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Does Regulatory Certification Affect the Information Content of Credit Ratings?

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We exploit an investor-paid rating agency's designation as a Nationally Recognized Statistical Rating Organization (NRSRO) to test whether this certification affects the agency's information production. We use a certified issuer-paid agency as a benchmark and find robust evidence that the investor-paid agency's ratings policy—both timelier and more symmetric with respect to positive and negative information—persists after it became certified for regulatory compliance. Our results suggest that ratings policy is more a function of rating agency compensation structure than the NRSRO certification by the U.S. Securities and Exchange Commission.

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1. Introduction

A growing body of literature argues that regulatory certification of credit rating agencies lowers the quality of the ratings they produce.[1] However, prior empirical papers that demonstrate a negative impact of the NRSRO designation on ratings quality do not disentangle the confounding effects of rating agency compensation structure. Beaver et al. (2006) compare an *issuer-paid* certified credit rating agency (CRA) with an *investor-paid* noncertified CRA and find that the latter agency produces more informative ratings. These authors dismiss the potential for conflicts of interest in the issuer-paid compensation structure and attribute the difference in ratings policy to the NRSRO designation.

In a cleaner test of an NRSRO effect, Kisgen and Strahan (2010) compare the ratings from Dominion Bond Rating Service (DBRS) before and after its designation. But like all other NRSROs at the time, DBRS was an issuer-paid rater. As such, one might conclude from the DBRS case that the conflicts of interest inherent in the issuer-paid model are exacerbated when the ratings have regulatory implications. However, one cannot conclude from the DBRS case whether an investor-paid rating agency would be similarly affected by the SEC certification, or which effect (compensation structure versus regulatory certification) dominates rating agency information production.[2]

In the model of Opp et al. (2012), regulatory reliance on credit ratings lowers ratings quality as the rating agencies find it more profitable to facilitate regulatory arbitrage than to sell informative ratings. These authors conclude that "without rating-based regulation, the issuer-pays arrangement is not subject to rating inflation, that is, deliberate upward bias in reported ratings" (p. 4). Stanton and Wallace (2013) likewise conclude that ratings-based regulation erodes ratings quality. By contrast, our empirical results indicate that agency compensation structure is a more important determinant of ratings quality than the regulatory certification of the agencies.

We are the first to empirically test the effects of the SEC certification on ratings quality independent from the confounding effect of the conflict of interest in the issuer-pays model. We exploit the December 2007

[1] The U.S. Securities and Exchange Commission (SEC) began designating certain credit rating agencies as Nationally Recognized Statistical Ratings Organizations (NRSROs) in 1975. Since then, NRSRO ratings serve as benchmarks for regulatory and contractual compliance for a host of financial institutions, mutual funds, and investment advisors; see Partnoy (1999), White (2010), and Chen et al. (2014).

[2] Regarding the conflict of interest inherent in the issuer-pays model, see Mathis et al. (2009), Sangiorgi et al. (2009), Becker and Milbourn (2011), Griffin and Tang (2012), He et al. (2012), Jiang et al. (2012), Strobl and Xia (2012), Bongaerts (2013), Cornaggia and Cornaggia (2013), Griffin et al. (2013), Kashyap and Kovrijnykh (2013), Kraft (2015), and Xia (2014). Cornaggia et al. (2016) document an additional layer of conflict at the analyst level.

certification of the Egan-Jones Ratings Company (EJR), which was the first *investor-paid* rating agency to receive the NRSRO designation.[3] At the time, EJR was certified only for corporate bond ratings.[4] As such, we limit our analysis to its corporate bond ratings (including financial institutions).

To disentangle the effects of the SEC certification and CRA compensation structure, we compare the properties of ratings produced by EJR and Moody's Investors Service (an *issuer-paid* NRSRO) before and after EJR's NRSRO designation. If differential ratings properties observed in the earlier period are a result of the NRSRO designation (and its corresponding regulatory significance), then we should observe EJR's ratings policy mimic Moody's policy following its designation. If we do not observe convergence in ratings policy, we can infer that compensation structure matters more than regulatory certification for determining information production.

We find that EJR's ratings policy—both timelier and more symmetric with respect to positive and negative information relative to Moody's ratings—persists in the sample period after it received the NRSRO designation. EJR updates its ratings three times more often than Moody's, both before and after its certification, and Granger causality tests indicate that EJR's ratings changes lead Moody's ratings changes in both time periods. Among its ratings changes, EJR is roughly equally likely to upgrade or downgrade, whereas Moody's is significantly more likely to downgrade. This characteristic suggests an optimistic bias in Moody's ratings at the time of issuance and that EJR responds more symmetrically to positive and negative information. The symmetry in EJR's ratings remains virtually unchanged after its certification.

We find some evidence of convergence between the raters in an increased symmetry among Moody's ratings updates in the later time period. This result is more consistent with the conclusion drawn by Xia (2014) that competition from EJR improved ratings quality among traditional rating agencies than with the certification hypothesis of Beaver et al. (2006). Still, securities markets data indicate that EJR remains more symmetric than Moody's in its response to positive and negative information. Specifically, the amount of negative information priced by the stock and bond markets prior to Moody's downgrades is significantly higher than that preceding EJR's downgrades in both periods, indicating more bad news must unfold to compel Moody's to downgrade.

Finally, the probability that EJR reverses a premature downgrade remains significantly higher after its certification.[5] This pattern also appears among ratings reversals that cross the investment grade threshold, indicating Moody's is more cautious of committing these issuer-harming downgrades than EJR in both time periods. Overall, the body of evidence indicates EJR's certification had little effect on the information content of its ratings.[6] We conclude that the effect on credit ratings policy deriving from rater compensation structure prevails over any SEC certification effect.

Our empirical findings are robust to a variety of concerns. First, EJR received 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 may confound our results. However, our results and conclusions are only strengthened if we withhold from our sample (which runs through June 2013) data from this 18-month recessionary period. Second, our results cannot arise from a general sense of pessimism on the part of EJR, because 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, and the industrial mix of these firms shows little change from pre- to post-December 2007 periods, indicating that sample selection issues do not limit the relevance of our findings. Fourth, the competitive landscape of the credit ratings industry remained stable over our sample period. Data from the SEC reveal this industry was equivalent to one with 2.76 equally sized firms in 2006 and 2.75 equally sized firms in 2012.[7] This stability limits the possibility that industry trends coinciding with EJR's NRSRO designation in 2007 drive our results. Fifth, it is important to test the parallel trends assumption when using a difference-in-differences identification strategy. If this assumption does not hold, then estimates of treatment effects can be too large, reflecting a trend in the treatment or control group rather than an abrupt shift driven by the proposed shock. Our paper is unusual because we essentially estimate a treatment effect of zero: the

[3] Of the 10 NRSROs in 2011, 7 received primary compensation from issuing firms (SEC 2011).

[4] The SEC further certified EJR to rate asset-backed securities and sovereign debt on December 4, 2008.

[5] Increased rating reversals are a corresponding cost associated with increased timeliness of ratings updates; see Cornaggia and Cornaggia (2013).

[6] Consonant with the empirical results, conversations with EJR's management confirm that EJR observed virtually no change in its clientele or the way market participants use its ratings. EJR reports that its client list includes "both regulated and non-regulated institutional investors, hedge funds, pension funds, banks, and fiduciaries but has never included retail investors."

[7] The U.S. Government Accountability Office (2010, p. 61) reports the Herfindahl–Hirschmann Index (HHI) as its measure of industry concentration over the 2006–2009 period. The SEC (2013, p. 13) reports the HHI inverse (10,000/HHI) to estimate the number of equally sized firms necessary to replicate the degree of concentration.

differential properties of ratings produced by EJR and Moody's remain the same after EJR's certification. A lack of treatment implies that trends in EJR's and Moody's ratings are parallel both before and after EJR's certification.

Finally, although we believe the differences in credit ratings produced by Moody's and EJR arise 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 this technology.

Our contribution to the literature is evidence against regulatory certification as the primary determinant of ratings accuracy. This conclusion is important in light of the current debate over the problems with rating agencies. Competing views in this debate fall into three main camps: ratings-based regulation (detailed above), rating catering, or ratings shopping.[8] We believe the differences in EJR's and Moody's ratings policies reflect catering to the paying clients of each. We hold this belief because Moody's and Standard & Poor's rate almost all publicly issued corporate bonds (see Bongaerts et al. 2012), and thus there are minimal opportunities for issuers in this asset class to shop for ratings. This argument is based on the institutional features of the corporate bond market rather than our empirical framework. We therefore cannot conclude that catering is a more important determinant of ratings policy than shopping for all asset classes. However, when paired with Kisgen and Strahan (2010), our findings imply the general result that regulatory certification exacerbates problems with the issuer-pays framework.

