The Information Content of Credit Ratings: Compensation Structure Does Matter

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JEL classification: G24, G28

Keywords: Credit Ratings, NRSRO, Capital Markets Regulation

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1. Introduction

Since the demise of high-profile investment-grade companies such as Enron and WorldCom, academics, journalists, regulators, and legislators have examined the quality of credit ratings produced by Nationally Recognized Statistical Ratings Organizations (NRSROs). The role of NRSRO-generated ratings in the recent collapse of the structured finance markets and other investment-grade firms again brings the question of ratings quality to the forefront of financial regulation and legislation.[1] The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank, hereafter) charges federal regulators to consider alternatives to NRSRO-generated ratings for regulatory compliance, but avoids mandates regarding the characteristics of replacement benchmarks. We aim to illuminate this regulatory reform and the overall understanding of ratings quality determinants.[2]

Path-breaking work by Beaver, Shakespeare, and Soliman (2006), hereafter BSS, first documents the differential properties in credit ratings produced by Moody's Investors Service (Moody's) and the Egan-Jones Ratings Company (EJR). These authors find that the information contained in EJR ratings is more timely (ratings adjust to incorporate information quickly) and more symmetric (ratings equally adjust to good and bad news) when compared to Moody's ratings. These authors attribute their results to the NRSRO designation; as a 'certified' rating agency, Moody's ratings have regulatory and contractual implications which necessitate ratings conservatism, while the only role of the (then) 'non-certified' EJR was to provide information to investors. These authors dismiss the alternative 'conflict of interest' explanation noting Moody's testimony that no one client represents more than 1.5% of its income. However, recent literature finds that traditional rating agencies do indeed cater to issuers (Kraft, 2010).

[1] Most recently, MF Global filed bankruptcy on October 31, 2011, seven days after Moody's downgraded the firm to Baa3 (the lowest investment grade credit rating). See Coval, Jurek, and Stafford (2009) regarding the role of inflated credit ratings in the demise of the structured finance markets. See U.S. Congress (2008) for legislators' perspectives on this point.

[2] Dodd-Frank section 939D calls for the Comptroller General of the U.S. to study alternative means for compensating NRSROs in order to incentivize more accurate ratings; see Appendix A for the complete text.

In this paper, we reconsider whether the differential properties documented by BSS result from differences in the rating agencies' compensation structures. The potential conflict of interest is simple: as an issuer-paid credit rating agency, Moody's receives compensation from firms that are adversely affected by ratings downgrades.[3] In contrast, as an investor-paid agency, EJR receives compensation from investors who benefit from timely information, good news and bad, when making investment decisions. We submit that the less timely and less symmetric information contained in Moody's ratings is consistent with Moody's compensation structure. Likewise, the more timely and symmetric information contained in EJR ratings is consistent with EJR's compensation structure.

We exploit the change in EJR's NRSRO designation in December 2007 to extend BSS and better distinguish between these explanations.[4] Importantly, the sample employed by BSS terminates in 2002, preventing these authors from following a similar approach. If the differences in ratings properties are a function of this certification from the Securities and Exchange Commission (SEC) (and the corresponding regulatory significance of certified ratings), then we should observe a change in EJR's ratings policy following its designation. That is, credit ratings produced by EJR should begin to resemble those produced by Moody's. However, if the timeliness and accuracy of EJR ratings (relative to Moody's ratings) result instead from EJR's compensation structure, then we should expect the differences in ratings properties to persist following the NRSRO designation.

We find robust evidence that EJR's ratings policy – symmetric with respect to good and bad information and timelier relative to Moody's ratings – persists in the sample period after it received the NRSRO designation. We also find some evidence consistent with a modification of

[3] The Securities and Exchange Commission (SEC) and IOSCO (2008) recognize the problematic conflict of interest inherent in the issuer-pays model (see sections 17g-5(b)(1) and 15E9(h) of the Exchange Act). The academic literature also explores this conflict of interest; for examples see Partnoy (1999), Mathis, McAndrews, and Rochet (2009), Skreta and Veldkamp (2009), Sangiorgi, Sokobin, and Spatt (2009), and Griffin and Tang (2010).

[4] EJR received the NRSRO designation as a result of the Credit Rating Agency Reform Act of 2006 (The Act). We discuss The Act and its role in helping EJR receive the NRSRO designation in greater detail in the institutional background section.

Moody's rating policy in the later period, but the differences between the raters remain significant in each of our tests. Specifically, using a sample of firms covered by both raters, we first document the frequency of EJR's ratings changes (.96 ratings changes per firm-year) remains significantly higher than the frequency of Moody's changes (0.32 ratings changes per firm-year) in the post-NRSRO time period.[5] Second, among ratings changes, the proportions of upgrades and downgrades suggest less ratings inflation by EJR and significantly more symmetric (asymmetric) responses to good and bad information by EJR (Moody's) in both time periods; 45% (55%) of EJR's changes are upgrades (downgrades), whereas 29% (71%) of Moody's changes are upgrades (downgrades). These proportions remain virtually unchanged across pre- and post-NRSRO time periods and we more rigorously confirm these patterns with Granger causality tests. Third, the amount of negative information priced by the stock market prior to Moody's downgrades is significantly higher than that preceding EJR downgrades in both periods, indicating more bad news must unfold to compel Moody's to downgrade. Fourth, the probability that EJR reverses a premature downgrade remains significantly higher in the later time period (8.6% probability of reversing within a firm-year for EJR compared to 1.5% probability for Moody's). This pattern also appears among ratings reversals that cross the investment grade threshold, indicating Moody's appears more cautious of committing these particularly costly downgrades relative to EJR in both time periods. Overall, the body of evidence indicates EJR continued to produce more timely and symmetric information relative to Moody's, and did not adjust its ratings policy to accommodate issuer re-contracting or regulatory concerns, after it became an NRSRO.

Our results are robust to a variety of concerns. First, EJR received the NRSRO designation in December 2007, the first month of the recent recession according to the National Bureau of Economic Research. This simultaneous erosion of economic conditions might confound our results. However, our results remain qualitatively unchanged if we withhold from

[5] In fact, EJR's frequency displays a marginally significant increase of 0.05 ratings changes per firm-year from the pre-NRSRO period while Moody's frequency remains unchanged.

our sample (which runs through June 2011) data from this 18-month recessionary period. Second, our results cannot arise from a general sense of pessimism on the part of EJR, since its average and median ratings are similar to Moody's ratings in both time periods. Third, our sample of firms covered by Moody's and EJR is broad (717 firms with CUSIPs and COMPUSTAT data) and the industrial mix of these firms shows little change from pre- to post-December 2007 periods, indicating sample selection issues do not limit the relevance of our findings. Fourth, the credit ratings industry remained stable over our sample period. Data from the SEC reveals this industry was equivalent to one with 2.76 equally sized firms in 2006 and 2.86 equally sized firms in 2010 (GAO 2010, SEC 2011). This stability limits the possibility that industry trends coinciding with EJR's NRSRO designation in 2007 might drive our results. Fifth, our sample of Moody's ratings likely contains some unsolicited ratings. Fulghieri, Strobl, and Xia (2010) argue that issuer-paid credit raters maximize their fees and enhance their reputations by imposing low (pessimistic) ratings on firms that do not pay. Although we cannot identify which ratings are unsolicited in the Moody's data, to the extent they exist, unobservable effects of unsolicited ratings should mitigate our finding that Moody's produces ratings that are more issuer-friendly than EJR. Six, although we believe the differences in credit ratings produced by Moody's and EJR reflect different policies arising from different compensation structures, we cannot rule out the possibility that other unobservable characteristics, such as different ratings technologies, drive our results. We note, however, that if a superior technology drives the information content of EJR ratings, Moody's would appear to have adequate resources to acquire EJR, just as Moody's acquired the KMV technology in 2002.

We are left to conclude that the more timely and symmetric ratings produced by EJR, relative to ratings produced by Moody's, follows from EJR's independence from issuing firms. To the extent that regulatory capital has been misallocated due to biased estimates of credit quality from the Big 3 credit rating agencies (Moody's, Standard & Poor's, and Fitch Ratings), reforms that adequately address the conflict of interest associated with issuer-paid ratings should

improve capital market efficiency.[6] However, we do not suggest regulators should enforce compulsory compensation mechanisms for private industry. Rather, we advocate independent credit risk analysis to provide advanced warning of firms' deteriorating credit quality. At present, there are three NRSROs receiving compensation from investors rather than issuing firms (we review them below). Our results suggest that the one we study offers timely, symmetric information regarding credit quality. Rather than prohibiting regulatory reliance on all NRSRO credit ratings, as required by Dodd-Frank, we suggest limiting any such prohibition to ratings paid for by issuers.[7]

The paper proceeds as follows. Section 2 provides institutional background and surveys the relevant literature. Section 3 states our hypotheses and details our empirical design, Section 4 details the data collection, and Section 5 details our results. Section 6 considers the potential role of unsolicited credit ratings and different rating technologies, and Section 7 concludes.

2. Institutional background

2.1. The role of credit ratings in capital allocation

Credit ratings play an important role in the allocation of capital for at least three reasons. First, credit raters are information intermediaries. Information production in general – credit risk assessment in particular – is potentially cost prohibitive to atomistic investors (Grossman and Stiglitz, 1980). As information intermediaries, credit raters theoretically improve market efficiency by reducing the information asymmetry between issuing firms and these so-called retail investors. Second, since market participants can easily obtain and interpret credit ratings provided by the Big 3, credit ratings serve as low-cost coordination mechanisms (Boot,

[6] For evidence and discussion of credit ratings' role in capital allocation see Kisgen (2005), Hovakimian, Kayhan, and Titman (2009), Tang (2009), and Cornaggia, Cornaggia, and Hund (2011). We explore the role of credit ratings in capital allocation in greater detail in Section 2 below.

[7] We report relevant sections of Dodd Frank in Appendix A; refer to Section 939A.

Milbourne, and Schmeits, 2006).[8] The public nature of credit ratings allows them to serve as contracting benchmarks. This characteristic makes downgrades harmful to issuing firms since they trigger higher interest rates, early principle repayment, and other negative consequences such as higher future costs of capital (Moody's 2006).

Third, beyond information production and contract benchmarking, another primary source of demand for credit ratings stems from regulatory compliance of institutional investors (Cantor and Packer, 1997). According to the Securities Industry and Financial Markets Association (SIFMA, 2007), regulated entities including insurance companies, banks, pension funds, and dealers hold approximately 40% of corporate bonds and asset-backed securities. Sophisticated institutional investors such as these may not rely on credit ratings for information, but rather for regulatory compliance. This argument supports the conclusions drawn by BSS and Cornaggia and Cornaggia (2011). We do not question the value of rating stability to regulated financial institutions. Rather, we question the extent to which rating policies are driven by compensation structure vis-à-vis their role in regulatory compliance.

2.2. The NRSRO designation

Historically, only ratings produced by NRSROs are useful for regulatory compliance. The SEC has required money market funds to hold short-term securities (typically commercial paper) rated AAA and has set net capital requirements for broker dealers based on NRSRO ratings of broker dealers' securities. Basel II employs credit ratings to establish capital adequacy requirements.[9] The Department of Labor employs ratings to regulate the financial risk of pension funds per the Employee Retirement Income Savings Act of 1974 (ERISA) and the National

[8] However, recent evidence provided by Cornaggia, Cornaggia, and Hund (2011) calls into question the comparability of credit ratings across asset classes. These authors document that relative to corporations, issuers of municipal and sovereign debt face significantly more stringent standards while issuers of asset backed securities face significantly more lax standards. These authors attribute their results to variation in revenue generation by asset class. Their evidence and conclusions support our primary hypothesis regarding the important role of rater compensation structure.

[9] Information on the Basel Committee on Banking Supervision is available here: http://www.bis.org/bcbs/ and details of minimum capital requirements are available here: http://www.bis.org/publ/bcbs128b.pdf.

Association of Insurance Companies (NAIC) and state insurance regulators have similar prudent investment requirements.[10] Finally, issuers obtaining stronger credit ratings have historically enjoyed preferential treatment when registering securities with the SEC; i.e., "short form" registration. Indeed, the assertion by BSS that ratings issued by NRSROs have important regulatory and contractual implications is clearly valid. However, these regulatory implications do not preclude an important role for rater compensation structure in determining rating policy.

2.3. The Credit Rating Agency Reform Act of 2006

The high profile "rating failures" of Enron and WorldCom by the Big 3 fuelled criticism resulting in the Credit Rating Agency Reform Act of 2006; hereafter The Act.[11] The Congressional summary of this bill 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 agency industry*".[12] In order to achieve competition, The Act opened the NRSRO designation to an application process and ultimately resulted in the NRSRO designation of EJR, thus providing the laboratory for the empirical work in this paper. We do not consider either The Act nor the change in EJR's NRSRO designation be exogenous. Rather, we believe that both followed the perceived performance failures of the Big 3 and a significant lobbying effort on the part of EJR (starting as early as 1998; Egan, 2003). This endogeneity complicates our empirical design in the following sense: we intend to test the significance of the NRSRO designation on EJR's behavior vis-à-vis Moody's behavior. But the designation of EJR resulted in part because of a perceived performance shortcoming by Moody's and thus could impact Moody's behavior

[10] See Ellul, Jotikashthira, and Lundblad (2011) regarding fire sales of corporate bonds by these institutional investors in response to downgrades in order to comply with regulations.

