Impact of the Dodd-Frank Act on Credit Ratings

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Abstract

We analyze the impact of the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) on corporate bond ratings issued by credit rating agencies (CRAs). We find no evidence that Dodd-Frank disciplines CRAs to provide more accurate and informative credit ratings. Instead, following Dodd-Frank, CRAs issue lower ratings, give more false warnings, and issue downgrades that are less informative. These results are consistent with the reputation model of Morris (2001), and suggest that CRAs become more protective of their reputation following the passage of Dodd-Frank. Consistent with Morris (2001), we find that our results are stronger for industries with low Fitch market share, where Moody's and Standard & Poor's have stronger incentives to protect their reputation (Becker and Milbourn (2011)). Our results are not driven by business cycle effects or firm characteristics, and strengthen as the uncertainty regarding the passage of Dodd-Frank gets resolved. We conclude that increasing the legal and regulatory costs to CRAs might have an adverse effect on the quality of credit ratings.

Keywords: Dodd-Frank, Reputation, Credit Ratings, Information

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"By imposing structural, regulatory, and liability reforms on rating agencies, this agreement will change the way nationally recognized statistical rating organizations behave and ensure that they effectively perform their functions as market gatekeepers going forward."

Congressman Paul Kanjorski (PA) [1]

1. Introduction

The mass defaults of highly rated structured finance products in 2007 and 2008 has led to a renewed focus on the quality of ratings issued by credit rating agencies (CRAs). Many observers partly blame CRAs' inflated ratings of structured finance products for the rapid growth and subsequent collapse of the shadow banking system, which was at the epicenter of the global recession of 2008-2009 (see, for e.g., Blinder (2007), Stiglitz (2008), and Brunnermeier (2009)).

In response to the financial crisis, Congress passed the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) in July 2010. Dodd-Frank outlines a series of broad reforms to the CRA market but delegates the responsibility of developing specific rules to the Securities and Exchange Commission (SEC) and other federal agencies.[2] As a result, provisions mandating internal control and governance reform are yet to be finalized as of April 2014. Provisions eliminating regulatory reliance on credit ratings have been implemented as recently as 2013. Nevertheless, two important provisions become effective immediately with the passage of the law. First, Dodd-Frank significantly increases CRAs' liability for issuing inaccurate ratings by lessening the pleading standards for private actions against CRAs under Rule 10b-5 of the Securities and Exchange Act of 1934. Second, the law makes it easier for the SEC to impose sanctions on CRAs and to bring claims against CRAs for material misstatements and fraud.

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[1] "Dodd-Frank Wall Street Reform and Consumer Protection Act." Congressional Record 156: 100 (June 20, 2010), p. H5238.

[2] Appendix A contains a summary of all provisions of the law concerning CRAs.

We test two hypotheses on the impact of Dodd-Frank on credit ratings. According to the *disciplining hypothesis,* Dodd-Frank achieves its stated objective of improving the quality of credit ratings. The increase in legal and regulatory penalties for issuing inaccurate ratings may encourage CRAs to invest in due diligence, to improve their methodology, and to better monitor the performance of their credit analysts. These changes could lead to more accurate and informative credit ratings. Credit ratings may improve further as CRAs strengthen internal control and corporate governance mechanisms, although this effect is likely to be muted given the uncertainty regarding the SEC's final rules.