Our results hold policy implications in light of the Dodd–Frank mandate to increase regulatory oversight of (and reduce reliance on) NRSROs. Reducing regulatory demand for ratings would appear to impact ratings quality primarily among the issuer-paid NRSROs. We conclude that the SEC certification does not imply market reliance and that the regulatory reform of the ratings industry should focus on rater incentives.

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 risk assessment is potentially cost prohibitive to atomistic investors (Grossman and Stiglitz 1980). As information intermediaries, credit raters theoretically improve market efficiency by reducing information asymmetry. Second, additional demand for NRSRO ratings stems from regulatory compliance of institutional investors. According to the Securities Industry and Financial Markets Association (2007), regulated entities including insurance companies, banks, pension funds, and dealers hold approximately 40% of corporate bonds and asset-backed securities. Third, the public nature of issuer-paid ratings allows them to serve as low-cost coordination mechanisms (Boot et al. 2006).[9] Because market participants can easily obtain and interpret them, these ratings commonly serve as contracting benchmarks. This characteristic makes downgrades harmful to issuing firms because they trigger higher interest rates, early principal repayment, and other negative consequences such as higher future costs of capital (Fons et al. 2002, Coppola and Stumpp 2002, Cantor and Mann 2006).

2.2. Credit Ratings Legislation

The SEC (2003) first designated Moody's, Standard & Poor's (S&P), and Fitch Ratings as NRSROs in 1975.[10] Significant legislative mandates in 2006 and 2010 clarified the qualifications for the NRSRO designation and increased SEC oversight of rating agencies applying for the designation. The Credit Rating Agency Reform Act of 2006 (Pub. L. 109-291 (2006); hereafter, the "Act") was intended "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."[11]

The Act opened the NRSRO designation to an application process that ultimately resulted in the designation of EJR. However, neither the Act nor the resulting designation of EJR was exogenous. Indeed, the high-profile "rating failures" of Enron and WorldCom by the Big 3 fueled EJR's lobbying effort to obtain the NRSRO designation (starting as early as 1998; see Egan 2003), which, in turn, advanced the Act.[12] This endogeneity complicates our empirical design in the

[8] Skreta and Veldkamp (2009) provide a theory of ratings shopping and its negative impact on the quality of structured product ratings. Griffin et al. (2013) provide evidence that catering, not shopping, reduced ratings quality among collateralized debt organizations.

[9] By definition, investor-paid ratings are available only to those willing to pay for access. Egan-Jones reports a variable fee structure ranging from $12,750 to $150,000 per year depending on investor size.

[10] Hereafter, these three credit rating agencies are referred to collectively as the "Big 3."

[11] Many recent papers indicate that competition does not necessarily improve rating information content; see Skreta and Veldkamp (2009), Becker and Milbourn (2011), Bolton et al. (2012), Manso (2013), and Goel and Thakor (2015).

[12] Moody's downgraded Enron to speculative grade on November 28, 2001, four days prior to Enron filing bankruptcy; 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).

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 as well. Indeed, evidence provided by Baghai et al. (2014) and Xia (2014) is consistent with the notion that the Big 3 tightened their rating standards over this time. We explain our empirical design in greater detail below, mindful of the potential for the Act to impact the ratings policies of both raters.

The second legislative act with implications for NRSROs is the Dodd–Frank Act of 2010 (Pub. L. 111-203 (2010)). Among other things, Dodd–Frank amended the Securities Exchange Act of 1934, mandated the new SEC Office of Credit Ratings, and expanded SEC oversight of this industry.[13] Similar to the Act, the relevant sections of the Dodd–Frank act resulted from perceived shortcomings of the ratings supplied by the Big 3 and their contribution to the financial crisis of 2008; see Coval et al. (2009), Ashcraft et al. (2010), and Cornaggia et al. (2013). We consider the potential influence of this crisis period on our results in §5.

3. Related Literature and Empirical Design

Our research question is whether SEC certification affects the information content of credit ratings and whether this effect is more or less important than rater compensation structure. Existing literature draws mixed conclusions on this point. The certification hypothesis, posed first by Beaver et al. (2006), suggests that NRSROs are conservative in their ratings policies (slow to update ratings and asymmetric in ratings updates, reflecting bad news especially slowly) because of the regulatory implications of the SEC certification. By contrast, noncertified CRAs are free to update their ratings quickly and symmetrically in response to new information. These authors find that EJR, which was not a certified NRSRO during their sample period, produced ratings that are more informative than ratings produced by Moody's. These authors attribute their results to the regulatory and contractual implications of Moody's NRSRO designation.

Strobl and Xia (2012) document similar results comparing EJR to S&P. However, these authors attribute their results to conflicts of interest inherent in S&P's compensation structure. The conflict of interest hypothesis is simple: issuer-paid CRAs receive their primary compensation from issuers adversely affected by low ratings.[14] By contrast, EJR relies on compensation from investors who benefit from timely information, good news and bad, when making investment decisions. In support of their certification hypothesis, Beaver et al. (2006) dismiss the potential for conflicted ratings, noting that no issuing firm represents more than 1.5% of Moody's income. However, neither of these studies explicitly tests alternative explanations for the differences in ratings. And neither study exploits changes in compensation structure or certification.

Kisgen and Strahan (2010) and Behr et al. (2014) construct tests around SEC certification, but only for *issuer-paid* CRAs. Behr et al. examine the original NRSRO designation of Moody's in 1975 and conclude that Moody's subsequently reduced its ratings quality. Similarly, Kisgen and Strahan find that DBRS altered its ratings policy following its certification in 2003. Specifically, the DBRS ratings became more highly correlated with the Big 3. But like Moody's, DBRS was an issuer-paid rater both before and after its designation. We hypothesize that this impact on rating information content is particular to CRAs with similar incentive structure. We predict that the SEC certification has less impact on raters with stronger incentives to produce information.

We employ a difference-in-differences approach to explicitly test the impact of SEC certification relative to EJR's incentives as an investor-paid rater. Our empirical design is similar to that of Beaver et al. (2006) but with a focus on comparing results before and after EJR's certification. We are most interested in the differences (pre- versus post-NRSRO designation of EJR) in differences (issuer-paid versus investor-paid rater). If the differential ratings observed by Beaver et al. in the early period were a result of the NRSRO designation, then we should observe EJR's ratings policy converging toward Moody's ratings policy following its designation. But if the differences in timeliness and accuracy between the raters result instead from their compensation structures, then we should expect no such convergence.

To test our central hypothesis, we employ the following analyses. (1) We consider descriptive statistics including average ratings changes by each rater in each time period (pre- and post-NRSRO designation of EJR). If the ratings policy is a function of certification, we

[13] The SEC has reduced (but not eliminated) its reliance on NRSROs in accordance with Dodd–Frank. However, a host of state-level regulations (i.e., the insurance industry) and international regulatory bodies (i.e., the Basel Accords) are not subject to the Dodd–Frank mandates.

[14] Recent theory papers show that investor-paid CRAs avoid the conflicts of interest (Bar-Isaac and Shapiro 2013) and the systematic bias (Skreta and Veldkamp 2009) associated with the issuer-pays business model. For evidence on the importance of credit ratings in determining issuers' access to capital, cost of capital, and corporate capital structure, see Faulkender and Petersen (2006), Kisgen (2006, 2009), and Sufi (2009). Both the SEC (2003) and the International Organization of Securities Commissions (2008) recognize the conflict of interest inherent in the issuer-pays model (see §§17g-5(b)(1) and 15E9(h) of the Exchange Act).

should observe a decrease in the ratings change activity by EJR in the later period. (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). Our primary tests employ Granger (1969) causality tests separately for the two time periods 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 and bond market returns as proxies for the magnitude of new information that precedes ratings 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 §5.

4. Sample Selection and Data Collection

4.1. EJR Credit Ratings

For our sample of investor-paid ratings, we obtain directly from EJR its complete ratings histories from July 1999 to June 2013. EJR generates firm-level 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. EJR denotes issuers with credit ratings equal to BBB− or higher as investment grade and issuers with credit ratings equal to BB+ or lower as speculative grade. To employ these ratings in our tests, we assign a numerical value to each rating ascending in credit quality (AAA = 21, AA+ = 20, . . . , D = 0). Following Beaver et al. (2006), we focus on ratings changes and delete rating affirmations and ratings at initial coverage.