[11] Moody's downgraded Enron to speculative grade on November 28, 2001 just four days prior to Enron filing a Chapter 11 petition on December 2; See U.S. Senate (2002). Moody's downgraded WorldCom to speculative grade on May 9, 2002, less than three months prior to its Chapter 11 petition on July 21; see Lyke and Jickling (2002) and *The New York Times* "Credit Rating of WorldCom is Cut to Junk", May 10, 2002.

[12] This summary of The Act is available here: www.govtrack.us/congress/bill.xpd?tab=summary&bill=s109-3850. Skreta and Veldcamp (2009) and Becker and Milbourn (2010) call into question the value of competition in the credit ratings industry. Bongaerts, Cremers, and Goetzman (2010) explore the role of new entrants in the ratings industry.

as well. We explain our empirical design in greater detail below, mindful of the potential for The Act to impact the ratings policies of both raters.

Although The Act increased the number of NRSROs to ten, the industry remained dominated by the Big 3 rating agencies.[13] Of the ten NRSROs in 2011, seven receive compensation from issuing firms and two of the three investor-paid firms are moving toward issuer-payment when rating asset backed securities (ABS); SEC (2011b). Not all of these ten firms compete for ratings business in the same asset classes; SEC (2011b). For example, EJR specializes in corporate issuers. In contrast, Morningstar presently rates only ABS while A.M. Best specializes in insurance companies. The Big 3 command the largest market share in part because they rate across all asset classes including issues by municipalities, sovereign nations, corporations, financial institutions, and the gamut of structured finance products.

In addition to the expansion of firms applying for the NRSRO designation, the perceived failures of the Big 3 rating agencies have fuelled a market for independent credit analysis by raters not seeking the NRSRO designation. The application process includes substantial reporting requirements and subjects applicants to ongoing regulatory oversight by the SEC in accordance with The Act.[14] Some prominent providers of independent credit analysis have, to date, chosen not to participate.[15] Given associated costs, we infer some perceived benefit of the government certification to applicants such as EJR. Our goal is to examine the extent to which this designation (vis-à-vis compensation structure) determines rating policy. We detail our empirical design next.

[13] Alphabetically: A.M. Best, DBRS, EJR, Fitch, Japan Credit Rating Agency, Kroll Bond Rating Agency (f/k/a Lace Financial Corp), Moody's, Morningstar (f/k/a Realpoint LLC), Rating & Investment Information, and S&P. SEC (2011a) reports a Herfindahl-Hirschman Index (HHI) of 3,495 for all NRSRO ratings outstanding in 2010, which is the equivalent of 2.86 equally-sized firms.

[14] The application form is available here: http://www.sec.gov/about/forms/formnrsro.pdf.

[15] CreditSights, formed in late 2000, produces the highly-recognized BondScore™ and is consistently ranked by *Credit* magazine as "Best Independent Credit Research Provider". Rapid Ratings formed in 1991 and has since participated in SEC roundtable discussions and testified before the House and Senate. The Center for Financial Research & Analysis (CFRA) was founded in 1994 and acquired by RiskMetrics Group in 2007 which had its IPO in 2008 (NYSE: RISK) and was subsequently acquired by MSCI in 2010.

3. Literature review, hypotheses, and empirical design

Our primary research question is whether rater compensation structure influences credit rating policies. Existing literature provides some evidence, but draws mixed conclusions on this point. We start here with a review of previous work providing support for the competing alternatives, and then we propose our strategy for disentangling contributing factors. As noted above, BSS document that information provided by EJR ratings is both more timely (ratings adjust to incorporate information quickly) and symmetric (ratings adjust symmetrically to good and bad news) when compared to Moody's ratings. These authors attribute their results to the NRSRO designation of Moody's (and EJR's lack thereof) during their sample period. These authors dismiss rater compensation structure as a viable explanation for their results, but they do not perform explicit tests to compare the alternatives.

More recently, Xia (2010) and Cornaggia and Cornaggia (2011) compare Moody's ratings to those produced by independent credit rating agencies. Similar to the results of BSS, these authors find that the independent raters provide more timely and accurate information than Moody's. In contrast to the conclusion drawn by BSS, these authors attribute the difference to compensation structure. However, these papers do not exploit variation in the independent raters' NRSRO designations.[16] Therefore, the evidence presented by these authors is consistent with the conclusions drawn by BSS. Like BSS, these authors discuss but do not explicitly test alternative explanations for the differences in rating policies.

In this paper, we exploit the change in EJR's NRSRO designation to explicitly test these competing explanations for the differential ratings policies at EJR and Moody's. If the differential ratings are a result of the NRSRO designation by the SEC (and the corresponding regulatory significance of NRSRO-generated ratings), then we should observe a change in EJR's ratings policy following its designation. But if the differences in timeliness and accuracy

[16] Xia (2010) uses data from EJR, which gained the NRSRO designation late in his sample period (July 1999 to July 2009) in December 2007. Cornaggia and Cornaggia (2011) use data from Rapid Ratings, which to date does not have the NRSRO designation.

between the raters result instead from their compensation structures, then we should expect no change in ratings policy.

Our empirical design begins essentially as a replication of the BSS study. The hypotheses we test are thus very similar to those of BSS. We pose additional hypotheses informed by more recent contributions to the credit ratings literature and, finally, we pose our primary hypothesis regarding the role of the NRSRO designation in shaping ratings policies. In order to test these hypotheses, we extend the analyses of BSS to include the time period following the SEC's designation of EJR as an NRSRO and compare the two time periods (pre- and post-NRSRO designation of EJR). Where BSS were concerned only with differences between EJR and Moody's, we are more concerned with differences (between the two time periods) in these differences (between the two raters). We note that credit raters vary along a host of dimensions beyond compensation structure and NRSRO designation, and thus an ideal comparison would include an analysis of all credit raters. Facing data constraints prohibiting such a complete analysis, we compare Moody's and EJR in order to achieve a direct comparison to the results of BSS.

Like BSS, we characterize our first hypotheses as a *clientele* effect. However, we define Moody's clientele differently than BSS. The premise of BSS's hypotheses is that, like EJR, Moody's clients are investors and other market participants (see page 308). They posit that the observed differences in ratings attributes are a function of Moody's 'quasi-governmental' role as an NRSRO. Although we recognize the regulatory and contractual role of Moody's ratings (discussed above), more recent evidence leads us to define the *issuing firms* providing compensation to Moody's as its clients (see, for examples, Kraft (2010), Xia (2010), and Cornaggia, Cornaggia, and Hund (2011)).

Issuing firms report that they are 'very concerned' about their credit ratings (Graham and Harvey, 2001). Indeed, empirical evidence suggests that firms manipulate their accounting statements in order to obtain inflated ratings (Caton, Chiyachantana, Chua, and Goh, 2011) and

further consider the impact on credit ratings when deciding whether to issue debt (Kisgen, 2005; Hovakimian, Kayhan, and Titman, 2009). We hypothesize that, at the margin, credit rating agencies that receive compensation from issuing firms will err on the side of 'optimism', since raters profit from continual relationships with issuing firms.[17] In contrast, we expect ratings funded by investors to exhibit no such bias.

Because Moody's receives the bulk of its compensation at the time of issuance, Moody's rationally views future 'surveillance' (ratings updates) as an ex post cost. Indeed, the SEC (2008b) examination team concludes that "*the surveillance processes used by the rating agencies appear to have been less robust then their initial processes*". Having put their best foot forward at the time of issuance, issuing firms have little incentive to pay for ongoing inspection. This is especially true among firms manipulating earnings (Caton, et al., 2011) as the aggressive accruals in the periods leading up to the issuance take years to unwind. In contrast, EJR receives continual compensation for continual information production. We thus propose the following hypotheses with respect to inflation, timeliness, and symmetry of ratings:

H1a: Given effective earnings management by issuers when ratings are first produced, credit raters will downgrade ratings more frequently than they upgrade ratings.

H1b: Issuer-paid ratings will exhibit greater inflation than investor-paid ratings and thus a greater proportion of future changes will be downgrades than upgrades.

H2a: The rating changes of investor-paid credit raters will reflect new information sooner than the rating changes of issuer-paid credit raters.

H2b: The ratings changes of investor-paid credit raters will reverse with greater frequency than the rating changes of issuer-paid credit raters.

H3a: The rating changes of investor-paid credit raters are more symmetric with respect to positive and negative information than the rating changes of issuer-paid credit raters.

[17] Whether or not the conflict of interest inherent in the issuer-pays model outweighs the negative reputation effects to credit rating agencies that issue inflated ratings remains a matter of debate. See Partnoy (1999), SEC (2008b), U.S. Congress (2008), Mathis, McAndrews, and Rochet (2009), Skreta and Veldkamp (2009), Sangiorgi, Sokobin, and Spatt (2009), Becker and Milbourn (2010), Griffin and Tang (2010), Kraft (2010), Xia (2010), and Cornaggia and Cornaggia (2011).

H3b: The rating changes of issuer-paid credit raters are asymmetric, favoring issuers with slower responses to negative information than to positive information.

Given the regulatory implications and liquidity effects that compound the information effect of a downgrade to speculative grade (Ellul et al., 2011), we hypothesize that the issuer-oriented ratings policy will be especially pronounced at the threshold between investment grade and speculative grade ratings classes.

H4a: Issuer-paid credit raters will be reluctant to downgrade across the investment-grade threshold and this aversion will be asymmetric, resulting in a 'kinked' ratings distribution.

H4b: Investor-paid credit raters will exhibit no difference in a reluctance to change ratings, around the investment grade threshold relative to other points along the rating distribution, resulting in a smooth ratings distribution.

Finally, in order to address the primary research question we pose in the paper, we hypothesize that the differences between the investor-paid and issuer-paid raters described above are a result of rater compensation structure rather than the NRSRO designation.

H5: The difference in credit ratings policies will remain after the investor-paid credit rater receives the NRSRO designation.

In order to test our hypotheses, we employ the following tests. (1) We consider descriptive statistics including average ratings changes by each rater in each time period (pre- and post-NRSRO designation of EJR). As BSS (page 309) state, "*we also would expect non-certified agencies to make more frequent ratings changes*". If the BSS hypotheses regarding the NRSRO designation hold, we should expect a decrease in the rating change activity by EJR after it receives the NRSRO designation. (2) We investigate ratings inflation and ratings symmetry by comparing the relative frequencies of upgrades and downgrades by each rater, separately for the two time periods. We then compute t-tests for differences (between time periods) in these differences (between raters). (3) We investigate timeliness first by computing raw probabilities of one rater downgrading (upgrading) in the six month window prior to a downgrade (upgrade) by the other rater. We include t-tests for differences (between time periods) in differences

(between raters). We further employ Granger causality tests separately for the two time periods (Granger, 1969) and compute Wald tests for differences in individual regression coefficients for each lag between the two time periods, as well as Wald tests for the joint significance of the lags' changes. (4) We examine stock market returns over short and long windows as proxies for the arrival of new information leading up to the rating changes by each rater. (5) We document 'reversal' rates as a proxy for correcting premature rating changes. We provide details along with our tabulated results in Section 5 below.

4. Sample selection and data collection

4.1. EJR credit ratings

For our sample of investor-paid ratings, we obtain EJR data directly from the company. Specifically, EJR provided us with complete ratings histories from July 1999 to June 2011 for all rated firms, along with the firms' ticker symbols resulting in 26,346 observations. EJR generates credit ratings that fall along a 22-point scale ranging from most creditworthy to least creditworthy: AAA, AA+, AA, AA-, A+, A, A-, BBB+, BBB, BBB-, BB+, BB, BB-, B+, B, B-, CCC+, CCC, CCC-, CC, C, and D. Although EJR ratings were not useful for regulatory compliance in the early part of our sample, EJR denotes obligations with credit ratings equal to BBB- or higher as "investment grade" and obligations with credit ratings equal to BB+ or lower as "speculative grade." In order to employ these ratings in our tests, we assign a numerical value to each rating ascending in credit quality (Table 1). Following BSS, we focus only on rating changes and delete all 'initial' ratings (initiation of coverage), 'affirmed' ratings (confirmation of the existing rating) and 'dropped' ratings (ratings coverage ends), resulting in 8,815 observations.

[Insert Table 1 here.]

The Act resulted in the NRSRO designation of EJR in December 2007, thus we have adequate data on both sides of this event to test the significance of the designation on the ratings

policies of EJR and Moody's. (The results in this paper are qualitatively similar if we restrict the sample to a six-year period centered around December 2007.) We are mindful, however, of potentially important differences between our sample period and that of BSS. BSS's sample spans 1996 through 2002 and contains the internet bubble; our sample begins in July 1999 and thus does not contain this bubble.[18] We have no hypotheses regarding the implications of bubbles on credit ratings, per se, but bubbles may well have implications for the observed stock returns that BSS use as proxies for information. Similarly, our time period contains the recent recession and their sample does not. We posit no formal hypotheses regarding the recession for rating policy, but the recession may have implications for the observed stock returns we use to replicate the BSS methodology. Overall, our results are largely unchanged if we omit data from the 18-month recession that began in December 2007. Figure 1 displays a timeline of relevant dates including The Act of 2006, EJR's NRSRO designation, recessionary periods, and our sample period.

