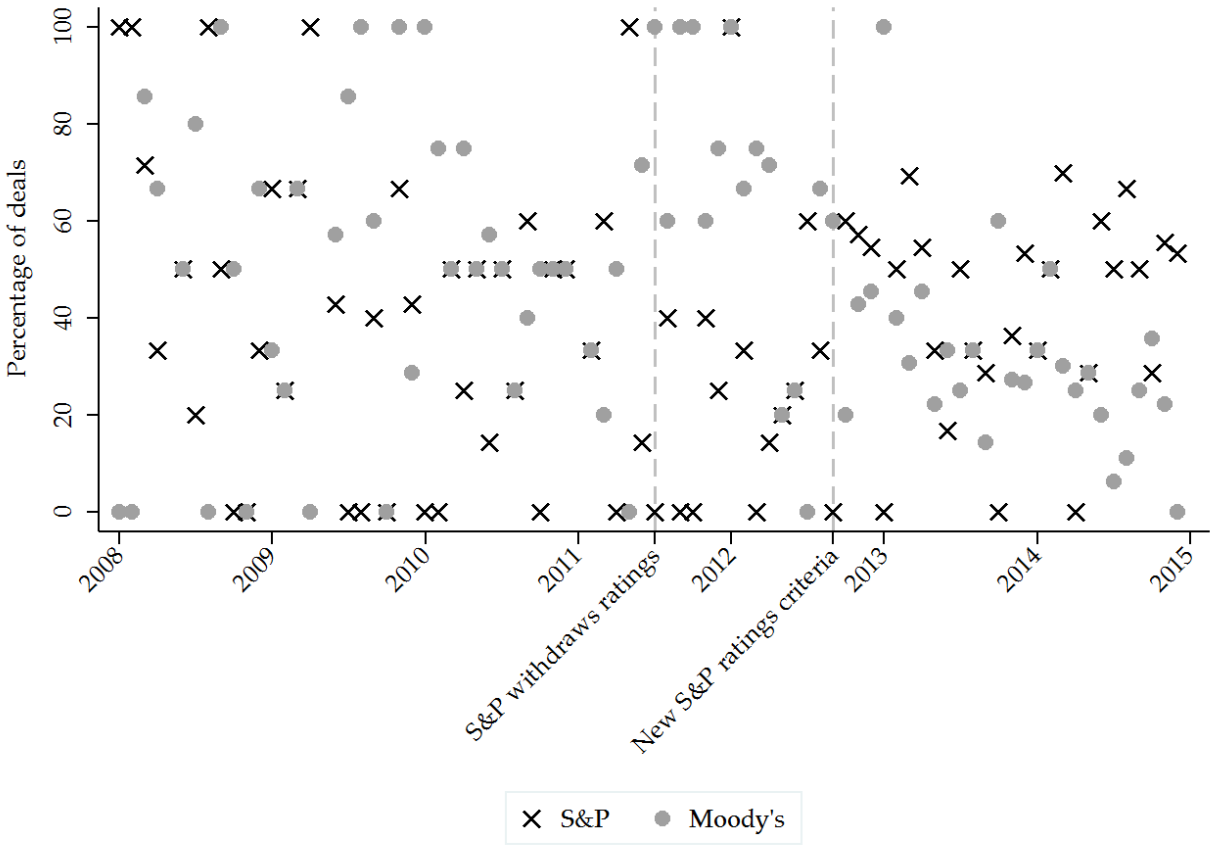


Figure 4. Time-line of events

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