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 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. To employ these ratings in our tests, we assign a numerical value to each rating ascending in credit quality (Aaa = 21, Aa1 = 20, . . . , C = 1). 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. To achieve a one-to-one mapping to EJR's firm-level ratings, we employ Moody's ratings of senior unsecured debt between July 1999 and June 2013 (corresponding to the EJR sample period).[15] For consistency, we focus on ratings changes in the period of joint coverage (i.e., ratings available from both Moody's and EJR).

Panel A of Table 1 indicates that the mean and median ratings from EJR are similar to those from Moody's in both time periods.[16] Although most of our tests and hypotheses concern changes in ratings, not levels of ratings, this characteristic is important to note; any difference in ratings between these raters for particular firms does not reflect systematic pessimism on the part of EJR. Untabulated frequencies by broad rating categories further indicate that EJR awards ratings in the A to AAA range more frequently than Moody's in both time periods, indicating that EJR ratings are not merely Moody's ratings with a conservative haircut. Panel B displays the size of 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

Lacking reliable common identifiers in the two raters' data, 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. We keep only those companies with available CUSIPs. We employ the intersection of covered issuers and detail our sample reconciliation by table and figure in an Internet appendix (available as supplemental material at http://dx.doi.org/10.1287/mnsc.2015.2188). The merged data set comprises a total of 8,911 ratings change observations of which 6,404 are EJR ratings changes and 2,507 are Moody's ratings changes. We refer to this sample as the *firms rated by both* sample and employ it in our tests below.

[15] We consider the potential for differences in ratings across bonds issued by larger firms with complex debt structures. Including all rated bonds poses a potential overrepresentation 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 S&P rating that EJR targets for comparison (see http://www.egan-jones.com). Ultimately, this point is immaterial because multiple bonds issued by the same firm typically have the same Moody's credit rating (Cornaggia and Cornaggia 2013).

[16] The levels of EJR's credit ratings are slightly higher (i.e., more favorable to issuers) than the levels of Moody's credit ratings. This pattern could exist because EJR benchmarks its ratings against S&P, not Moody's, and existing literature documents that relative to S&P, Moody's tends to award slightly lower ratings (Bongaerts et al. 2012).

Table 1 Distributions of Credit Ratings

Panel A—Resulting ratings following changes in *firms rated by both*

	N changes	Mean resulting rating	Std. dev.	25th percentile	Median	75th percentile
Full sample						
EJR	6,404	11.1	4.1	9	12	14
Moody's	2,507	10.2	4.2	7	11	13
1999–2007						
EJR	3,928	11.1	4.0	9	12	14
Moody's	1,470	10.2	4.1	7	11	13
2008–2013						
EJR	2,476	11.1	4.1	8	12	14
Moody's	1,037	10.2	4.3	7	10	14

Panel B—Size of credit ratings changes in *firms rated by both*

	N changes	Mean notches	Std. dev.	25th percentile	Median	75th percentile
Full sample						
EJR upgrades	2,906	1.3	1	1	1	1
EJR downgrades	3,498	−1.4	1	−2	−1	−1
Moody's upgrades	840	1.3	1.2	1	1	1
Moody's downgrades	1,667	−1.6	1.3	−2	−1	−1
1999–2007						
EJR upgrades	1,762	1.3	1	1	1	1
EJR downgrades	2,166	−1.4	1	−2	−1	−1
Moody's upgrades	449	1.3	1.1	1	1	1
Moody's downgrades	1,021	−1.7	1.3	−2	−1	−1
2008–2013						
EJR upgrades	1,144	1.3	1	1	1	1
EJR downgrades	1,332	−1.4	1	−1	−1	−1
Moody's upgrades	391	1.3	1.2	1	1	1
Moody's downgrades	646	−1.5	1.4	−2	−1	−1

Notes. Panel A displays descriptive statistics of the numeric conversions of credit ratings issued by Moody's and EJR between 1999 and 2013. Credit ratings greater than 11 are investment grade; credit ratings less than 12 are speculative grade. Panel B displays descriptive statistics on the sizes of the credit ratings' changes measured in notches.

The stock returns tests require data from the Center for Research in Security Prices (CRSP) daily stock return and daily indices/deciles files. 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 to match each company to its corresponding market cap-based decile (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html, accessed March 2014).

We compute compounded bond returns with end-of-day trade prices obtained from the Trade Reporting and Compliance Engine (TRACE) available from July 1, 2002. We merge the nine-digit bond CUSIP available from the DRD database to TRACE data, removing observations with missing prices, zero prices, or multiple closing prices. For issuers with multiple outstanding bonds, we employ the average compounded return around each rating action in order to avoid oversampling. Although the bond return sample is smaller than the stock return sample, the proportions of ratings changes are nearly identical. Moody's accounts for 2,087 of 8,111 ratings changes (25.73%) in the stock returns sample and 1,149 of 3,844 ratings changes (29.89%) in the bond returns sample.

Where available, we obtain the following additional data from COMPUSTAT: sales, total assets, market value of equity (the number of shares outstanding multiplied by fiscal year-end share price), and net income. The subsample of observations for firms with COMPUSTAT data contains 6,414 firm-year observations, with a total of 7,878 ratings change observations (5,857 of EJR and 2,021 of Moody's). None of our tests requires these COMPUSTAT data; they are used only to describe the sample of issuers.

5. Results

5.1. Descriptive Statistics

Table 2 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 NRSRO designation in

Table 2 Descriptive Statistics

	1999–2007	2008–2013	Difference in means (*p*-value)
N firm-years	3,990	2,424	
Sales (in $millions)			
Mean	13,311	15,845	2,534***
Median	5,710	6,518	(0.000)
Std. dev.	22,398	25,545	
Total assets (in $millions)			
Mean	41,835	60,621	18,786***
Median	8,121	9,331	(0.000)
Std. dev.	158,180	24,497	
Market value of equity (in $millions)			
Mean	16,562	15,285	−1,276
Median	5,388	5,255	(0.154)
Std. dev.	35,125	29,549	
Market-to-book			
Mean	3.31	1.68	−1.63**
Median	1.97	1.57	(0.042)
Std. dev.	34.41	18.27	
Net income (in $millions)			
Mean	651.3	804.6	153.3
Median	247.4	260.9	(0.106)
Std. dev.	3,463.3	3,633.7	
Number of EJR ratings changes per firm-year			
Mean	0.91	0.91	−0.00
Median	1.00	1.00	(0.947)
Std. dev.	0.96	0.99	
Number of Moody's changes per firm-year			
Mean	0.31	0.32	0.01
Median	0.00	0.00	(0.749)
Std. dev.	0.59	0.57	

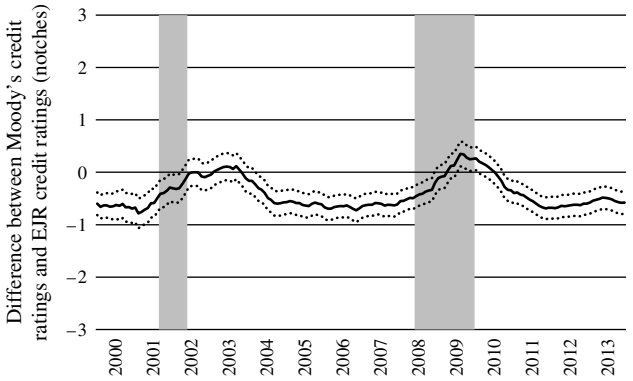
Notes. This table displays descriptive statistics for firm-year observations from 1999 to 2013 with credit ratings from EJR and Moody's. *Sales, total assets,* and *net income* were obtained from COMPUSTAT. We calculate *market value of equity* as the product of firms' common shares outstanding and share 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 were obtained 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 2013 dollars. *Number of EJR ratings changes per firm-year* represents the average number of times EJR upgrades or downgrades a firm's credit rating per year; *Number of Moody's ratings changes per firm-year* represents the average number of times Moody's upgrades or downgrades a firm's credit rating per year.

*; **; and *** indicate that the difference is significant at the10%, 5%, and 1% levels, respectively.

December 2007. These figures are inflation adjusted, reported in year 2013 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 (1.68) is roughly half that of the earlier period (3.31), and the difference is significant at 5%. Although average revenues increased significantly, the increase in net income was marginal (p-value = 0.106).

Table 2 also reports the average number of ratings changes per firm-year by each rater in both time periods.[17] Moody's altered ratings only 0.31 (0.32) times per year for the average firm in the earlier (later) time period; the increase is not significant. In comparison, EJR altered ratings nearly three times as frequently as Moody's (0.91 times per year) in both time periods. If certification were driving the difference in ratings policy, we should observe a decrease in ratings change activity by EJR after it is certified. EJR's continued ratings change activity in the latter period provides our first evidence against the certification hypothesis.