[Insert Figure 1 here.]

4.2. Moody's credit ratings

We employ Moody's Default and Recovery Database (DRD) for our sample of issuer-paid ratings. The DRD includes complete Moody's credit ratings histories for debt obligations issued by public firms. Moody's generates credit ratings that fall along a 21-point alphanumeric scale. The scale ranges from most creditworthy to least creditworthy: Aaa, Aa1, Aa2 Aa3, A1, A2, A3, Baa1, Baa2, Baa3, Ba1, Ba2, Ba3, B1, B2, B3, Caa1, Caa2, Caa3, Ca, and C. Moody's denotes obligations with credit ratings equal to Baa3 or higher as "investment grade" and obligations with credit ratings equal to Ba1 or lower as "speculative grade" (Table 1). We employ Moody's ratings of senior unsecured debt between July 1999 and June 2011

[18] EJR ratings data from prior to 1999 are no longer available from Bloomberg or EJR.

(corresponding to the EJR sample period) yielding 701,815 company-level rating observations.[19] Following BSS, we drop all 'initial' ratings and ratings changes prior to the first EJR observation, resulting in 19,099 company-level rating change observations.

Panel B of Table 1 indicates that mean and median ratings from EJR are similar to those from Moody's in both time periods. This is important to note; any difference in ratings between these raters for particular firms is not a reflection of systematic 'pessimism' on the part of EJR. Un-tabulated frequencies by rating classes further indicate that EJR awards ratings in the A to AAA range more frequently than Moody's in both time periods, indicating EJR ratings are not merely Moody's ratings with a conservative 'haircut'. Panel C of Table 1 displays the size of EJR's and Moody's ratings adjustments measured in notches. The ratings adjustments are similar in size across raters in both time periods and for upgrades and downgrades.

4.3. Intersection of EJR and Moody's

Due to the lack of reliable common identifiers in the two raters' databases, we manually merge the companies rated by EJR and Moody's by looking at company names, tickers, forms 10-K, companies' websites, and also checking for potential company name changes or mergers. Table 2 provides our sample collection and reconciliation detail. Following BSS, we deleted companies that are covered by Moody's but not by EJR or covered by EJR but not by Moody's and we deleted all Moody's rating changes prior to the first EJR observation. The merged dataset comprises a total 10,244 rating changes observations of which 7,323 are EJR rating changes and 2,921 are Moody's rating changes. Consistent with BSS, we keep only those companies with available CUSIPs, which reduce the sample to a total of 8,002 rating changes observations for 717 firms. Figure 2 displays the industrial mix of firms in our sample, before and after EJR

[19] We consider the potential for differences in credit ratings across bonds issued by larger firms with complex debt structures. Including all rated bonds poses a potential over-representation problem whereby high-frequency issuers disproportionately drive results. Alternatively, we consider selecting one bond to represent issuers according to various criteria, including seniority, maturity, highest credit rating, or lowest credit rating. We choose to employ senior unsecured ratings because this is the Standard & Poor's rating that EJR targets for comparison (see www.egan-jones.com) and also because BSS do so. Ultimately this discussion is largely immaterial since multiple bonds issued by the same firm usually have the same Moody's credit rating (Cornaggia and Cornaggia, 2011).

received the NRSRO designation. The industrial mix remains stable, with a modest reduction in telecommunication firms and a modest increase in financial firms. Untabulated tests reveal our results are robust to the exclusion of observations associated with firms in these two industries. The stable industrial mix indicates our results are not driven by, for example, a shift in the profile of firms rated by EJR or Moody's after EJR's NRSRO designation.

[Insert Table 2 here.]

[Insert Figure 2 here.]

We obtain the following financial statement data from the COMPUSTAT annual database: sales, total assets, market value of equity (number of shares outstanding multiplied by fiscal-year-end share price) and net income. Because some observations in the EJR sample and the Moody's sample are of subsidiaries of larger firms which do not have data available in COMPUSTAT, and because COMPUSTAT data are available only until December 2010 at the time of this writing, our main sample reduces to a total of 6,931 rating changes observations (5,167 are EJR changes, 1,764 are Moody's changes). We describe this sample in Table 3 and employ it in timeliness tests below. The stock returns tests require data from CRSP daily stock return and daily Indices/Deciles files. Consistent with BSS, we calculate compounded size-adjusted stock returns, inclusive of dividends and other distributions, by subtracting the value-weighted average return for all firms in the same size-matched decile. We measure size as market capitalization at the beginning of the return accumulation period. We employ decile breakpoints available from Ken French's website in order to match each company to its corresponding market cap-based decile. The sample in the stock returns tests comprises a total of 6,774 rating changes observations (5,064 are EJR changes, 1,710 are Moody's changes). The 6,774 ratings changes reflect 5,557 firm-year observations as we observe multiple ratings changes for some firms within the same year.

5. Results

5.1. Descriptive statistics

Table 3 provides descriptive statistics using one observation per firm-year for firms covered by EJR and Moody's with CUSIPs and COMPUSTAT data. We first describe the rated firms with various measures of firm size and market-to-book and compare the time periods before and after EJR received the NRSRO designation in December 2007. These figures are inflation-adjusted, reported in year 2010 dollars. Firms are significantly larger in book value (total assets) in the later time period, but have smaller market capitalization. Indeed, the average market-to-book ratio in the later period (1.43) is less than half that of the earlier period (3.31) and the difference is significant at 5%. While average revenues increased significantly, net income fell by an insignificant amount.

Table 3 also reports the average number of ratings changes per firm-year by each rater in both time periods.[20] Moody's altered ratings only .31 (.32) times per year for the average firm in the earlier (later) time period; the increase is not significant. In comparison, EJR altered ratings .91 (.96) times per year, respectively. This increase in EJR's ratings change activity is marginally significant and it provides our first evidence inconsistent with the certification explanation for observed rating policies. If the NRSRO designation determined rating policy, we should expect EJR to decrease its ratings change frequency when it became an NRSRO.

[Insert Table 3 here.]

Figure 3 displays distributions of firm-month credit ratings for each rater in both time periods. Each bar indicates the percent of observations with each particular rating. The distribution of EJR ratings appears smooth – monotonically increasing between B- and BBB, and then monotonically decreasing from BBB to AAA, but with a fat lower tail in the C to CCC+

[20] We compute ratings changes on a monthly basis, so to the extent that either rater changes its ratings multiple times within a firm-month, these averages will underestimate the rating change activity.

range. Conversely, the distribution of Moody's ratings demonstrates a 'kink' at the investment grade threshold. The frequency of the lowest Moody's rating above the investment grade cutoff (Baa3) appears higher than expected in a monotonic distribution in the early period. In both periods, the frequencies of the highest speculative ratings (Ba1 and Ba2) appear lower than expected in a monotonic distribution such as that obtained by EJR. This pattern is consistent with the reluctance of the issuer-paid rater to downgrade clients across this threshold (H4a) but we do not observe it in the rating policy of the issuer-paid rater (H4b). Like BSS, we statistically test the smoothness of these distributions following the procedure of Burgstahler and Dichev (1997).[21] Like BSS, we find in untabulated results that the difference is significant for Moody's (suggesting a significant kink) and insignificant for EJR (suggesting a smooth distribution). Like Burgstahler and Dichev (1997), we infer intentional management to affect this 'kink' in the distribution. Most important for our primary hypotheses is the finding that the distribution is smooth for EJR in both time periods (H4b holds in both time periods) suggesting no change in rating policy after its designation as an NRSRO. However, the significant kink in the Moody's distribution observed by BSS and in our earlier time period attenuates in the later time period (H4a holds only in the early period). To the extent that these histograms reveal an effect of The Act on credit rating policy, it appears to have affected Moody's, not EJR.

[Insert Figure 3 here.]

Figure 4 plots the differences between Moody's ratings and EJR ratings over time. Specifically, we calculate the difference between Moody's and EJR's ratings (see Table 1 for the numeric conversion of the ratings) for each firm in each month over our entire sample period. We then compute the monthly averages of these differences and plot them over time. Our first

[21] Specifically, we define smoothness as follows: the expected number of observations in any given interval of the distribution is the average number of observations in the two immediately adjacent intervals. The test statistic used to test the null hypothesis that the distribution is smooth is the difference between the actual number of observations in an interval and the expected number of observations in the interval, divided by the estimated standard deviation of the difference calculated following the method of Burgstahler and Dichev (1997).

observation from this graph is that differences between raters do not reflect general pessimism on the part of EJR. If EJR ratings were simply Moody's ratings with a conservative 'haircut', we would observe a straight line somewhere above zero. We also observe that differences between the raters appear greatest during recessions. We infer that EJR considers macro-economic factors that affect credit risk while Moody's 'rates through the cycle' (Moody's, 2003).

[Insert Figure 4 here.]

Panel A of Table 4 reports the number of credit ratings changes (upgrades and downgrades) and the number and proportion of those that are downgrades by each rater in both time periods. Consistent with the effective earnings management by issuing firms documented by Caton, et al. (2011) and H1a, we observe higher proportions of downgrades than upgrades for both raters. However, consistent with H1b, this disparity is greater for the issuer-paid rater; approximately 70% of Moody's changes are downgrades in each time period. The disparity in EJR ratings is smaller (approximately 55% of its changes are downgrades). Consistent with H5, these differences in percentages are remarkably stable from the earlier to the later time period, as evidenced by the insignificant difference-in-differences. Importantly, these patterns remain qualitatively similar for a variety of sample selection choices. Untabulated robustness tests reveal similar patterns if we restrict the sample to a six-year period centered on December 2007, if we restrict the sample to ratings changes within investment grade territory, if we restrict the sample to ratings changes within speculative grade territory, or if we withhold data from the 18-month recessionary period beginning in December 2007. Further, Panel B of Table 4 repeats this analysis, restricting the sample in Panel A to ratings changes that cross the investment grade threshold and therefore have potential regulatory or re-contracting implications. The insignificant difference between time periods for both raters and the insignificant difference-in-differences in this sample of 'important' rating changes corroborate the conclusions from Panel A.

[Insert Table 4 here.]

5.2. Timeliness tests

We document our first test of rating timeliness in Table 5. Specifically, we compute probabilities that EJR updates its ratings in the six-month period prior to a similar update by Moody's, and vice versa. Panel A (Panel B) displays the probabilities that each rater downgrades (upgrades) its ratings in the six-month period prior to a downgrade (upgrade) by the other rater. The table displays results from tests of whether the differences are significant, both across raters and within each rater across before- and after-December 2007 periods, and whether the differences-in-differences are significant. In the early time period, EJR downgrades its ratings prior to 55.3% of Moody's downgrades. In contrast, Moody's downgrades its ratings prior to 21.8% of EJR downgrades. These differences attenuate by 9.3% in the later period: EJR moves prior to 49% of Moody's downgrades and Moody's moves prior to 24.8% of EJR downgrades, yet the differences between the raters remains significant (24.2% with p-value = 0.0000) in the later period. This evidence supports hypotheses H2a and H5. The patterns in upgrades tabulated in Panel B are similar to those in Panel A. EJR moves prior to 38.3% (31.5%) of Moody's upgrades in the early (later) period and Moody's moves prior to 7.2% (10.8%) of ERJ upgrades, respectively. As in Panel A, this difference remains significant (20.7% with p-value = 0.0000) in the later period and supports hypotheses H2a and H5. Similar to our symmetry tests, these timeliness patterns remain qualitatively similar for a variety of sample selection choices. Untabulated robustness tests reveal similar patterns if we restrict the sample to a six-year period centered on December 2007, if we restrict the sample to ratings changes within investment grade territory, if we restrict the sample to ratings changes within speculative grade territory, if we restrict the sample to ratings changes that cross the investment grade threshold, or if we withhold data from the 18-month recessionary period beginning in December 2007.

Interestingly, the attenuation effects appearing in Panels A and B lend some support to the BSS hypotheses. The significant differences-in-differences indicate EJR's downgrades (upgrades) become 9.3% (10.3%) less likely to lead Moody's downgrades (upgrades) after EJR

received the NRSRO designation. However, the reduction in the 'timeliness gap' is not entirely attributable to a modification by EJR. Although EJR moves first less often in the later period, Moody's moves first more often. To the extent that the NRSRO designation of EJR (or The Act) altered rating policy, it appears to affect both raters. We note, however, that because the first differences between EJR and Moody's remain economically large after EJR received the designation, the raters' differing compensation structures appear to maintain a greater influence on this measure of timeliness.

[Insert Table 5 here.]

In order to more finely illustrate timeliness, we decompose the probabilities of ratings changes by month in Figure 5. Specifically, we plot the probability of an EJR downgrade (Moody's downgrade) in a 13-month window around a downgrade by Moody's (EJR).[22] Panels A and B display these plots in the period prior to the EJR designation in December 2007 and Panels C and D display the same plots in the post period. Consistent with the results in Table 5, EJR's ratings changes tend to lead those of Moody's both before and after EJR received the NRSRO designation.