Alternatively, the increase in legal and regulatory penalties under Dodd-Frank can have an adverse effect on the quality of credit ratings. The reason is that these penalties are asymmetric, whereas CRAs are penalized for optimistically biased ratings but not for pessimistically biased ratings (Goel and Thakor (2011)). For example, having an investment-grade rating for an issuer that subsequently defaults is likely to subject CRAs to legal or regulatory action. In contrast, neither investors nor the SEC are likely to challenge a speculative-grade rating for an issuer that remains solvent. Dodd-Frank makes optimistic ratings costlier for CRAs because optimistic ratings are more likely to be perceived as optimistically biased, inviting legal and regulatory scrutiny. To protect (or rebuild) their reputation, CRAs may respond by lowering their ratings beyond a level justified by an issuer's fundamentals (Morris (2001)). We call this the *reputation hypothesis.* As CRAs lower their ratings regardless of their information, investors rationally discount CRAs' rating downgrades. The result is that some of the private information of CRA analysts is lost to the market.[3]

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[3] Morris (2001) provides an example of the reputation effect in the context of political correctness, whereas an informed social scientist advises an uninformed policy maker on the merits of affirmative action by race. The social scientist makes the politically correct recommendation of affirmative action regardless of whether she believes this is indeed the right policy choice. This is because the social scientist does not want to be perceived as being racist. In equilibrium,

The reputation hypothesis makes three empirical predictions: (1) all else equal, CRAs issue lower credit ratings following Dodd-Frank; (2) all else equal, there are more false warnings (i.e., speculative grade rated issues that do not default within a year) following Dodd-Frank; and (3) all else equal, credit rating downgrades become less informative following Dodd-Frank. In contrast, the disciplining hypothesis predicts that credit ratings become more accurate and more informative following Dodd-Frank, directly opposing predictions (2) and (3) of the reputation hypothesis.

Using a comprehensive sample of corporate bond credit ratings from 2006 to 2012, we find results that provide strong support for the reputation hypothesis. First, we find that bond ratings are lower, on average, in the post-Dodd-Frank period (defined as the period from July 2010 to May 2012). The odds that a corporate bond is rated as non-investment grade are 1.19 times greater after the passage of Dodd-Frank, holding all else constant. Second, we find more false warnings in the post-Dodd-Frank period, where false warnings are defined as speculative grade rated issues that do not default within one year. The odds of a false warning are 1.84 times greater after the passage of Dodd-Frank, holding all else constant. Third, we find that the bond market responds less to rating downgrades in the post-Dodd-Frank period. Prior to the passage of Dodd-Frank, bond prices decrease on average by 1.023% following a rating downgrade; this compares to a decrease of 0.654% following the passage of Dodd-Frank. In contrast, the bond market's response to rating upgrades remains the same. Fourth, we find that the stock market also responds less to rating downgrades in the post-Dodd-Frank period. Stock prices decrease by 2.461% following a rating downgrade in the pre-Dodd-Frank period; in the post-Dodd-Frank period, the decrease is only 1.248%. Taken together, these results show that rating downgrades are less informative in the post-Dodd-Frank

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the social scientist's information is lost. The formal model of Morris (2001) builds on the earlier conceptual work by Loury (1993).

period as the market discounts the actions of CRAs meant to protect their reputation. It appears that the reputation effect outweighs the disciplining effect of Dodd-Frank in the market for corporate bond credit ratings.

We provide additional evidence in support of the reputation hypothesis by examining whether the above results vary with variations in the CRAs' ex-ante reputation costs. Becker and Milbourn (2011) show that CRAs invest more in reputation when they face less intense competition. Using Fitch's entry into the CRA market as a competitive shock, Becker and Milbourn (2011) show that increased competition from Fitch coincides with lower quality ratings from the incumbent CRAs (Moody's and Standard and Poor's (S&P)).[4] By decreasing expected rents in the industry, competition decreases incumbents' incentives to invest in reputation for accurate ratings. We expect that, following the passage of Dodd-Frank, the ratings of Moody's and S&P are lower, less accurate, and less informative within industries with lower Fitch market share. When Fitch's market share is lower, legal and regulatory penalties have higher expected costs to Moody's and S&P in terms of lost future rents. Showing that the results are stronger when Fitch's market share is lower ties our main findings to CRAs' reputation incentives.