Figure 1 Difference Between Moody's Ratings and EJR Ratings



Notes. 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 2013. 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. Dotted lines represent 95% confidence intervals.

We plot the differences between Moody's ratings and EJR ratings over time in Figure 1. Specifically, we calculate the difference between Moody's and EJR's 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 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 increase during recessions. This pattern is driven by EJR's faster responses (downgrades) to deteriorating economic conditions. We infer that EJR considers macroeconomic factors that affect credit risk, and Moody's rates through the cycle.

5.2. Symmetry Tests

The conflict of interest in an issuer-paid CRA is acute around the investment-grade (IG) threshold. Firms that are below this arbitrary line face a significant liquidity

[17] 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 ratings change activity.

premium increasing the cost of capital and lowering the probability of issuing new debt securities; see Chen et al. (2007) and Ellul et al. (2011). Given the regulatory implications and liquidity effects that compound the information effect of a downgrade to speculative grade, we hypothesize that the issuer-oriented ratings policy will be especially pronounced at the threshold between investment-grade and speculative-grade ratings classes. By contrast, we hypothesize that EJR's incentives as an investor-paid rater will be stronger than any new concerns about the regulatory implications of the IG threshold resulting from its regulatory certification. In short, we predict that Moody's ratings are highly sensitive to the IG threshold and that EJR's ratings are insensitive to the IG threshold, even after its regulatory certification.

Figure 2 displays distributions of firm-month credit ratings for each rater in both periods. Each bar indicates the percentage of observations with each particular rating. The distributions of EJR ratings appear smooth—monotonically increasing between B− and BBB, and then monotonically decreasing from BBB to AAA, but with fat left tails. By contrast, the distributions of Moody's ratings demonstrate kinks at the IG threshold. In both periods, the frequency of the lowest Moody's rating above the cutoff (Baa3) appears higher than expected in a monotonic distribution. The frequencies of the highest speculative ratings (Ba1 and Ba2) are lower than the corresponding ratings (BB and BB+) in the EJR distributions. These patterns are consistent with the reluctance of issuer-paid Moody's to downgrade clients across this threshold, which is not observed in the rating policy of investor-paid EJR.

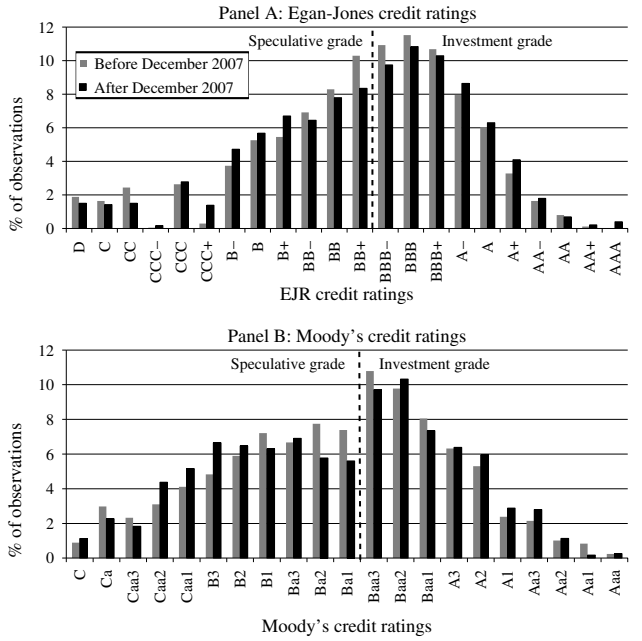
We statistically test the smoothness of these distributions.[18] In untabulated results we find that the difference (in both periods) is significant for Moody's (suggesting significant kinks) and insignificant for EJR (suggesting smooth distributions). Similar to Burgstahler and Dichev (1997), we infer intentional management to affect the kink. Most important for our primary hypothesis is the finding that the distribution is smooth for EJR in both time periods, suggesting no change in ratings policy after its designation as an NRSRO.

Our second test of rating symmetry compares Moody's and EJR's ratings migration. The premise of this test is that given large samples across long time series, an unbiased ratings policy would result in similar proportions of upgrades and downgrades over time. By contrast, one-directional rating migration would indicate a bias in original ratings at the time of issuance.[19] At the margin, we expect rating agencies that receive compensation from issuing firms will err on the side of optimism because these raters profit from continual relationships with issuing firms. By contrast, we expect ratings funded by investors to exhibit no such bias. Most important for our central research question, if Moody's observed optimism stems from its regulatory certification rather than its compensation structure, then we should expect EJR to exhibit similar bias after its certification.

Panel A of Table 3 reports the number of ratings changes (upgrades and downgrades) and the number and proportion of those that are downgrades by each rater in both time periods. Consistent with an optimistic bias at the time of issuance, we observe higher proportions of subsequent downgrades than upgrades by issuer-paid Moody's. The investor-paid EJR exhibits more symmetric updating (comparable likelihoods of upgrades and downgrades), which suggests uncertainty, but not bias, at the point of issuance.

Both raters become more symmetric in the later time period: EJR's downgrades fall from 55.1% to 53.8%

Figure 2 Distributions of Credit Ratings Before and After EJR Received NRSRO Designation



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

[18] 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).

[19] Griffin and Tang (2012) find that issuance ratings are more optimistic than surveillance ratings.

Table 3 Credit Ratings Changes Before and After December 2007

	Before Dec. 2007		After Dec. 2007			
	All changes	Downgrades	All changes	Downgrades	Difference in time periods	Diff-in-diff
Panel A—Ratings changes using *firms rated by both*						
EJR	3,928	2,166 55.1%	2,476	1,332 53.8%	−1.3% (0.285)	
Moody's	1,470	1,021 69.5%	1,037	646 62.3%	−7.2%*** (0.000)	
Difference in raters		−14.3%*** (0.000)		−8.5%*** (0.000)		
Difference-in-differences						5.8%** (0.014)
Panel B—Restricted to upgrades and downgrades crossing the investment grade threshold						
EJR	431	231 53.6%	279	153 54.8%	1.2% (0.751)	
Moody's	123	84 68.3%	106	53 50.0%	−18.3%*** (0.005)	
Difference in raters		−14.7%*** (0.004)		4.8% (0.392)		
Difference-in-differences						19.5%*** (0.010)

Notes. Panel A displays numbers of credit ratings changes by Moody's and EJR between 1999 and 2013 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 for the periods before and after December 2007, for each rater across the periods before and after December 2007, 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%, 5%, and 1% levels, respectively.

of total ratings changes and Moody's downgrades fall from 69.5% to 62.3%. However, only the change in Moody's updating is significant, which results in a significant second difference. Most relevant to our central hypothesis, EJR does not converge toward Moody's. In the postcertification period, EJR remains significantly more symmetric (at 1%) than Moody's. The convergence of Moody's toward EJR is not consistent with the certification hypothesis of Beaver et al. (2006). Rather, these results suggest that competition from investor-paid EJR improved Moody's ratings quality. Untabulated robustness tests reveal similar patterns if we restrict the sample to a 10-year period centered on December 2007 or if we withhold data from the 18-month recessionary period beginning in December 2007.[20]

Panel B of Table 3 repeats this analysis, restricting the sample to ratings changes that cross the IG threshold (which have greater expected regulatory and recontracting implications). EJR's symmetry remains nearly constant, from 53.6% downgrades prior to certification to 54.8% downgrades after certification. We conclude from this stability that EJR's certification did not result in greater sensitivity to the IG threshold. As in panel A, we find a significant change in Moody's updating in the later time period, resulting in a significant second difference. Moody's becomes symmetric in its updating across the IG threshold and is no longer significantly different from EJR. Both results from panel B—EJR's stability and the new symmetry exhibited by Moody's—are inconsistent with the certification hypothesis of Beaver et al. (2006).

Overall, we conclude from Table 3 that EJR does not even partially converge toward Moody's in the period following its certification. Rather, Moody's converges toward EJR (at least partially). Among the full sample of ratings changes, EJR remains significantly more symmetric in the postcertification period. These results are more consistent with competition from investor-paid EJR affecting Moody's ratings policies than they are with EJR's certification decreasing its ratings quality.

[20] As expected, there is greater downgrade activity by both raters during the financial crisis than in the months following the crisis. Still, the pattern observed in Table 3 (that Moody's is more likely to downgrade) remains significant in the postcrisis period. The first difference is −14.3% prior to December 2007 and −9.9% after June 2009; both differences are significant at 1%.