[Insert Figure 5 here.]

We test for Granger causality in Table 6 by expanding the *Firms rated by both sample* into a panel dataset with firm-month observations. We create observations for every firm and every month, regardless of whether Moody's or EJR changed a firm's credit rating within a given month. We populate these observations with indicator variables. For example, *Moody's down* (*EJR down)* is an indicator variable taking a value of 1 if Moody's (EJR) downgrades a firm's credit rating within a given month and 0 if it does not. Similarly, *Moody's up* (*EJR up)*

[22] To conserve space, we omit similar graphical depictions of upgrade probabilities. The magnitudes of upgrade probabilities are smaller, as one would expect since both raters tend to upgrade less often than they downgrade (see Table 4), but the pictures convey a similar story: EJR moves prior to Moody's with greater probability than Moody's moves prior to EJR, and these patterns exist both before and after EJR received the NRSRO designation.

takes a value of 1 if Moody's (EJR) upgrades a firm's credit rating within a given month and 0 if it does not. We conduct logistic vector autoregressions using these indicator variables and their lags for sample periods containing firm-month observations before December 2007 and after December 2007. We follow BSS and use six lags, although the inferences we explain below are generally insensitive to the number of lags:

$$\text{Moody's down}_{i,t} = \alpha + \sum_{j=1}^{6} \beta_j \text{ Moody's down}_{i,t-j} + \sum_{j=1}^{6} \gamma_j \text{ EJR down}_{i,t-j} + \varepsilon_{i,t} \quad (1)$$

$$\text{EJR down}_{i,t} = \alpha + \sum_{j=1}^{6} \beta_j \text{ Moody's down}_{i,t-j} + \sum_{j=1}^{6} \gamma_j \text{ EJR down}_{i,t-j} + \varepsilon_{i,t} \quad (2)$$

$$\text{Moody's up}_{i,t} = \alpha + \sum_{j=1}^{6} \beta_j \text{ Moody's up}_{i,t-j} + \sum_{j=1}^{6} \gamma_j \text{ EJR up}_{i,t-j} + \varepsilon_{i,t} \quad (3)$$

$$\text{EJR up}_{i,t} = \alpha + \sum_{j=1}^{6} \beta_j \text{ Moody's up}_{i,t-j} + \sum_{j=1}^{6} \gamma_j \text{ EJR up}_{i,t-j} + \varepsilon_{i,t} \quad (4)$$

β's and γ's are coefficients, α's are the regression constants, *i* represents the firm, *t* represents the month, and *j* represents the number of lags. We follow these regressions with F-tests of the null hypothesis that changes in EJR's credit ratings do not Granger cause changes in Moody's credit ratings, and vice versa. Specifically, we test the null hypothesis that the lags of *EJR down* are jointly equal to zero for equation (1), the lags of *Moody's down* are jointly equal to zero for equation (2), the lags of *EJR up* are jointly equal to zero for equation (3), and the lags of *Moody's up* are jointly equal to zero for equation (4). Table 6 contains the results.

[Insert Table 6 here.]

Panel A of Table 6 contains results from the regressions in equations (1) and (2). The coefficient estimates for all lags of *EJR down* in equation (1) are positive and significant in both time periods and similar in magnitude to the coefficient estimates in BSS, if not slightly larger. The coefficient estimates for lags of *Moody's down* in equation (2) are generally positive and many are significant. The Granger causality F-statistics are significant in all four regressions, indicating EJR's downgrades Granger cause Moody's downgrades and vice versa. This result is consistent with BSS's findings. However, the F-statistics testing whether the lags of *EJR down*

are jointly equal to zero are many orders of magnitude larger than the F-statistics testing whether the lags of *Moody's down* are jointly equal to zero. This relation is true for both time periods, suggesting EJR's downgrades have a stronger Granger causality effect on Moody's downgrades than vice versa, and this relation did not change after EJR received the NRSRO designation.

Panel A of Table 6 also contains Wald tests of whether the coefficient estimates on lags of *EJR down* in equation (1) changed after EJR received the NRSRO designation. We conduct tests on individual coefficients, as well as tests that the six lags jointly changed. The tests on individual coefficients indicate none changed, with the exception of the third lag, which became slightly larger (it increased by 0.36, from 0.90 to 1.26). This increase, although only marginally significant, indicates EJR may have actually become timelier in explaining Moody's downgrades after it received the NRSRO designation. The insignificant p-value (0.72) from the joint test corroborates this lack of change.

Below and to the right of these results are Wald tests of whether the coefficient estimates on lags of *Moody's down* in equation (2) changed after EJR received the NRSRO designation. We find only one change: the coefficient estimate on the sixth lag became significantly smaller, shrinking by 1.11, from 0.26 to -0.84. This change drives the significant p-value in the joint test. This result indicates that, if anything, Moody's downgrades became less timely in explaining EJR's downgrades after EJR received the NRSRO designation. Overall, the results in Panel A of Table 6 indicate EJR produces timelier credit ratings than Moody's, and since this relation maintains before and after EJR received the NRSRO designation, it is not a result of the NRSRO designation, consistent with H5.[23]

The results in Panel B of Table 6 are broadly consistent with the results in Panel A. Panel B repeats the analysis in Panel A for upgrades (equations (3) and (4)). Similar to Panel A, the Granger causality F-statistics reveal Moody's upgrades and EJR's upgrades Granger cause each

[23] Prior literature characterizes Moody's ratings policy as a 'partial adjustment process' (Altman and Kao, 1992, Altman and Rijken, 2004). Moody's (2002, 2006) explains their desire for rating stability and the tradeoff against timeliness.

other. However, the F-statistics indicating whether the lags of *EJR up* are jointly equal to zero are larger than the F-statistics indicating whether the lags of *Moody's up* are jointly equal to zero, and this relation maintains in both sample periods. Therefore, we conclude EJR's upgrades are timelier than Moody's upgrades, and this relation is not a result of the NRSRO designation, consistent with H5. The results from Wald tests indicate no significant changes for any of the lags of *EJR up* in equation (3) or *Moody's up* in equation (4). The lone exception is the sixth lag of *EJR up* in equation (3). This lag increases by 0.67, from 0.16 to 0.83. Although only marginally significant, this change indicates that EJR's upgrades may have become slightly timelier in explaining Moody's upgrades.

5.3. Stock return tests

The granger causality tests above describe the relative timeliness of EJR and Moody's ratings changes. The purpose of this section is to measure the timeliness of the EJR and Moody's ratings with respect to information relevant for pricing equities. Following BSS, we compute compounded size-adjusted stock returns, inclusive of dividends and other distributions, by subtracting the value-weighted average return for all firms in the same size-matched decile where size is measured as market capitalization at the beginning of the return accumulation period.[24] We compute returns over four accumulation periods of various lengths and winsorize them at five percent and 95 percent to mitigate the influence of outliers. We do so separately for both time periods of interest. We report these returns in Table 7, along with first and second differences between raters and time periods.

[Insert Table 7 here.]

We begin by comparing our results in the pre-December 2007 time period to those reported by BSS. In the three-day window around ratings changes we observe returns that are

[24] For robustness, we also compute abnormal returns using the market-adjusted returns method of Brown and Warner (1985) in which the daily abnormal return is the firm-specific return minus the value-weighted market return from CRSP. This alternative measure does not materially alter our results or conclusions.

significantly larger in magnitude around EJR changes than around Moody's changes (for both downgrades and upgrades). These results are consistent with those reported by BSS who interpret this result as evidence of EJR capturing more of the information that stock markets deem important to the valuation of securities. However, for this short-term announcement window, it is possible that the causality runs in the other direction. That is, these results are also consistent with the conclusion that rating changes by EJR are more informative to the stock market than the rating changes by Moody's.[25] Either interpretation is consistent with earlier movement by EJR as documented above.

We also find results consistent with BSS in the 12-month period preceding the rating changes. Note that our purpose is not to measure long-run mispricing. Rather, like BSS, we begin with the premise that the stock market returns capture the release of public information in a timely manner. We interpret these longer-run pre-downgrade (pre-upgrade) returns as a proxy for the amount of negative (positive) information that must accumulate in order to compel a rating action.

We find significantly greater negative stock returns in the 12 months preceding Moody's downgrades (-29.34% compared to -24.01% for EJR) in the pre-December 2007 time period. We interpret this as a reluctance of Moody's relative to EJR to downgrade bonds in response to negative information priced by the stock market. Conversely, we find significantly smaller positive stock returns in the 12 months preceding Moody's upgrades (21.68% compared to 26.65% for EJR). These results suggest not only that Moody's requires more negative information than EJR in order to downgrade, consistent with H2a, but also that Moody's requires more negative information in order to downgrade than it requires positive information to upgrade, consistent with H3b. Returns from the six-month and 11-day windows are consistent in

[25] A rich existing literature examines the extent to which Moody's informs markets with mixed findings; see Hettenhouse and Sartoris (1976), Weinstein (1977), Pinches and Singleton (1978), Wakeman (1981), Ingram, Brooks, and Copeland (1983), Holthausen, and Leftwich (1986), Hand, Holthausen, and Leftwich (1992) Goh and Ederington (1993), Hite and Warga (1997), and Ederington and Goh (1998).

upgrades in the pre-December 2007 period: Moody's requires significantly less positive information to upgrade than EJR does. However, the differences in downgrades are insignificant for these windows.

Figure 6 graphically illustrates the asymmetry in Moody's rating policy. The positive returns that compel an upgrade by Moody's are smaller than those that compel an upgrade by EJR. In contrast, the negative returns that compel a downgrade by Moody's are often greater in magnitude than (a) the negative returns that compel an EJR downgrade and (b) the positive returns that prompt Moody's upgrades.

[Insert Figure 6 here.]

In Table 7, results from both the six- and 12-month windows in the pre-December 2007 period further support H3a: rating changes by EJR are more symmetric with respect to positive and negative information. In the 12-month window, EJR adjusts following -24.01% and 26.65% returns (a 2.64% difference in absolute levels). The corresponding returns prior to Moody's adjustments exhibit a wider spread: -29.34% and 21.68% (a 7.66% difference in absolute levels). This asymmetric response to good and bad news is also apparent in the six-month window (-17.74% and 16.16% for EJR compared to -19.09% and 9.72% for Moody's).

Results in the post-December 2007 period do not suggest a change in EJR's rating policy after it received the NRSRO designation. Results in the three day window are consistent with the pre-December 2007 period: announcement returns are higher for EJR than for Moody's. However, the difference in downgrades exhibits a p-value of 0.1070; upgrades remain significantly different with p-value of 0.0016. We report the insignificant 11-day windows for completeness.

Continuing in the later time period, we observe stock price movements 12 months prior to downgrades that are similar to those in the earlier period for both raters: Moody's downgrades its ratings after significantly more negative information arrives to the market than is necessary to

compel EJR to downgrade. This pattern is present in the 6 months prior to downgrades, as well. However, the results for upgrades reverse. In the earlier period, Moody's upgraded in response to less (priced) information than required by EJR to upgrade, but EJR upgrades its ratings in response to less information than Moody's after December 2007. As in Figure 3 and Table 5, we note that the NRSRO designation of EJR (or The Act resulting in the designation) appears to affect Moody's as much as ERJ. We observe no change in Moody's downgrades (the difference in returns in the 12 months prior to Moody's downgrades from before December 2007 to after is only 0.76% with $p = 0.7209$), but we infer a modification in Moody's policy for upgrading (the difference in returns in the 12 months prior to Moody's downgrades from before December 2007 to after is 16.07% with $p = 0.0004$).

First and second differences of returns in the 12-month windows prior to EJR changes suggest that EJR did not revise its rating policy after it became an NRSRO. If anything, EJR increased the speed with which it downgrades firms in the later period, requiring less negative information to compel a downgrade. First and second differences are consistent with a less issuer-friendly upgrade policy by Moody's in the later period. However, results in Tables 4, 5, and 6 indicate that changes in EJR ratings remain more symmetric and timely than changes in Moody's ratings after EJR received the NRSRO designation.

5.4. Reversals

Moody's (2006) argues against timeliness of ratings changes on the grounds that it breeds ratings volatility. Recall from Section 3 that BSS interpret Moody's preference for stable ratings as a function of Moody's 'quasi-governmental' status as an NRSRO. We posit that Moody's preference for stability reflects its incentives given that Moody's receives compensation from issuing firms while EJR produces timely ratings because its paying clients demand them. The evidence in Cornaggia and Cornaggia (2011) that regulated financial institutions earned higher returns due to this ratings policy may help explain why this status quo of relatively uninformative Moody's ratings persists. In any case, if the BSS interpretation is correct, we

should observe higher volatility (ratings reversals) in the EJR ratings compared to the Moody's ratings only in the pre-December 2007 period.