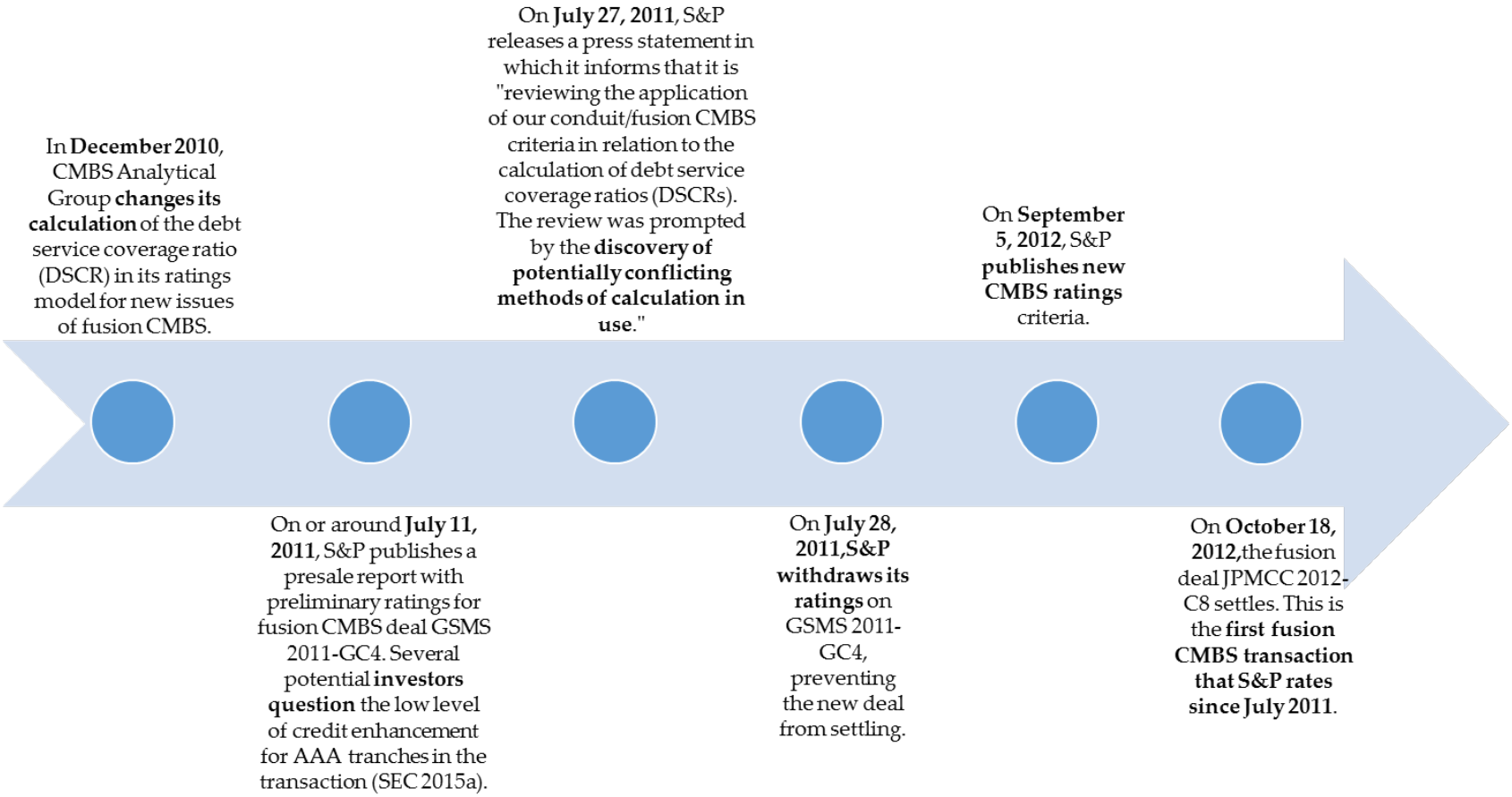
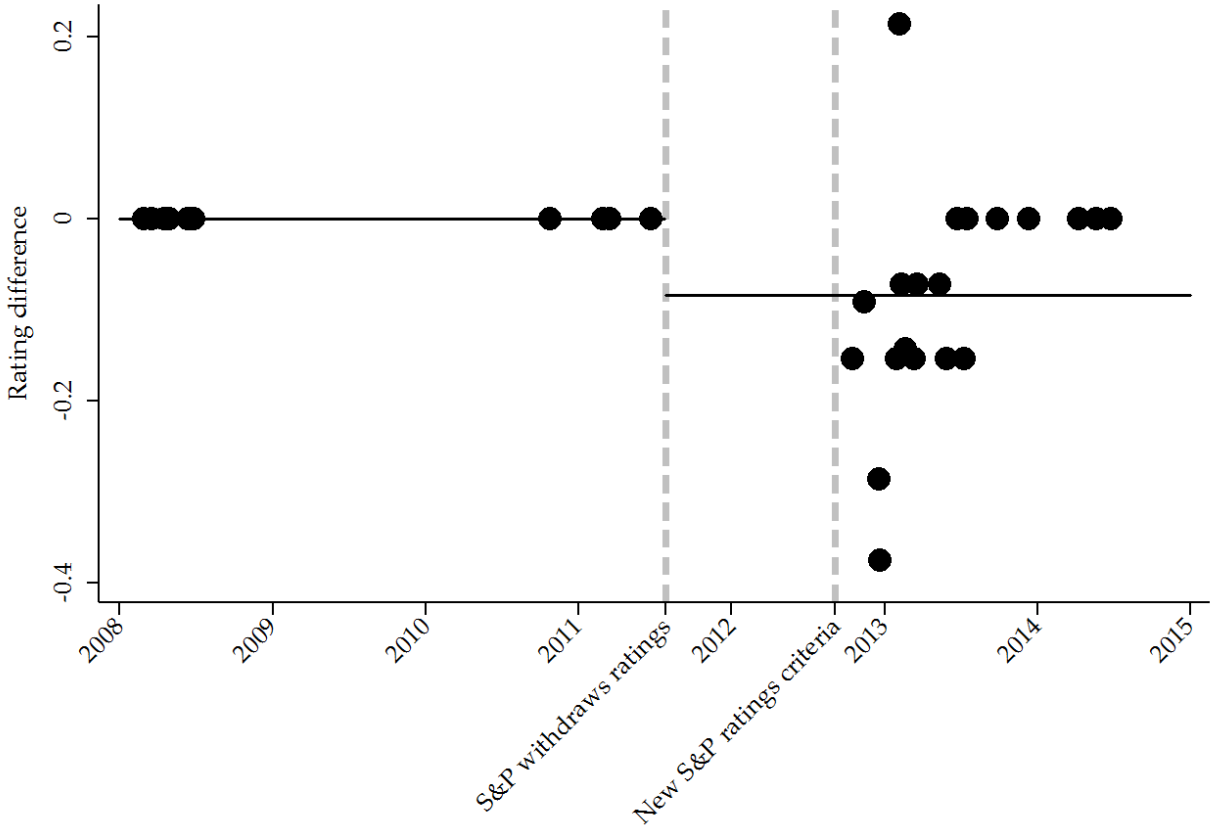