Table 4 Probabilities of One Rater Updating Its Ratings Prior to the Other Rater

	1999–2007	2008–2013	Difference in time periods	Difference-in-differences
Panel A—Probabilities of one rater downgrading prior to the other rater downgrading				
EJR prior to Moody's	54.4%	46.4%	−8.1%*** (0.002)	
Moody's prior to EJR	21.4%	21.2%	−0.2% (0.898)	
Difference in raters	33.0%*** (0.000)	25.2%*** (0.000)		
Difference-in-differences				7.9%*** (0.009)
Panel B—Probabilities of one rater upgrading prior to the other rater upgrading				
EJR prior to Moody's	39.1%	29.3%	−9.8%*** (0.000)	
Moody's prior to EJR	7.3%	11.8%	4.4%*** (0.001)	
Difference in raters	31.7%*** (0.000)	17.5%*** (0.000)		
Difference-in-differences				14.2%*** (0.000)

Notes. This table displays, for the sample periods before and after December 2007, probabilities that EJR updates its ratings in the six-month window 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 window prior to a downgrade (upgrade) by the other rater. The table displays results from tests of whether the differences in probabilities are significant across raters for the periods before and after December 2007, for each rater across the periods before and after December 2007, 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%, 5%, and 1% levels, respectively.

5.3. Timeliness Tests

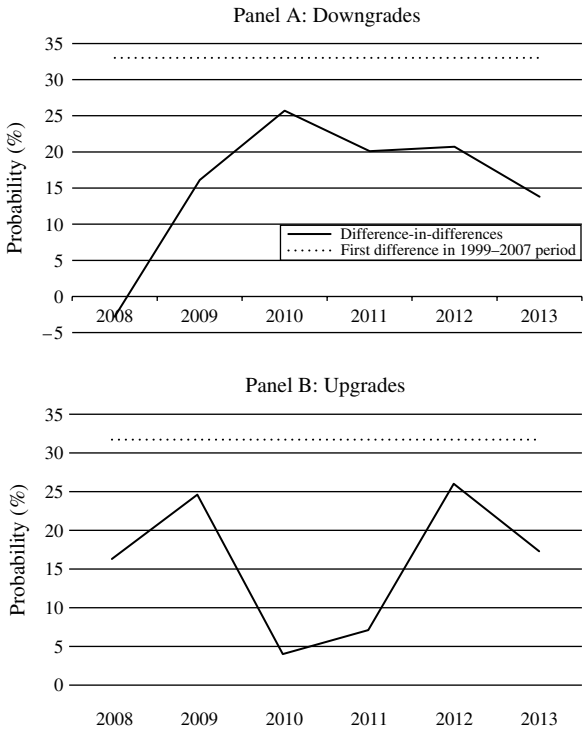
We document our first test of rating timeliness in Table 4. Specifically, we compute probabilities that EJR updates its ratings in the six-month period prior to a similar update by Moody's, and vice versa. Panel A (panel B) displays the probabilities that each rater downgrades (upgrades) its ratings 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 the periods before and after December 2007 periods, as well as whether the differences-in-differences are significant. In the early period, EJR downgrades its ratings prior to 54.4% of Moody's downgrades. By contrast, Moody's downgrades its ratings prior to 21.4% of EJR downgrades. These results indicate that EJR ratings are timelier than Moody's.

These differences attenuate by 7.9% in the later period: EJR moves prior to 46.4% of Moody's downgrades and Moody's moves prior to 21.1% of EJR downgrades, yet the difference between the raters remains significant (25.2% with p-value = 0.000) in the later period. Although the overall pre- and postcertification percentages indicate that EJR loses some of its relative timeliness (−8.1% is significant at 1%), the resulting figures confirm that EJR is still more than twice as likely to move before Moody's than vice versa (46.4% compared with 21.2%).

Concerned that this significant second difference may reflect a slow but steady convergence of EJR toward Moody's, we break the 2008–2013 period down year by year and test for a time trend. We reestimate Table 4, panel A six additional times, defining the later time period separately as 2008 only, 2009 only, etc. We plot the resulting second differences in Figure 3. The horizontal dotted line at 33.0% in Figure 3, panel A represents the first difference in the precertification period. Thus, we would conclude that EJR has converged to Moody's if the second difference reaches this amount. However, we observe no such pattern. The plot in panel A indicates partial convergence during the crisis period between 2008 and 2010 and that this pattern abates in subsequent years. Although EJR does not fully converge toward Moody's, the initial convergence suggests some impact of certification. Still, Figure 3 does not suggest that more time would reveal greater convergence. Six years after its certification, EJR remains a significantly different rater from Moody's. Motivated by these preliminary results, we use a Granger causality framework to perform more rigorous tests of timeliness later in this section.

The upgrade results in Table 4, panel B demonstrate similar reduction in lead time by EJR (−9.8% is significant at 1%) as that observed in panel A. Additionally, in panel B we observe significant improvement in

Figure 3 Changes in the Probabilities of One Rater Updating Its Ratings Prior to the Other Rater from Before December 2007 to Calendar Years Afterward



Notes. We compute the probability that EJR updates its ratings in the six months prior to Moody's making similar changes and the probability that Moody's updates its ratings in the six months prior to EJR making similar changes. We subtract the latter from the former to calculate a first difference. We calculate first differences using observations from 1999 to 2007, the time period during which EJR did not have the NRSRO designation. We also calculate first differences using data from each calendar year from 2008 to 2013. This figure plots differences-in-differences; we subtract first differences using data from 1999 to 2007 from each of the first differences from 2008 to 2013. Panel A (panel B) plots differences-in-differences in downgrade (upgrade) probabilities.

Moody's timeliness (4.4% is significant at 1%). Combined, these significant first differences result in a significant (at 1%) second difference of 14.2%. Still, as in panel A, EJR remains significantly more timely than Moody's (17.5% with p-value = 0.000) in the later time period. EJR is nearly three times as likely to move first (29.3% compared with 11.8%) than Moody's following its certification. The second differences in panel B of Figure 3 also rule out a slow but steady convergence of EJR toward Moody's over time. The horizontal dotted line at 31.7% represents the first difference in the precertification period. Thus, we would conclude that EJR has converged to Moody's if the second difference reaches this amount. We observe no convergence and thus conclude that EJR remains a significantly different rater from Moody's six years after its certification.

The timeliness patterns observed in Table 4 remain qualitatively similar in untabulated robustness tests restricting the sample to a 10-year period centered on December 2007 or withholding data from the 18-month recessionary period beginning in December 2007. To more finely illustrate timeliness, we decompose the probabilities of ratings changes by month in Figure 4. Specifically, we plot the probability of an EJR downgrade (Moody's downgrade) in each month of a 13-month window centered on a downgrade by Moody's (EJR). 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.[21] Consistent with the results in Table 4, EJR's ratings changes tend to lead those of Moody's both before and after EJR received NRSRO designation. By contrast, the probability that Moody's downgrades experiences an uptick once EJR downgrades, and this probability remains elevated in subsequent months.