A rating reversal occurs when a rater changes a firm's credit rating in a direction opposite to a prior change within the past 365 days. Table 8 reports the probabilities that each rater reverses its ratings within a firm-year, in both time periods, and reports the first and second differences. The results are inconsistent with the NRSRO explanation for rating policy. EJR reverses its ratings more frequently than Moody's in both time periods. Panel A indicates EJR reverses its downgrades in 6.4% (8.6%) of firm-years compared to 1.2% (1.5%) for Moody's in the pre-December 2007 (post-December 2007) period. If the regulatory implications of the NRSRO designation determined rating policy, we should observe a reduction in EJR reversals. In contrast, we observe significantly more reversals for EJR relative to Moody's (first difference) and this difference actually grows after EJR receives the NRSRO designation (second difference) This result also obtains for reversals of downgrades across the investment grade threshold (Panel B), consistent with H3a. Panels C and D suggest that reversals of upgrades by EJR diminish in the post-December 2007 period but remain significant. However, the 'bite' associated with regulatory compliance and re-contracting should be most pronounced in downgrades. That is, from a re-contracting or regulatory perspective, correcting a premature downgrade is a more costly error to Moody's paying clients (issuing firms) than a premature upgrade. Overall, these results support H2b and H5. Our results do not suggest that EJR backed away from its policy of timely information provision in order to accommodate issuer re-contracting or regulatory concerns.

[Insert Table 8 here.]

6. Other considerations

6.1. Unsolicited ratings

We are aware of one confounding effect working against our hypotheses: the existence of unsolicited credit ratings by raters that receive compensation from issuers. Fulghieri, Strobl, and

Xia (2010) argue that issuer-paid credit raters maximize their fees and enhance their reputations by imposing low (pessimistic) ratings on firms that do not pay. Any such pessimistic unsolicited ratings by Moody's in our data would deflate the average Moody's rating and potentially alter its observed ratings changes.[26] Gan (2004) estimates that unsolicited ratings accounted for 22% of new-issue ratings in U.S. markets between 1994 and 1998. We observe cumulative revenues by various sources in Moody's annual report, but we cannot observe fees paid (or not paid) by any particular issuer. Our hypotheses regard rating policy for paying client issuers. Any unobservable mitigating effects of unsolicited ratings should mute our results.

6.2. Differences in rating technology

We consider the potential for differences in ratings technology as a determinant of the information content of credit ratings. We provide only discussion as the lack of transparency on the part of the raters prevents an empirical examination. Reliant on revenues from subscribers, EJR is naturally reluctant to share its proprietary rating model. Moody's periodically releases *Special Comments* and *Rating Methodology* reports to aid public understanding of the ratings process. However, the SEC (2008b) reports that "*significant aspects of the ratings process were not always disclosed*". Moreover, both Moody's and EJR employ a combination of quantitative and qualitative analyses. With no clean measure of rating analyst skill, we cannot explicitly test for superior qualitative analysis in one rater or the other. However, we view the differences in information content as a matter of policy than a matter of skill. We hypothesize that issuer-paid raters face a fundamentally different incentive structure than investor-paid raters, and we find supportive results.

[26] For example, Fulghieri et al. (2010) detail the case of Hannover Re as follows: "…within weeks after Hannover refused to pay for Moody's services, Moody's issued an unsolicited rating for Hannover, giving it a financial strength rating of 'Aa2,' one notch below that given by S&P. Over the course of the following two years, Moody's lowered Hannover's debt rating first to 'Aa3' and then to 'A2.' Meanwhile, Moody's kept trying to sell Hannover its rating services. In March 2003, after Hannover continued to refuse to pay for Moody's services, Moody's downgraded Hannover's debt by another three notches to junk status, sparking a 10% drop in the insurer's stock price. The scale of this downgrade came as a surprise to industry analysts, especially since the two rating agencies Hannover paid for their services, S&P and A.M. Best, continued to give Hannover high ratings" (page 2).

We also note that if differences in credit ratings were driven by technology rather than policy, Moody's would appear to have adequate resources to acquire EJR, just as it acquired the KMV technology in 2002. Although Moody's market capitalization is smaller today, BSS published at the height of Moody's market capitalization in 2006, when Moody's should have had sufficient resources to make such a purchase. We further note that Moody's incumbent status affords it not only greater resources but also better access to information. Prior to Dodd-Frank, NRSROs were exempt from Regulation Fair Disclosure (Reg FD). NRSROs' client relationships with issuing firms offer Moody's access to proprietary information (Butler and Rodgers, 2003; Fulghieri et al., 2010). Even as an NRSRO, EJR relies on publicly available information such as issuers' financial statements. A host of papers document variation in reporting quality suggesting that by relying on public information, EJR is at an informational disadvantage.[27] For these reasons, we are confident in our classification of credit ratings information content as a matter of policy rather than technology in our analysis of Moody's and EJR.

7. Conclusion

Our results confirm that the information contained in EJR ratings is both more timely (ratings adjust to incorporate information quickly) and symmetric (ratings adjust symmetrically to good and bad news) than the information contained in Moody's ratings. We further document that these differences persist following the NRSRO designation of EJR and thus we attribute our results to rating policies influenced by rater compensation structure. We hypothesize that raters compensated by issuers face a fundamentally different incentive structure than those compensated by investors. Our results are consistent with this hypothesis. Evidence against the prevailing state of the literature strengthens our conclusion; we attribute at most a small portion of the differences in rating policies to the NRSRO designation.

[27] For examples, see Dechow, Sloan, and Sweeney (1995), Bharath, Sunder ,and Sunder (2008), Jorion, Shi, and Zhang (2009), and Beatty, Liao, and Weber (2010).

Our results should be of interest to a host of market participants, regulators, and academic researchers. Credit ratings affect capital allocation in multiple ways, including information provision for retail investors, low-cost contracting mechanisms for a host of counterparties, and regulatory compliance by institutional investors. Even if regulators successfully mitigate the regulation-induced reliance on the Big 3's ratings, decades of debt covenants employing these ratings as re-contracting triggers remain. The prohibitive cost of re-contracting suggests that Moody's ratings will play an important role in allocating capital into the foreseeable future. However, for timely credit risk metrics in regulation, investment, and research, our results commend investor-paid credit analysis.

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Appendix

A.1. Relevant Sections of Dodd-Frank Wall Street Reform and Consumer Protection Act

SEC. 939A. REVIEW OF RELIANCE ON RATINGS.

(a) AGENCY REVIEW.—Not later than 1 year after the date of the enactment of this subtitle, each Federal agency shall, to the extent applicable, review—

(1) any regulation issued by such agency that requires the use of an assessment of the credit-worthiness of a security or money market instrument; and

(2) any references to or requirements in such regulations regarding credit ratings.

(b) MODIFICATIONS REQUIRED.—Each such agency shall modify any such regulations identified by the review conducted under subsection (a) to remove any reference to or requirement of reliance on credit ratings and to substitute in such regulations such standard of credit-worthiness as each respective agency shall determine as appropriate for such regulations. In making such determination, such agencies shall seek to establish, to the extent feasible, uniform standards of credit-worthiness for use by each such agency, taking into account the entities regulated by each such agency and the purposes for which such entities would rely on such standards of credit-worthiness.

(c) REPORT.—Upon conclusion of the review required under subsection (a), each Federal agency shall transmit a report to Congress containing a description of any modification of any regulation such agency made pursuant to subsection (b).

SEC. 939D. GOVERNMENT ACCOUNTABILITY OFFICE STUDY ON ALTERNATIVE BUSINESS MODELS.

(a) STUDY.—The Comptroller General of the United States shall conduct a study on alternative means for compensating nationally recognized statistical rating organizations in order to create incentives for nationally recognized statistical rating organizations to provide more accurate credit ratings, including any statutory changes that would be required to facilitate the use of an alternative means of compensation.

(b) REPORT.—Not later than 18 months after the date of enactment of this Act, the Comptroller General shall submit to the Committee on Banking, Housing, and Urban Affairs of the Senate and the Committee on Financial Services of the House of Representatives a report on the results of the study conducted under subsection (a), including recommendations, if any, for providing incentives to credit rating agencies to improve the credit rating process.

Table 1 – Distributions of credit ratings

Panel A displays numeric conversions of Moody's and EJR's alphanumeric credit ratings scales. Panel B displays descriptive statistics of the numeric conversions of credit ratings issued by Moody's and EJR between 1999 and 2010 for firms with CUSIPs and COMPUSTAT data. Credit ratings greater than 11 are investment grade, credit ratings less than 12 are speculative grade. Panel C displays descriptive statistics on the sizes of the credit ratings changes measured in notches.

Panel A – Numeric conversions of Moody's and EJR's credit ratings scales

Investment grade			Speculative grade		
Moody's scale	EJR scale	Numeric rating	Moody's scale	EJR scale	Numeric rating
Aaa	AAA	21	Ba1	BB+	11
Aa1	AA+	20	Ba2	BB	10
Aa2	AA	19	Ba3	BB-	9
Aa3	AA-	18	B1	B+	8
A1	A+	17	B2	B	7
A2	A	16	B3	B-	6
A3	A-	15	Caa1	CCC+	5
Baa1	BBB+	14	Caa2	CCC	4
Baa2	BBB	13	Caa3	CCC-	3
Baa3	BBB-	12	Ca	CC	2
			C	C	1
				D	0

Panel B – Summary statistics of resulting credit ratings following changes in *Firms rated by both sample*

	N changes	Mean resulting rating	Std Dev	25th percentile	Median	75th percentile
Full sample						
EJR	5,167	11.1	4.0	9	12	14
Moody's	1,764	10.7	4.1	8	11	14
1999 to 2007						
EJR	3,620	11.2	3.9	9	12	14
Moody's	1,239	10.8	4.0	8	11	14
2008 to 2010						
EJR	1,547	10.8	4.2	8	11	14
Moody's	525	10.5	4.3	7	11	14

Panel C – Summary statistics of size of credit ratings changes in *Firms rated by both sample*

	N changes	Mean notches	Std Dev	25th percentile	Median	75th percentile
Full sample						
EJR upgrades	2,347	1.3	0.9	1	1	1
EJR downgrades	2,820	-1.3	0.8	-1	-1	-1
Moody's upgrades	520	1.2	0.5	1	1	1
Moody's downgrades	1,244	-1.4	1.0	-1	-1	-2
1999 to 2007						
EJR upgrades	1,645	1.2	0.9	1	1	1
EJR downgrades	1,975	-1.3	0.8	-1	-1	-1
Moody's upgrades	358	1.1	0.4	1	1	1
Moody's downgrades	881	-1.4	0.9	-1	-1	-2
2008 to 2010						
EJR upgrades	702	1.3	0.8	1	1	1
EJR downgrades	845	-1.4	0.8	-1	-1	-2
Moody's upgrades	162	1.2	0.7	1	1	1
Moody's downgrades	363	-1.5	1.2	-1	-1	-2

Table 2 – Sample reconciliation

This table displays the number of observations in the sample after applying a variety of filters. EJR provided us with the company's credit ratings history from July 1999 to June 2011. We obtain Moody's credit ratings history over the same period from Moody's Default and Recovery Database. We match EJR's firm-level credit ratings with Moody's credit ratings of the same firms' senior unsecured debt. Samples that include filters requiring firms to have COMPUSTAT data include credit ratings issued no later than 2010.

Credit ratings issued by	Subtotals	Number of observations	Table and figure location
EJR between July 1999 and June 2011		26,346	
EJR between July 1999 and June 2011 that are changes		8,815	
Moody's between July 1999 and June 2011		701,815	
Moody's between July 1999 and June 2011 that are changes		19,099	
EJR and Moody's between July 1999 and June 2011 that are changes (after removing changes made Moody's before EJR makes its first change for the same firm)		10,244	
EJR	7,323		
Moody's	2,921		
EJR and Moody's between July 1999 and June 2011 that are changes for firms with CUSIPs		8,002	F4
EJR	5,799		
Moody's	2,203		
EJR and Moody's between July 1999 and December 2010 for firms with CUSIPs and COMPUSTAT data that are changes		6,931	T1, T5, T6, T8, F2, F3, F5
Firms rated by both sample			
EJR	5,167		
Moody's	1,764		
EJR and Moody's between July 1999 and November 2007 for firms with CUSIPs and COMPUSTAT data that are changes		4,859	T4
EJR	3,620		
Moody's	1,239		
EJR and Moody's between December 2007 and December 2010 for firms with CUSIPs and COMPUSTAT data that are changes		2,072	T4
EJR	1,547		
Moody's	525		
EJR and Moody's between July 1999 and December 2010 for firms with CUSIPs, COMPUSTAT data, and CRSP data that are changes		6,774	T7, F6
Stock returns sample			
EJR	5,064		
Moody's	1,710		
EJR and Moody's for firms with CUSIPs and COMPUSTAT data where we retain the credit rating outstanding at the beginning of each calendar year from July 1999 to December 2010		5,557	T3
EJR	3,993		
Moody's	1,564		

Table 3 – Descriptive statistics

This table displays descriptive statistics for firm-year observations from 1999 to 2010 with credit ratings from EJR and Moody's. Sales, total assets, and net income come from COMPUSTAT. We calculate market value of equity as the product of firms' common shares outstanding and share prices at the end of the fiscal year. We calculate market-to-book as the quotient of firms' share prices at the end of the fiscal year and book value per share. The number of common shares outstanding, share prices, and book value per share come from COMPUSTAT. We use annual average consumer price index data from the U.S. Bureau of Labor Statistics to adjust all observations of sales, total assets, market value of equity, and net income to 2010 dollars. Number of EJR (Moody's) ratings changes per firm-year represents the average number of times EJR (Moody's) upgrades or downgrades a firm's credit ratings per year. *, **, and *** indicate the difference is significant at the 10 percent, 5 percent, or 1 percent level, respectively.