Figure 5. Tranche ratings, 2008 – 2014

The figure compares S&P ratings to ratings by Moody's and/or Fitch. Each 'dot' in the figure represents the average (across all tranches of a given deal) rating difference between S&P and Moody's and/or Fitch. The rating difference of a tranche is 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. The first dashed vertical line corresponds to July 28, 2011, when S&P retracted its ratings on the deal GSMS 2011-GC4; the second vertical line indicates September 5, 2012, when S&P published new CMBS ratings criteria. The two solid horizontal lines denote the average rating differences before and after the July 2011 event. Panel A shows fusion deals, while Panel B shows non-fusion deals. The sample period is 2008 – 2014.

Panel A: Fusion deals



Panel B: Non-fusion deals

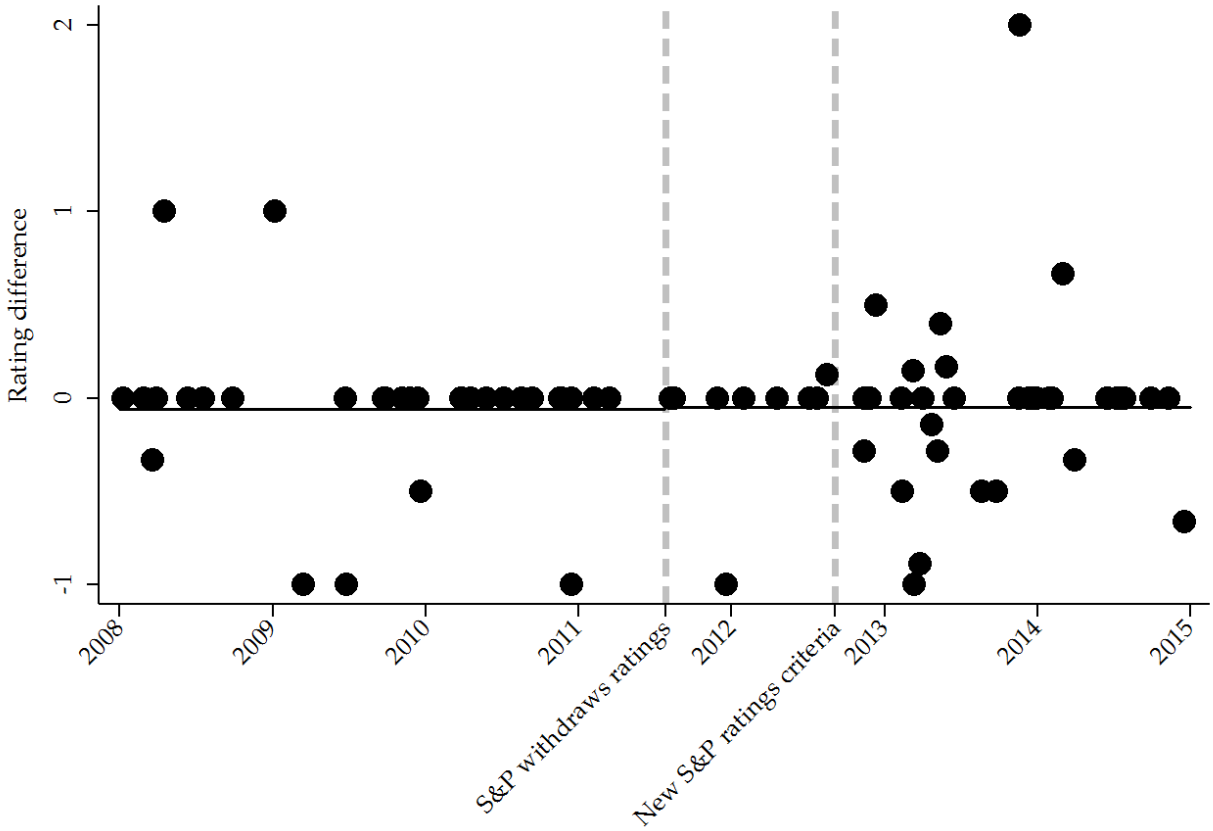


Figure 6. Ratings upgrades on seasoned fusion CMBS tranches, 2008 – 2014

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.