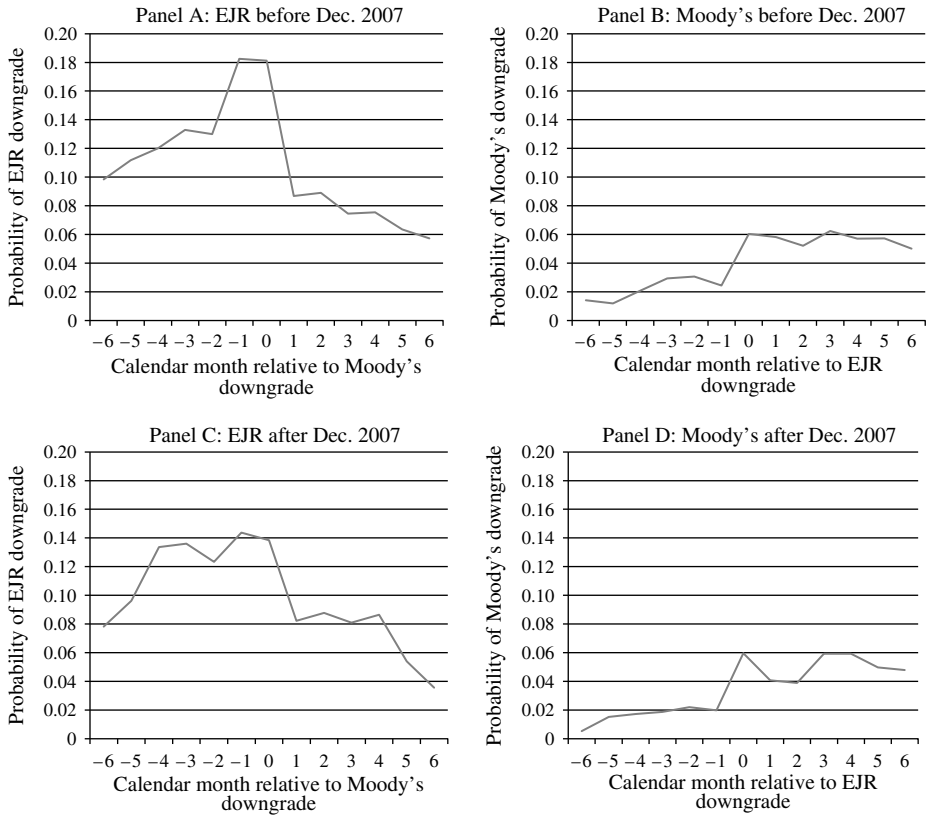
We test for Granger causality in Table 5 by expanding the *firms rated by both* sample into a panel data set with firm-month observations. We create observations for every firm and every month, regardless of whether Moody's or EJR changed a firm's credit rating within a given month. We populate these observations with indicator variables. For example, *Moody's down* is an indicator variable taking a value of 1 if Moody's downgrades a firm's credit rating within a given month and 0 if it does not; *EJR down* takes a value of 1 if EJR downgrades a firm's credit rating within a given month and 0 if it does not. Similarly, *Moody's up* takes a value of 1 if Moody's upgrades a firm's credit rating within a given month and 0 if it does not; *EJR up* takes a value of 1 if 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 employ six lags, although the inferences we explain below are generally insensitive to the number of lags:

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

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

[21] To conserve space, we omit similar graphical depictions of upgrade probabilities. The magnitudes of upgrade probabilities are smaller, as expected from Table 3, but the pictures are similar: EJR moves prior to Moody's with greater probability than vice versa, and these patterns persist after EJR received NRSRO designation.

Figure 4 Probability of One Rater Downgrading Around the Other Rater's Downgrades



Notes. 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. Panels A and B plot these probabilities using data from before December 2007, the month that EJR received NRSRO designation. Panels C and D replicate panels A and B, respectively, using data from after December 2007.

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

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

where 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 0 for Equation (1), the lags of *Moody's down* are jointly equal to 0 for Equation (2), the lags of *EJR up* are jointly equal to 0 for Equation (3), and the lags of *Moody's up* are jointly equal to 0 for Equation (4).

Table 5 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. The coefficient estimates for lags of *Moody's down* in Equation (2) are generally positive, and many are significant. However, the magnitudes of these coefficients are much smaller (ranging from 0.15 to 0.66) than those in model (1), which range from 0.68 to 1.39. We conclude that an EJR downgrade has a larger average effect on the probability that Moody's will downgrade than vice versa.

The Granger causality F-statistics are significant in all four regressions. However, the F-statistics testing whether the lags of *EJR down* are jointly equal to 0 are 9–14 times larger than the F-statistics testing whether the lags of *Moody's down* are jointly equal to 0. This relation is true for both time periods, suggesting that EJR's downgrades have a stronger Granger causality effect on Moody's downgrades than vice versa both before and after EJR received NRSRO designation.

Table 5 also contains Wald tests of whether the coefficient estimates on lags of *EJR down* in Equation (1) changed after EJR received 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. The insignificant

Table 5 Logistic Regressions, Granger Causality Tests, and Wald Tests (Downgrades Only)

	Before Dec. 2007		After Dec. 2007		Wald tests of the change from before Dec. 2007 and later			
	Moody's down	*EJR down*	*Moody's down*	*EJR down*	*Moody's down*		*EJR down*	
	(1)	(2)	(3)	(4)	Individual lags (3) − (1)	Six lags jointly	Individual lags (4) − (2)	Six lags jointly
EJR down								
Lag 1	1.39***	0.77***	1.39***	0.47***	0.00			
	(0.00)	(0.00)	(0.00)	(0.00)	(0.99)			
Lag 2	1.08***	0.84***	0.98***	1.04***	−0.10			
	(0.00)	(0.00)	(0.00)	(0.00)	(0.62)			
Lag 3	0.90***	0.71***	1.17***	1.30***	0.27			
	(0.00)	(0.00)	(0.00)	(0.00)	(0.17)			
Lag 4	0.86***	0.64***	0.83***	1.03***	−0.04			
	(0.00)	(0.00)	(0.00)	(0.00)	(0.86)			
Lag 5	0.73***	0.46***	0.82***	0.52***	0.08			
	(0.00)	(0.00)	(0.00)	(0.00)	(0.69)			
Lag 6	0.68***	0.61***	0.60***	0.97***	−0.08			
	(0.00)	(0.00)	(0.00)	(0.00)	(0.70)	(0.86)		
Moody's down								
Lag 1	0.19	0.66***	0.10	0.48***			−0.18	
	(0.26)	(0.00)	(0.63)	(0.00)			(0.42)	
Lag 2	0.17	0.53***	0.30	0.32**			−0.21	
	(0.33)	(0.00)	(0.14)	(0.05)			(0.36)	
Lag 3	0.26	0.30**	1.19***	0.37**			0.07	
	(0.13)	(0.03)	(0.00)	(0.02)			(0.76)	
Lag 4	0.28	0.25*	0.53***	0.49***			0.26	
	(0.10)	(0.10)	(0.01)	(0.00)			(0.25)	
Lag 5	0.36**	0.24*	0.55***	−0.03			−0.28	
	(0.04)	(0.09)	(0.01)	(0.86)			(0.29)	
Lag 6	0.26	0.15	0.33	−0.51**			−0.66**	
	(0.15)	(0.33)	(0.14)	(0.03)			(0.02)	(0.14)
Constant	−4.46***	−3.71***	−4.83***	−3.97***				
	(0.00)	(0.00)	(0.00)	(0.00)				
Granger								
F-stat.	525.66***	57.90***	470.49***	33.49***				
p-value	0.00	0.00	0.00	0.00				
N	48,505	48,505	50,567	50,567				
Pseudo-R^2	0.0698	0.0396	0.0911	0.0615				

Notes. This table displays results from logit regressions with firm-month observations. We use firm-month observations where *Moody's down* takes a value of 1 if Moody's downgrades the firm's credit rating within the month and 0 otherwise; EJR down takes a value of 1 if EJR downgrades the firm's credit rating within the month and 0 otherwise. *p*-Values are in parentheses below coefficient estimates. This table also displays *F*-statistics from Granger causality tests. 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 0. Finally, this table displays differences in coefficient estimates and *p*-values from Wald tests of whether the difference between coefficient estimates generated from the "Before Dec. 2007" and "After Dec. 2007" sample periods are significantly different. The table also contains *p*-values from tests of whether the differences between the coefficient estimates of six lags are jointly equal to 0.

*; **; and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

p-value (0.86) 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 NRSRO designation. We find only one change: the coefficient estimate on the sixth lag became significantly smaller, shrinking by 0.66, from 0.16 to −0.51. This result indicates that, if anything, Moody's downgrades became less timely in explaining EJR's downgrades after EJR received NRSRO designation. However, lags 1, 2, and 3 appear most relevant for Moody's Granger-causing EJR's downgrades. The *p*-value from the joint test is 0.14, indicating insignificant change overall.

Overall, the results in Table 5 indicate that EJR produces timelier credit ratings than Moody's. Because this relation maintains before and after EJR received NRSRO designation, it cannot be a result of NRSRO designation. We repeat this analysis for upgrades (Equations (3) and (4)) in the Internet appendix. The results

are similar to the results in Table 5. The *F*-statistics testing whether the lags of *EJR up* are jointly equal to 0 are 3–11 times larger than the *F*-statistics testing whether the lags of *Moody's up* are jointly equal to 0. This relation is true for both time periods, suggesting EJR's upgrades have a stronger Granger causality effect on Moody's upgrades than vice versa both prior to and following EJR's certification. The *p*-values on the joint Wald tests are 0.50 for EJR upgrades and 0.47 for Moody's upgrades.