		1999 to 2007	2008 to 2010	Difference in means (p-value)
Firm-year observations	N	3,993	1,564	
Sales (in $millions)	Mean	12,453	14,191	1,738***
	Median	5,343	5,988	(0.0074)
	Std Dev	20,960	23,655	
Total assets	Mean	39,154	51,421	12,268**
(in $millions)	Median	7,605	8,439	(0.0145)
	Std Dev	148,009	210,904	
Market value of equity	Mean	15,515	13,403	-2,111**
(in $millions)	Median	5,059	4,577	(0.0226)
	Std Dev	32,856	25,763	
Market-to-book	Mean	3.31	1.43	-1.88**
	Median	1.97	1.53	(0.0425)
	Std Dev	34.40	20.25	
Net income	Mean	609	604	-5
(in $millions)	Median	232	223	(0.9653)
	Std Dev	3,242	3,528	
Number of EJR ratings	Mean	0.91	0.96	0.05*
changes per firm-year	Median	1.00	1.00	(0.0729)
	Std Dev	0.96	1.04	
Number of Moody's	Mean	0.31	0.32	0.01
changes per firm-year	Median	0.00	0.00	(0.5537)
	Std Dev	0.59	0.60	

Table 4 – Credit ratings changes before and after December 2007

Panel A displays numbers of credit ratings changes by Moody's and EJR between 1999 and 2010 for firms with CUSIPs and COMPUSTAT data, and the proportions of the changes that are downgrades. Panel B restricts the sample to upgrades that migrate above the investment grade threshold and downgrades that migrate below the investment grade threshold. The table displays results from tests of whether the differences in proportions are significant across raters within before- and after-December 2007 periods, within raters across before- and after-December 2007 periods, and whether the differences-in-differences are significant. p-values are in parentheses below the differences and differences-in-differences. *, **, and *** indicate statistical significance at the 10 percent, 5 percent, or 1 percent level, respectively.

Panel A – *Firms rated by both sample*

	Before 12/2007		After 12/2007			
	Total changes	Downgrades	Total changes	Downgrades	Δ	ΔΔ
EJR	3,620	1,975	1,547	845		
		54.6%		54.6%	0.1%	
					(0.966)	
Moody's	1,239	881	525	363		
		71.1%		69.1%	-2.0%	
					(0.440)	
Δ		-16.5%***		-14.5%***		
		(0.000)		(0.000)		
ΔΔ						2.0%
						(0.491)

Panel B – *Firms rated by both sample* restricted to upgrades and downgrades crossing the investment grade threshold

	Before 12/2007		After 12/2007			
	Total changes	Downgrades	Total changes	Downgrades	Δ	ΔΔ
EJR	399	215	170	97		
		53.9%		57.1%	3.2%	
					(0.481)	
Moody's	97	67	47	32		
		69.1%		68.1%	-1.1%	
					(0.898)	
Δ		-15.2%***		-11.0%		
		(0.006)		(0.198)		
ΔΔ						4.2%
						(0.656)

Table 5 – Probabilities of one rater updating its ratings prior to the other rater

This table displays probabilities that EJR updates its ratings in the six-month period prior to a similar update by Moody's, and vice versa. Panel A (Panel B) displays the probabilities that one rater downgrades (upgrades) its ratings in the six-month period prior to a downgrade (upgrade) by the other rater. The table displays results from tests of whether the differences in proportions are significant across raters within before- and after-December 2007 periods, within raters across before- and after-December 2007 periods, and whether the differences-in-differences are significant. p-values are in parentheses below the differences and differences-in-differences. *, **, and *** indicate statistical significance at the 10 percent, 5 percent, or 1 percent level, respectively.

Panel A – Probabilities of downgrades prior to downgrades

	EJR prior to Moody's	Moody's prior to EJR	Δ	Δ Δ
Before December 2007	55.3%	21.8%	33.5%***	
			(0.0000)	
After December 2007	49.0%	24.8%	24.2%***	
			(0.0000)	
Δ	-6.3%***	3.1%**		
	(0.0090)	(0.0430)		
Δ Δ				-9.3%***
				(0.0010)

Panel B – Probabilities of upgrades prior to upgrades

	EJR prior to Moody's	Moody's prior to EJR	Δ	Δ Δ
Before December 2007	38.3%	7.2%	31.0%***	
			(0.0000)	
After December 2007	31.5%	10.8%	20.7%***	
			(0.0000)	
Δ	-6.7%***	3.6%***		
	(0.0060)	(0.0030)		
Δ Δ				-10.3%***
				(0.0010)

Table 6 – Logistic regressions, Granger Causality tests, and Wald tests

This table displays results from logit regressions with firm-month observations. Panel A uses firm-month observations where Moody's down (EJR down) takes a value of one if Moody's (EJR) downgrades the firm's credit rating within the month and zero otherwise. Panel B uses firm-month observations where Moody's up (EJR up) takes a value of one if Moody's (EJR) upgrades the firm's credit rating within the month and zero otherwise. This table also displays F-statistics from Granger Causality tests. In Panel A, for regressions with Moody's down (EJR down) as the dependent variable, the Granger Causality F-statistic indicates whether the coefficient estimates on the six lags of EJR down (Moody's down) are jointly equal to zero. In Panel B, for regressions with Moody's up (EJR up) as the dependent variable, the Granger Causality F-statistic indicates whether the coefficient estimates on the six lags of EJR up (Moody's up) are jointly equal to zero. Finally, this table also displays differences in coefficient estimates and p-values from Wald tests of whether the difference between coefficient estimates generated from the "Before 12/2007" and "After 12/2007" sample periods are different. The table contains coefficient-by-coefficient differences and p-values, as well as p-values from tests of whether the differences between the coefficient estimates of six lags are jointly equal to zero. *, **, and *** indicate statistical significance at the 10 percent, 5 percent, or 1 percent level, respectively.

Panel A – Downgrades

	Before 12/2007		After 12/2007		Wald tests of the change from Before 12/2007 to After 12/2007			
					Moody's down		EJR down	
	Moody's down	EJR down	Moody's down	EJR down	Individual lags	Six lags jointly	Individual lags	Six lags jointly
EJR down								
Lag 1	1.42***	0.70***	1.36***	0.24	-0.05		-0.46**	
	(0.00)	(0.00)	(0.00)	(0.10)	(0.78)		(0.01)	
Lag 2	1.06***	0.77***	0.91***	0.76***	-0.15		-0.01	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.49)		(0.94)	
Lag 3	0. 90***	0.63***	1.26***	1.05***	0.36*		0.42**	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.09)		(0.01)	
Lag 4	0.77***	0.54***	0.94***	0.88***	0.17		0.34**	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.45)		(0.04)	
Lag 5	0.77***	0.43***	0.76***	0.38***	-0.01		-0.04	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.97)		(0.81)	
Lag 6	0.67***	0.52***	0.59***	0.72***	-0.08		0.20	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.71)	(0.72)	(0.21)	(0.00)***
Moody's down								
Lag 1	-0.11	0.63***	-0.46	0.44**	-0.35		-0.19	
	(0.57)	(0.00)	(0.12)	(0.02)	(0.37)		(0.44)	
Lag 2	0.23	0.64***	-0.19	0.24	-0.42		-0.39	
	(0.21)	(0.00)	(0.50)	(0.20)	(0.25)		(0.11)	
Lag 3	0.26	0.39***	0.81***	0.17	0.54*		-0.22	
	(0.14)	(0.00)	(0.00)	(0.39)	(0.08)		(0.39)	
Lag 4	0.28	0.17	0.51**	0.42**	0.23		0.25	
	(0.12)	(0.28)	(0.03)	(0.03)	(0.46)		(0.32)	
Lag 5	0.34*	0.23	0.63***	-0.15	0.29		-0.38	
	(0.06)	(0.12)	(0.00)	(0.52)	(0.36)		(0.19)	
Lag 6	0.38**	0.26*	0.02	-0.84***	-0.35		-1.11	
	(0.04)	(0.08)	(0.94)	(0.00)	(0.34)	(0.29)	(0.00)***	(0.00)***
Constant	-4.43***	-3.59***	-4.56***	-3.43***				
	(0.00)	(0.00)	(0.00)	(0.00)				
Granger F-stat.	449.9***	60.2***	322.4***	20.1***				
p-value	(0.00)	(0.00)	(0.00)	(0.00)				
N	39,769	39,769	19,004	19,004				
Pseudo R^2	0.0677	0.0337	0.1042	0.0473				

Panel B – Upgrades

	Before 12/2007		After 12/2007		Wald tests of the change from Before 12/2007 to After 12/2007			
					Moody's up		EJR up	
	Moody's up	EJR up	Moody's up	EJR up	Individual lags	Six lags jointly	Individual lags	Six lags jointly
EJR up								
Lag 1	1.01***	0.09	0.86***	-0.52**	-0.16		-0.61**	
	(0.00)	(0.51)	(0.00)	(0.02)	(0.64)		(0.02)	
Lag 2	0.70***	0.38***	0.14	0.24	-0.56		-0.14	
	(0.00)	(0.00)	(0.72)	(0.19)	(0.21)		(0.53)	
Lag 3	0.67***	0.70***	1.11***	1.22***	0.44		0.52***	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.20)		(0.00)	
Lag 4	1.08***	0.33**	0.90***	1.06***	-0.19		0.73***	
	(0.00)	(0.01)	(0.00)	(0.00)	(0.58)		(0.00)	
Lag 5	0.84***	0.54***	0.82***	0.58***	-0.02		0.04	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.96)		(0.84)	
Lag 6	0.16	0.51***	0.83***	1.12***	0.67*		0.61***	
	(0.52)	(0.00)	(0.00)	(0.00)	(0.08)	(0.36)	(0.00)***	(0.00)***
Moody's up								
Lag 1	-1.40	0.42*	0.07	0.97***	1.47		0.55	
	(0.16)	(0.08)	(0.92)	(0.00)	(0.24)		(0.12)	
Lag 2	-0.23	0.57**	0.46	0.78***	0.69		0.22	
	(0.69)	(0.01)	(0.44)	(0.00)	(0.39)		(0.54)	
Lag 3	-0.16	0.38	-0.71	0.29	-0.56		-0.10	
	(0.79)	(0.11)	(0.48)	(0.40)	(0.62)		(0.82)	
Lag 4	0.55	0.21	-0.64	0.07	-1.18		-0.15	
	(0.19)	(0.42)	(0.53)	(0.85)	(0.25)		(0.76)	
Lag 5	-0.06	0.34	0.10	0.43	0.16		0.09	
	(0.91)	(0.17)	(0.89)	(0.20)	(0.86)		(0.83)	
Lag 6	0.97***	0.09	0.91*	0.27	-0.06		0.18	
	(0.00)	(0.74)	(0.08)	(0.44)	(0.92)	(0.73)	(0.69)	(0.82)
Constant	-5.02***	-3.50***	-5.04***	-3.53***				
	(0.00)	(0.00)	(0.00)	(0.00)				
Granger F-stat.	106.9***	14.03**	58.4***	22.69***				
p-value	(0.00)	(0.02)	(0.00)	(0.00)				
N	39,769	39,769	19,004	19,004				
Pseudo R^2	0.0242	0.0092	0.0279	0.0366				

Table 7 – Stock returns tests

This table displays average buy-hold size-adjusted stock returns around credit ratings changes for different accumulation periods. We calculate size-adjusted returns by subtracting the value-weighted average return for all firms in the same size-matched decile. We winsorize the returns at five percent and 95 percent to mitigate the influence of outliers. The table displays results from tests of whether the differences in proportions are significant across raters within before- and after-December 2007 periods, within raters across before- and after-December 2007 periods, and whether the differences-in-differences are significant. p-values are in parentheses below the differences and differences-in-differences. *, **, and *** indicate statistical significance at the 10 percent, 5 percent, or 1 percent level, respectively.