5.4. Stock and Bond Return Tests

The Granger causality tests above describe the timeliness of EJR and Moody's ratings changes relative to each other. The purpose of this section is to measure the timeliness of the EJR and Moody's ratings in response to new information. We begin with the premise that stock prices capture the release of public information in a timely manner. We then examine the magnitude of returns that precede a ratings change to gauge the magnitude of price-relevant information that must unfold in order to compel a rating action for each rater. We favor equity returns in part because corporate bond markets are less liquid and thus less sensitive to marginal information.[22] Additionally, TRACE provides less data than CRSP, particularly in the pre-2007 period. Despite these limitations, we tabulate similar analysis using bond returns for completeness.

Panel A of Table 6 displays the stock return tests. 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.[23] We compute returns over accumulation periods of various lengths and winsorize the returns at 5% and 95% of their empirical distributions to mitigate the influence of outliers. We do so separately for both time periods of interest (before and after December 2007). We report average returns along with first and second differences between raters and time periods.

In the pre-December 2007 period we observe returns in the three-day window around ratings changes that are significantly larger in magnitude (at 1%) around EJR changes than around Moody's changes (for both downgrades and upgrades). These results are consistent with the conclusion that ratings changes by EJR are more informative than ratings changes by Moody's.[24]

Our purpose in the 6- and 12-month windows is not to measure long-run mispricing. We interpret these long-run predowngrade (preupgrade) 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 preceding Moody's downgrades (relative to EJR downgrades) in the pre-December 2007 time period. The difference is 2.41% (6.15%) in the 6-month (12-month) window; both are significant at 1%. We interpret this difference as a greater reluctance at Moody's relative to EJR to downgrade bonds in response to negative information priced by the stock market.

Conversely, we find smaller positive returns preceding Moody's upgrades relative to EJR upgrades in this period. The difference is 5.51% (3.59%) in the 6-month (12-month) window; the 6-month window is significant at 1%. These results suggest not only that Moody's requires more negative information than EJR in order to downgrade but also that Moody's requires more negative information in order to downgrade than it requires positive information to upgrade.

Results from both the 6- and 12-month windows further indicate that ratings changes by EJR are more symmetric with respect to positive and negative information. In the 12-month window, EJR adjusts following −24.62% and 25.37% returns (a difference of 0.77% in absolute value). The corresponding returns prior to Moody's adjustments exhibit a wider spread: −30.77% and 21.78% (a difference of 8.99% in absolute value). This asymmetric response is also apparent in the 6-month window (a difference of 2.95% in absolute value for EJR compared with a 10.87% difference in absolute value for Moody's).[25]

If the SEC certification was more influential than compensation structure, EJR's rating policies should converge toward Moody's following its certification. Specifically, we should observe (1) relatively more information required to compel EJR to downgrade and (2) less symmetry in EJR's responses to positive and negative information.

[22] Chen et al. (2007) review related literature and document that illiquidity itself is priced in corporate bond spreads.

[23] 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.

[24] A rich existing literature examines the extent to which Moody's informs markets with mixed findings; see Weinstein (1977), Pinches and Singleton (1978), Ingram et al. (1983), Holthausen and Leftwich (1986), Hand et al. (1992), Goh and Ederington (1993), Hite and Warga (1997), Ederington and Goh (1998), Kliger and Sarig (1999), Dichev and Piotroski (2001), and Cornaggia et al. (2014).

[25] Table 6 reports price movement preceding rating changes. Alternatively, we consider raters' responses to all stock price changes greater than 10% or 20%, respectively. These untabulated results also suggest that EJR is more likely to update its ratings (upgrades and downgrades) than Moody's following information resulting in material stock price movement. Inconsistent with the certification hypothesis, this difference persists in the post-2007 period.

Table 6 Stock and Bond Return Tests

	N	Day −1 through day +1	−6 months through day −1	−12 months through day −1
		Panel A—Stock returns		
Before December 2007				
Downgrades				
EJR	2,002	−5.09%	−18.40%	−24.62%
Moody's	910	−2.76%	−20.81%	−30.77%
Difference		−2.33%***	2.41%***	6.15%***
		(0.000)	(0.030)	(0.000)
Upgrades				
EJR	1,661	2.69%	15.45%	25.37%
Moody's	362	0.30%	9.94%	21.78%
Difference		2.39%***	5.51%***	3.59%
		(0.000)	(0.000)	(0.183)
After December 2007				
Downgrades				
EJR	1,263	−3.36%	−15.40%	−21.80%
Moody's	514	−3.34%	−20.40%	−28.85%
Difference		0.24%	5.00%***	7.06%***
		(0.623)	(0.000)	(0.000)
Upgrades				
EJR	1,098	1.81%	10.99%	23.32%
Moody's	301	0.43%	8.66%	23.93%
Difference		1.38%***	2.33%	−0.60%
		(0.000)	(0.171)	(0.849)
Difference: After Dec. 2007 − *Before Dec.* 2007				
Downgrades				
EJR		1.73%***	3.00%***	2.82%***
		(0.000)	(0.001)	(0.017)
Moody's		−0.58%	0.41%	1.92%
		(0.211)	(0.799)	(0.312)
Upgrades				
EJR		−0.88%***	−4.46%***	−2.05%
		(0.000)	(0.000)	(0.277)
Moody's		0.14%	−1.28%	2.15%
		(0.548)	(0.482)	(0.523)
Difference-in-differences: (After Dec. 2007 − Before Dec. 2007)$_{EJR}$−(After Dec. 2007 − Before Dec. 2007)$_{Moody's}$				
Downgrades		2.10%***	2.60%	0.90%
		(0.001)	(0.139)	(0.680)
Upgrades		−1.00%**	−3.20%	−4.20%
		(0.029)	(0.170)	(0.310)
		Panel B—Bond returns		
Before December 2007				
Downgrades				
EJR	605	−0.69%	−2.22%	−3.29%
Moody's	306	−0.79%	−3.67%	−5.61%
Difference		0.10%	1.45%**	2.32%***
		(0.626)	(0.018)	(0.003)
Upgrades				
EJR	596	0.37%	0.96%	1.84%
Moody's	201	0.24%	0.44%	1.01%
Difference		0.13%	0.52%	0.83%
		(0.232)	(0.190)	(0.314)
After December 2007				
Downgrades				
EJR	786	−0.87%	−4.46%	−6.85%
Moody's	424	−1.34%	−8.61%	−13.09%
Difference		0.47%*	4.15%***	6.25%***
		(0.100)	(0.000)	(0.000)
Upgrades				
EJR	708	0.54%	3.16%	8.58%
Moody's	218	0.41%	2.59%	6.82%
Difference		−0.13%	−0.57%	−1.76%*
		(0.292)	(0.192)	(0.065)

Table 6 (Continued)

	N	Day −1 through day +1	−6 months through day −1	−12 months through day −1
Difference: After Dec. 2007 − *Before Dec.* 2007				
Downgrades				
EJR		−0.19%	−2.24%***	−3.56%***
		(0.327)	(0.00)	(0.000)
Moody's		−0.55%	−4.94%***	−7.49%***
		(0.140)	(0.000)	(0.000)
Upgrades				
EJR		0.17%*	2.71%***	6.74%***
		(0.052)	(0.000)	(0.000)
Moody's		0.17%	2.15%***	5.81%***
		(0.176)	(0.000)	(0.000)
Difference-in-differences: (After Dec. 2007 − Before Dec. 2007)$_{EJR}$−(After Dec. 2007 − Before Dec. 2007)$_{Moody's}$				
Downgrades		0.37%	2.70%**	3.93%***
		(0.333)	(0.018)	(0.008)
Upgrades		−0.01%	0.57%	0.94%
		(0.971)	(0.939)	(0.479)

Notes. This table reports stock and bond returns as measures of information flow preceding credit rating updates. Panel A displays average buy-and-hold size-adjusted stock returns for different accumulation periods preceding rating changes. We calculate size-adjusted returns by subtracting the value-weighted average return for all firms in the same size-matched decile. We obtain stock returns data from CRSP. Panel B displays average compounded bond returns for the same accumulation periods examined in panel A. For each issuer with multiple outstanding bonds, we employ the average compounded return around each rating action to avoid oversampling. Bond returns data are available from TRACE from July 2002, so for the six-month window, the first observation is for January 2003. Around both upgrades and downgrades, the table displays results from tests of whether the differences in returns are significant across raters for the periods before and after December 2007, for each rater across the periods before and after December 2007, 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%, 5%, and 1% levels, respectively.

Results in the three-day window in the post-December 2007 period are consistent with the earlier period only for the upgrades: announcement returns are higher for EJR's upgrades than for Moody's. The market appears to price Moody's and EJR's downgrades similarly in the later period. The timeliness results for the 6-month and 12-month windows are robust in the latter period for downgrades but not upgrades. Specifically, we find significantly greater negative stock returns preceding Moody's downgrades (relative to EJR downgrades) in the post-December 2007 time period. The difference is 5.00% (7.06%) in the 6-month (12-month) window, and both are significant at 1%. The results indicate that EJR requires less negative information to unfold prior to a downgrade in the postcertification period, both relative to itself in the prior period and relative to Moody's in either period.