		N	Day -1 through day +1	Day -11 through day -1	-6 months through day -1	-12 months through day -1
Before December 2007						
Downgrades	EJR	1919	-5.07%	-4.26%	-17.74%	-24.01%
	Moody's	855	-2.31%	-3.61%	-19.09%	-29.34%
	Δ		-2.76%***	-0.65%	1.35%	5.33%***
			(0.0000)	(0.1331)	(0.2205)	(0.0003)
Upgrades	EJR	1607	2.49%	2.14%	16.16%	26.65%
	Moody's	346	0.32%	1.26%	9.72%	21.68%
	Δ		2.17%***	0.88%**	6.44%***	4.97%*
			(0.0000)	(0.0167)	(0.0001)	(0.0822)
After December 2007						
Downgrades	EJR	837	-4.47%	-4.56%	-15.95%	-21.03%
	Moody's	352	-3.48%	-3.54%	-20.44%	-28.59%
	Δ		-0.99%	-1.02%	4.49%***	7.56%***
			(0.1070)	(0.1916)	(0.0036)	(0.0000)
Upgrades	EJR	701	1.86%	1.68%	11.70%	29.41%
	Moody's	157	0.40%	0.95%	10.20%	37.74%
	Δ		1.46%***	0.73%	1.50%	-8.33%
			(0.0016)	(0.1863)	(0.5485)	(0.1014)
Δ: After December 2007 – Before December 2007						
Downgrades	EJR		0.59%	-0.31%	1.78%*	2.98%**
			(0.1503)	(0.4637)	(0.0866)	(0.0291)
	Moody's		-1.17%**	0.06%	-1.35%	0.76%
			(0.0227)	(0.9380)	(0.4495)	(0.7209)
Upgrades	EJR		-0.63%**	-0.46%	4.45%***	2.76%
			(0.0139)	(0.1050)	(0.0006)	(0.2427)
	Moody's		0.08%	-0.32%	0.48%	16.07%***
			(0.7859)	(0.6002)	(0.8362)	(0.0004)
ΔΔ: (After 12/07 EJR – Before 12/07 EJR) – (After 12/07 Moody's – Before 12/07 Moody's)						
Downgrades			1.76%**	-0.37%	3.13%*	2.22%
			(0.0190)	(0.5920)	(0.0990)	(0.3290)
Upgrades			-0.71%	-0.14%	3.97%	-13.31%**
			(0.1910)	(0.8410)	(0.1030)	(0.0150)

Table 8 – Reversals

This table displays probabilities that a rater reverses its ratings within a firm-year. Panel A (Panel C) displays probabilities that a rater upgrades (downgrades) a firm's credit rating after having downgraded (upgraded) it within the past year. Panel B (Panel D) restricts the sample in Panel A (Panel C) to reversals where the credit rating migrates into investment (speculative) grade territory after having migrated into speculative (investment) grade territory within the past year. The table displays results from tests of whether the differences in proportions are significant across raters within before- and after-December 2007 periods, within raters across before- and after-December 2007 periods, and whether the differences-in-differences are significant. p-values are in parentheses below the differences and differences-in-differences. *, **, and *** indicate statistical significance at the 10 percent, 5 percent, or 1 percent level, respectively.

Panel A – Reversals following downgrades less than a year prior

	EJR	Moody's	Δ	Δ Δ
1999 to 2007	6.4%	1.2%	5.2%***	
			(0.000)	
2008 to 2010	8.6%	1.5%	7.1%***	
			(0.000)	
Δ	2.2%***	0.3%		
	(0.000)	(0.530)		
Δ Δ				1.9%***
				(0.002)

Panel B – Reversals into investment grade following downgrades into speculative grade

	EJR	Moody's	Δ	Δ Δ
1999 to 2007	2.0%	0.4%	1.5%***	
			(0.000)	
2008 to 2010	2.8%	0.4%	2.3%***	
			(0.000)	
Δ	0.8%***	-0.0%		
	(0.001)	(0.915)		
Δ Δ				0.8%**
				(0.018)

Panel C – Reversals following upgrades less than a year prior

	EJR	Moody's	Δ	Δ Δ
1999 to 2007	6.3%	0.8%	5.5%***	
			(0.000)	
2008 to 2010	3.2%	1.0%	2.2%***	
			(0.000)	
Δ	-3.1%***	0.2%		
	(0.000)	(0.545)		
Δ Δ				-3.3%***
				(0.000)

Panel D – Reversals into speculative grade following upgrades into investment grade

	EJR	Moody's	Δ	Δ Δ
1999 to 2007	1.7%	0.3%	1.5%***	
			(0.000)	
2008 to 2010	0.7%	0.3%	0.5%*	
			(0.051)	
Δ	-1.0%***	0.0%		
	(0.000)	(0.993)		
Δ Δ				-1.0%***
				(0.000)

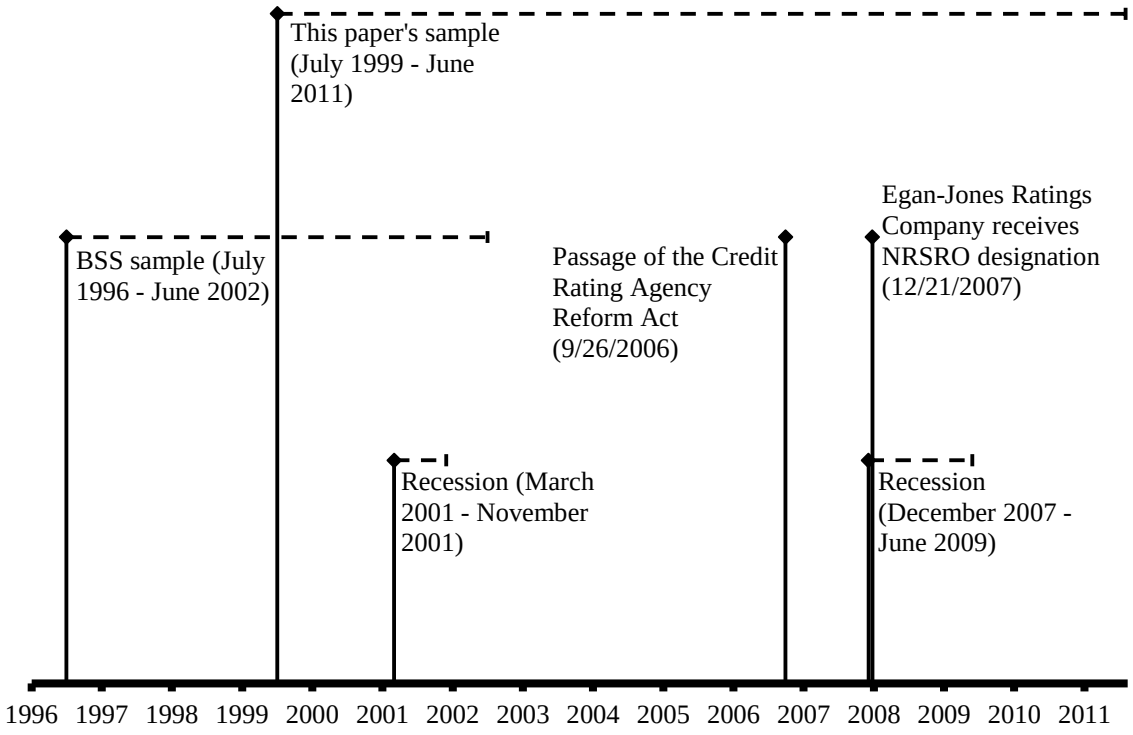


Fig. 1. Timeline of relevant dates

This figure displays dates that are relevant to our study, including the span of the sample employed by Beaver, Shakespeare, and Soliman (2006), the span of our sample, the passage of the Credit Rating Agency Reform Act of 2006, EJR's designation as an NRSRO, and recessions according to the National Bureau of Economic Research.

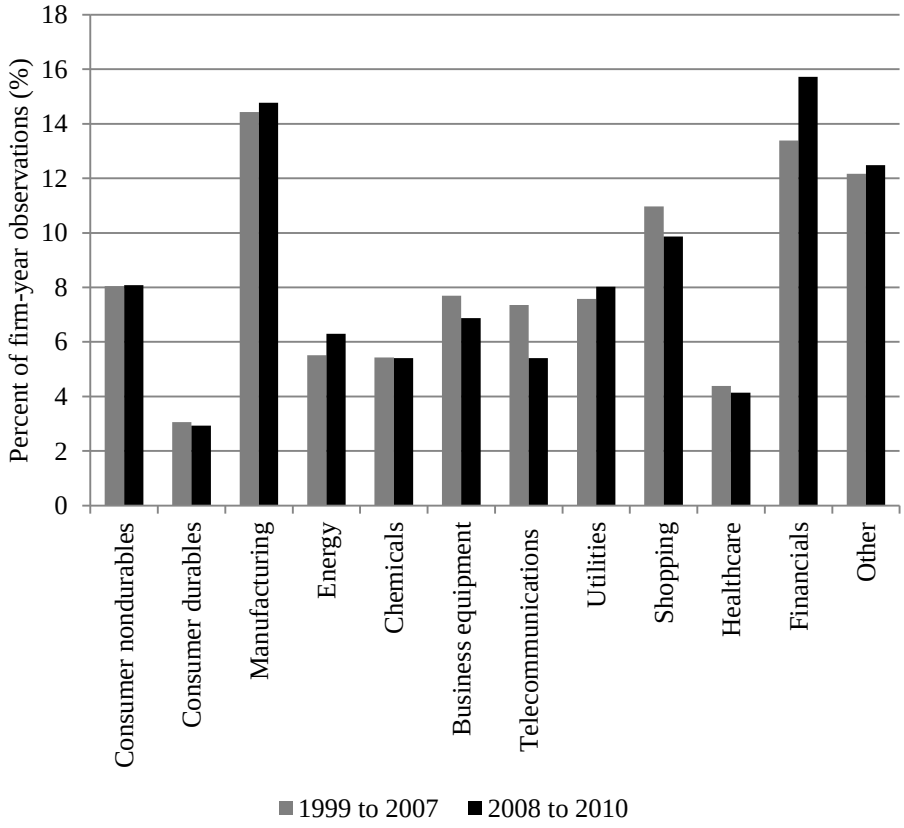
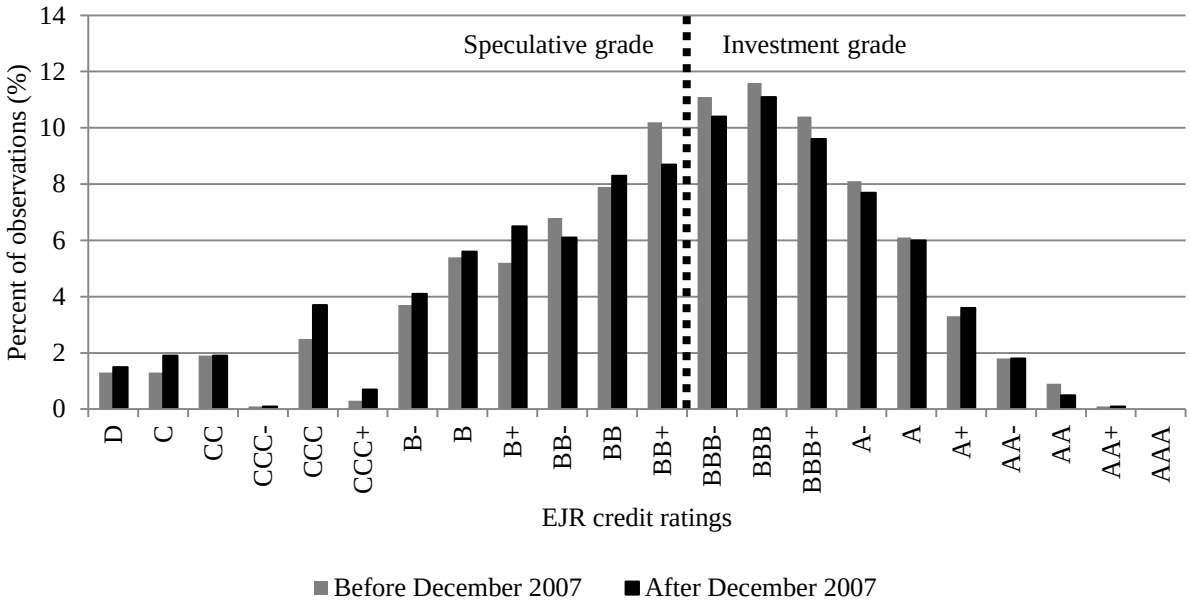
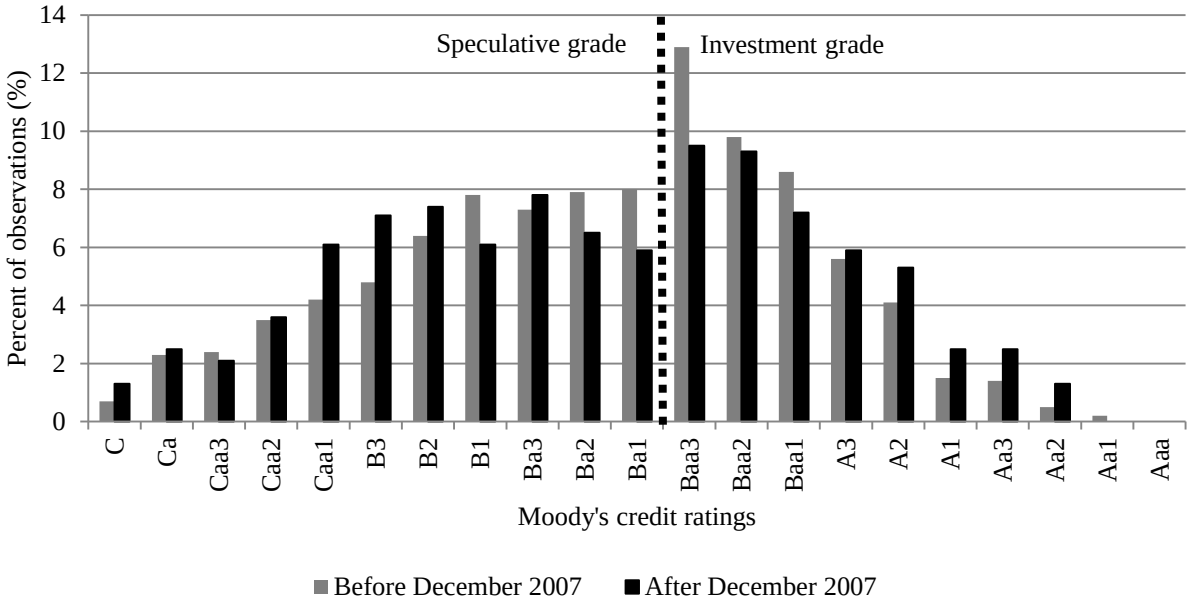


Fig. 2. Industrial mix of firms with credit ratings from EJR and Moody's before and after EJR received the NRSRO designation

This figure plots distributions of firms in our sample according to Kenneth French's 12 industry classifications. We begin with the *Firms rated by both sample* and include firms in this figure if they have coverage from both Moody's and EJR in a given year. EJR received the NRSRO designation on December 21, 2007.