Results with respect to symmetry also remain in the later time period. In the 12-month window, EJR adjusts following −21.80% and 23.32% returns (a difference of 1.52% in absolute value). The corresponding returns prior to Moody's adjustments exhibit a wider spread: −28.85% and 23.93% (a difference of 4.92% in absolute value). This asymmetric response is also apparent in the 6-month window (a difference of 4.41% in absolute value for EJR compared with an 11.74% difference in absolute value for Moody's).

From the panel comparing each rater in the later period to itself in the early period, we observe that EJR downgrades in response to less information in the later period than it did in the early period. This increase in speed is significant at 1% in both the 6-month and 12-month windows. This result is inconsistent with the certification hypothesis. The increase in downgrade speed is also significant at 1%, but only in the 6-month window.

Second, differences are insignificant for both upgrades and downgrades in both 6- and 12-month windows. Overall, Table 5 indicates that while the market appears to price EJR ratings less in the later period, EJR's certification did not impact either its relative speed or its superior symmetry.

For completeness, we replicate the returns analysis with bond returns in Table 6, panel B. These return magnitudes are smaller, but the general pattern persists. EJR downgrades in response to less negative information than Moody's requires. This difference is significant at 5% and 10% in the precertification period and significant at 1% in the postcertification period. There is no difference between raters in returns preceding upgrades in the early period. Moody's is marginally faster to upgrade than EJR in the later time period.

From the panel comparing each rater to itself in the prior period, we observe that both raters require more information to change their ratings (true for upgrades as well as downgrades) in the later time

period. However, the positive second difference in returns preceding downgrades suggests that Moody's is even slower downgrading relative to EJR in the later period than the earlier period. This result contradicts the certification hypothesis, which predicts that EJR should close this gap and converge toward Moody's.

5.5. Reversals

Cantor and Mann (2006) discuss potential costs of volatile ratings that accompany timely rating changes. We posit that Moody's preference for stability reflects its incentives as an issuer-paid rater with freely disseminated ratings. By contrast, EJR produces timely ratings because its paying clients demand them. If ratings policy is more a function of regulatory certification than compensation structure, we should observe higher volatility (ratings reversals) in the EJR ratings compared with the Moody's ratings in the pre-December 2007 period only.

We identify a ratings reversal when a rater changes a firm's credit rating in a direction opposite to a prior change within the past 365 days. Table 7 reports the

Table 7 Reversals

	1999–2007	2008–2013	Difference in time periods	Difference-in-differences
	Panel A—Reversals following downgrades less than a year prior			
EJR	6.4%	7.2%	0.8%**	
			(0.030)	
Moody's	1.2%	1.3%	0.1%	
			(0.811)	
Difference in raters	5.2%***	6.0%***		
	(0.000)	(0.000)		
Difference-in-differences				0.7%
				(0.171)
	Panel B—Reversals into investment grade following downgrades into speculative grade			
EJR	2.0%	2.5%	0.5%**	
			(0.016)	
Moody's	0.4%	0.7%	0.3%	
			(0.234)	
Difference in raters	1.5%***	1.8%***		
	(0.000)	(0.000)		
Difference-in-differences				0.3%
				(0.390)
	Panel C—Reversals following upgrades less than a year prior			
EJR	6.3%	3.7%	−2.6%***	
			(0.000)	
Moody's	0.8%	1.0%	0.1%	
			(0.653)	
Difference in raters	5.5%***	2.8%***		
	(0.000)	(0.000)		
Difference-in-differences				−2.7%***
				(0.000)
	Panel D—Reversals into speculative grade following upgrades into investment grade			
EJR	1.7%	1.2%	−0.5%***	
			(0.002)	
Moody's	0.3%	0.2%	−0.0%	
			(0.872)	
Difference in raters	1.5%***	1.0%***		
	(0.000)	(0.000)		
Difference-in-differences				−0.5%**
				(0.041)

Notes. 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 probabilities are significant across raters for the periods before and after December 2007, for each rater across the periods before and after December 2007, 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%, 5%, and 1% levels, respectively.

probabilities that each rater reverses its ratings within a firm-year, in both time periods, and reports the first and second differences. We find that EJR reverses its ratings more frequently than Moody's in both time periods. Panel A indicates EJR reverses its downgrades in 6.4% (7.2%) of firm-years compared with 1.2% (1.3%) for Moody's in the pre-December 2007 (post-December 2007) period. If the regulatory implications of the NRSRO designation are paramount, then we should observe a reduction in EJR reversals after its certification. Instead, we observe significantly more reversals for EJR relative to Moody's (first difference) and to itself in the prior period (first difference). The second difference is insignificant, and we conclude that EJR's certification did nothing to inhibit its reversal rate. This result also obtains for reversals of downgrades across the investment grade threshold in panel B.

Panels C and D of Table 7 suggest that reversals of upgrades by EJR diminish in the post-December 2007 period, resulting in significant second differences. However, the "bite" associated with regulatory compliance and recontracting should be most pronounced in downgrades (panels A and B). That is, from a recontracting or regulatory perspective, correcting a premature downgrade is more costly than correcting a premature upgrade. Moreover, EJR's reversal rates remain significantly greater (at 1%) than Moody's reversal rates in the postcertification time period. EJR's reversal rate is 3.7 times greater than Moody's rate in panel C and 6 times greater in panel D. Overall, the results do not suggest that EJR backed away from its policy of timely information provision in order to accommodate issuer recontracting or regulatory concerns.

6. Other Considerations

6.1. Unsolicited Ratings

We are aware of one confounding effect potentially working against our hypotheses: unsolicited credit ratings by issuer-paid raters. Fulghieri et al. (2013) argue that issuer-paid credit raters maximize their fees and enhance their reputations by imposing pessimistic ratings on firms that do not pay. Any such ratings by Moody's in our data would deflate the average Moody's rating and potentially alter its observed ratings changes.[26] 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 hypothesis regards ratings policy for paying client issuers. Any unobservable mitigating effects of unsolicited ratings should mute our results.

6.2. Differences in Ratings 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 ratings model. Moody's periodically releases "Special Comments" and "Rating Methodology" reports to aid public understanding of the ratings process. However, the SEC (2008, p. 13) 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 production as a matter of policy rather than a matter of skill. We hypothesize that investor-paid raters face a fundamentally different incentive structure than issuer-paid raters, and we find supportive results.

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 (Kealhofer, McQuown and Vasicek) technology. 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. As such, client relationships with issuers offer Moody's access to proprietary information. By contrast, EJR relies on publicly available information such as issuers' financial statements. For these reasons, we are confident in our classification of credit ratings information content as a matter of policy rather than technology.

7. Conclusion

The purpose of this paper is to test whether NRSRO designation affects information production by credit rating agencies. In contrast to results for the issuer-paid DBRS, we find surprisingly little impact of the designation on the investor-paid EJR. We conclude that CRA compensation structure is a more important determinant of ratings policy than certification by

[26] For example, Fulghieri et al. (2013, p. 485) 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' . . . . 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."

the SEC. We further conclude that the prevalence of Moody's ratings in corporate contracting is attributable more to its public dissemination of its ratings than its certification.

However, our results do not imply that the removal of NRSRO designation, as mandated by Dodd–Frank, will have no impact on ratings quality. Our results indicate that this regulatory change will affect the heterogeneous set of NRSROs in different ways. Future empirical analysis of the post-Dodd–Frank regulatory landscape may indeed find that reduced regulatory reliance on rating agencies improves the quality of issuer-paid ratings. However, our results suggest that investor-paid rating agencies will continue to provide ratings updates that are timelier and more symmetric.

We do not, however, advocate a regulatory mandate against issuer-paid credit ratings as an alternative solution to the problem of ratings inflation, for at least two reasons. First, given only investor-paid raters, some raters may cater to institutional investors who prefer inflated ratings in order to invest in riskier (i.e., higher-yield) assets. Second, the issuer-pays compensation structure facilitates public dissemination of ratings, which serve as a disciplinary tool and a low-cost coordination mechanism (see Boot et al. 2006). Still, for investors preferring timely and symmetric ratings updates, our results suggest a premium over the price of the public good.

Supplemental Material

Supplemental material to this paper is available at http://dx.doi.org/10.1287/mnsc.2015.2188.

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