Panel A



Panel B

Fig. 3. Distributions of EJR and Moody's credit ratings before and after EJR received the NRSRO designation

This figure displays distributions of firm-month credit ratings. Each bar indicates the percent of observations with a particular credit rating. Panel A (Panel B) displays histograms of EJR (Moody's) credit ratings before and after EJR received the NRSRO designation on December 21, 2007.

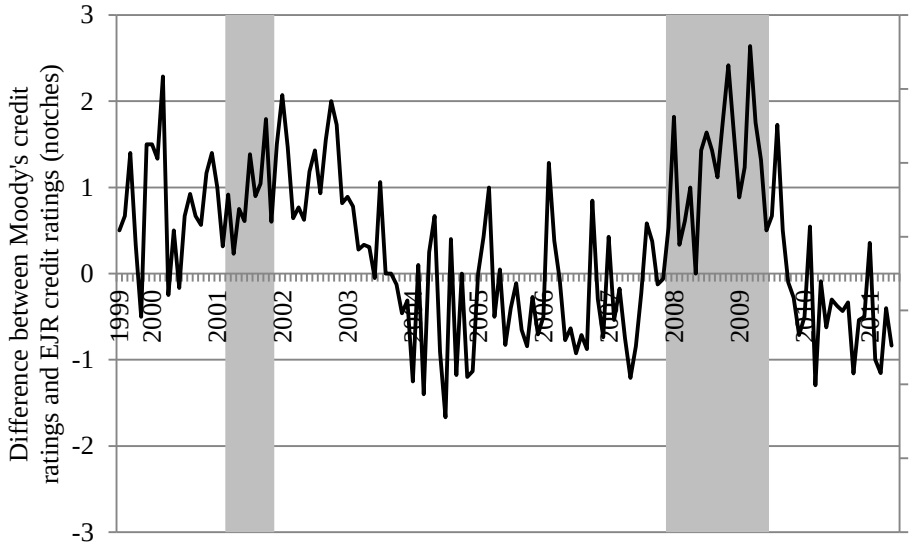
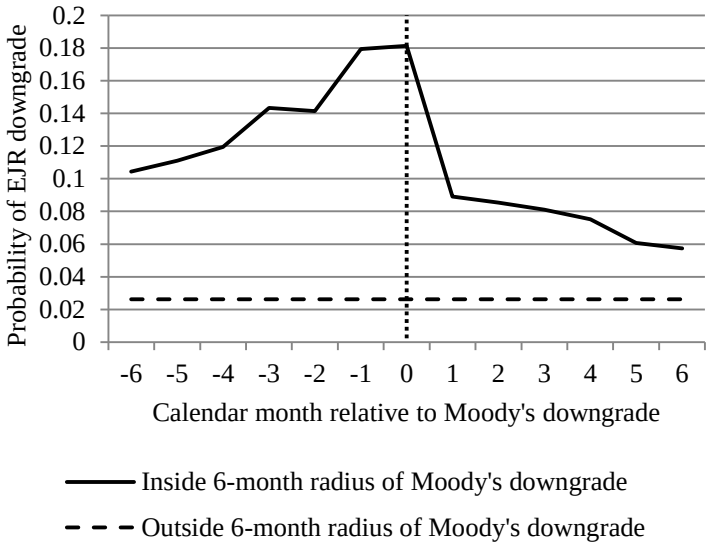
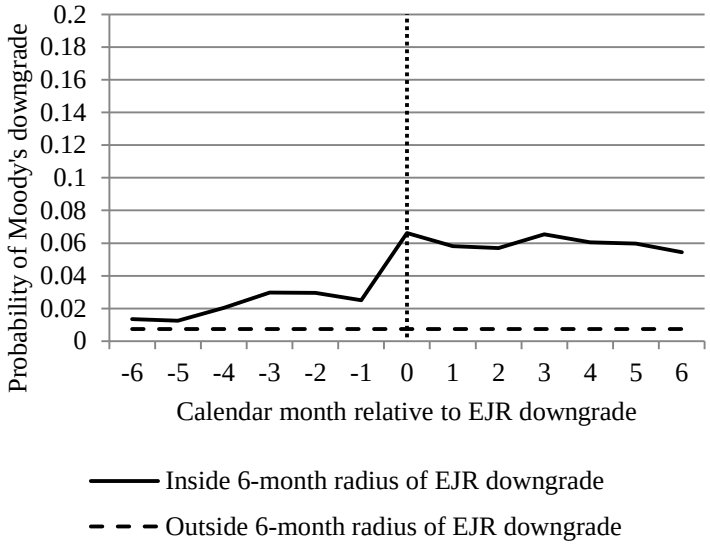


Fig. 4. Difference between Moody's ratings and EJR ratings

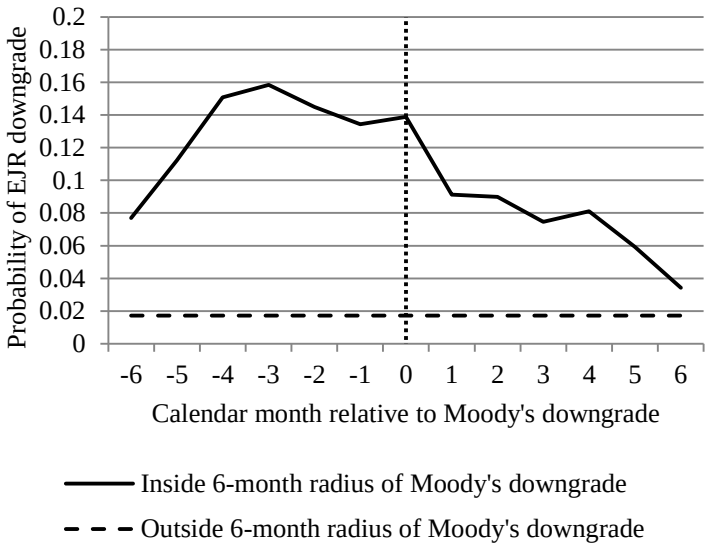
We calculate the difference between the Moody's credit rating and EJR credit rating for each firm and each month from July 1999 to June 2011. This figure displays the monthly averages of the differences. The highest and lowest credit ratings for Moody's (EJR) are Aaa and C (AAA and C), which take on values of 21 and 1, respectively. The grey bars indicate recessionary periods according to the National Bureau of Economic Research.



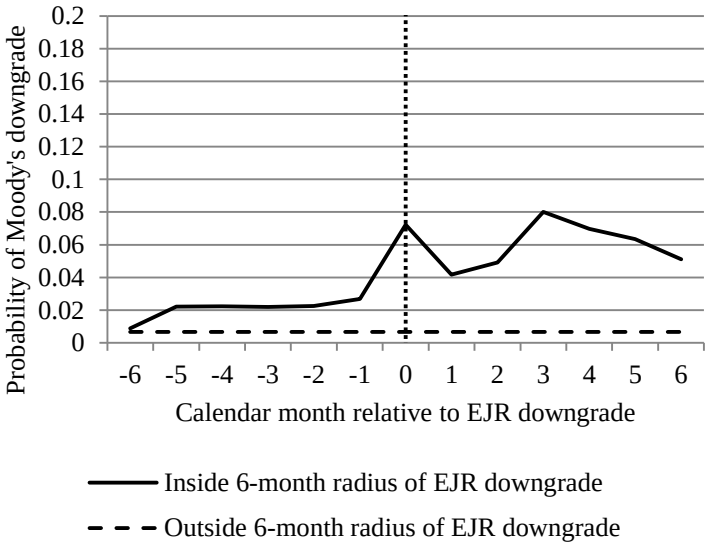
Panel A – Before December 2007, probability that EJR downgrades around Moody's downgrades



Panel B – Before December 2007, probability that Moody's downgrades around EJR downgrades

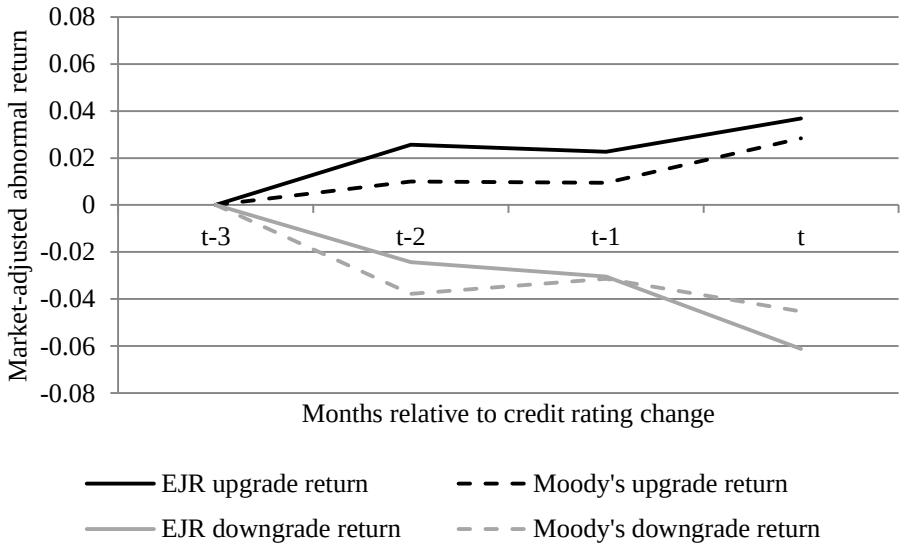


Panel C – After December 2007, probability that EJR downgrades around Moody's downgrades

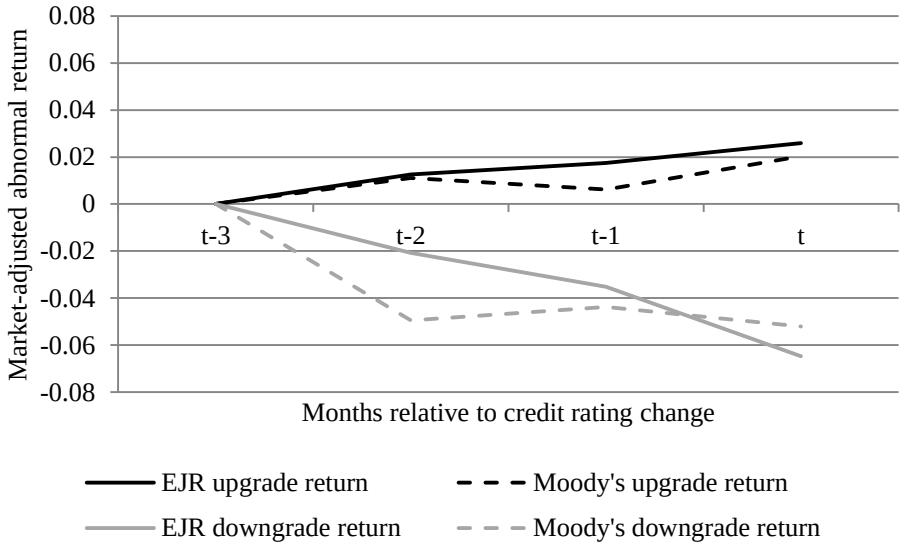


Panel D – After December 2007, probability that Moody's downgrades around EJR downgrades

Fig. 5. Probability of one rater downgrading around the other rater's downgrades
Panel A (Panel B) displays the probability that EJR (Moody's) downgrades a firm's credit rating in the months before and after Moody's (EJR) downgrades the same firm. The dashed line in Panel A (Panel B) displays the probability that EJR (Moody's) downgrades a firm's credit ratings in the months outside the 13-month window surrounding the Moody's (EJR) downgrades. Panels A and B plot these probabilities using data from before December 2007, the month that EJR received the NRSRO designation. Panels C and D replicate Panels A and B, respectively, using data from after December 2007.



Panel A – Credit rating changes before December 2007



Panel B – Credit rating changes after December 2007

Fig. 6. Monthly average stock returns in the months prior to a credit rating change
Panel A (Panel B) displays market-adjusted abnormal stock returns for the three months prior to credit ratings changes by Moody's or EJR before (after) December 2007. We winsorize the returns at five percent and 95 percent to mitigate the influence of outliers.