Consistent with the reputation hypothesis, we find that all four results are stronger within industries with lower Fitch market share. Within industries in the bottom quartile of Fitch market share, the passage of Dodd-Frank increases the odds of a non-investment grade rating 2.27 times, increases the odds of a false warning 8.21 times, reduces the reaction of bond prices to downgrades by 1.083%, and reduces the reaction of stock prices to downgrades by 2.976%. These results are

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[4] Becker and Milbourn (2011) show convincingly that Fitch's market share within an industry is exogenous to industry characteristics and the quality of credit ratings. For example, Fitch's market share in an industry is unrelated to credit growth in the industry, industry profitability, and the difficulty of predicting default within the industry. Fitch's market share is also unrelated to the coverage provided by Moody's and S&P, who rate virtually all corporate issues.

both statistically and economically significant. CRAs issue lower, less accurate, and less informative credit ratings following Dodd-Frank when their reputation costs are greater.

We perform a number of robustness tests. First, it is possible that the results are driven in part by the economic recession of 2007-2009 rather than the passage of Dodd-Frank. However, our results remain similar after controlling for macroeconomic variables such as market valuation, market returns, firm-specific returns, perceived profitability, and GDP. We also find no changes in credit ratings around the 2001 economic recession within industries with low Fitch market share. Second, we find that credit ratings become progressively more conservative and less informative as the uncertainty regarding Dodd-Frank's passage is reduced. This finding establishes a closer link between Dodd-Frank's passage and changes in credit ratings. Third, we find no evidence that the lower ratings in the post-Dodd-Frank period reflect deteriorating issuer quality.

Taken together, our findings show that Dodd-Frank has had unintended consequences in the market for corporate bond ratings.[5] We focus on the ratings of corporate bonds because corporate bonds are a homogeneous asset class, the properties of corporate credit ratings have been studied extensively in the literature, and data on ratings, pricing, and characteristics of corporate bond issuers are readily available. Our findings may not apply to credit ratings of structured finance products. The structured finance market has experienced significant changes following 2008, including the continued involvement by the Federal Reserve, the collapse of the private residential mortgage-backed securities market, and the placement of Fannie and Freddie Mac, two of the largest underwriters, in conservatorship. These developments make it challenging to attribute any recent changes in the properties of structured finance credit ratings to the passage of Dodd-Frank.

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[5] Prior studies show unintended consequences of various regulations, including mandatory seat belt laws (Peltzman (1975)), teacher compensation (Jacob and Levitt (2003)), historic landmark designations (Schaeffer and Millerick (1991)), and predatory lending laws (Bostic et al. (2012)).

This paper can help guide policy as regulators continue to debate the best way to restructure the credit ratings industry. Our results for corporate bond ratings suggests that further attempts to increase the costs to CRAs for issuing biased ratings are likely to be ineffective and may result in a loss of information. The common wisdom is that increasing the penalties for biased ratings will make CRAs provide higher quality ratings. However, as we show in this paper, CRAs respond to the increased regulatory pressure by issuing lower, less informative corporate bond ratings to protect their reputation. Any regulatory scheme for CRAs should carefully consider the trade-off between these two effects.

The rest of the paper is organized as follows. Section 2 provides a brief summary of the provisions of Dodd-Frank that are relevant to the CRA market. Section 3 discusses prior research on the informativeness of credit ratings, the perceived bias of CRAs, and changes in the properties of credit ratings over time. Section 4 describes our data and variables and Section 5 our empirical tests and results. Section 6 concludes.

2. Dodd-Frank Wall Street Reform and Consumer Protection Act

In this section, we discuss in detail the two provisions of Subtitle C of Dodd-Frank ("Improvements to the Regulation of Credit Rating Agencies") that are most likely to affect corporate credit ratings. First, Dodd-Frank increases the legal penalties for issuing inaccurate ratings by lessening the pleading standards for private actions against CRAs under Rule 10b-5 of the Securities and Exchange Act of 1934. Second, the law makes it easier for the SEC to impose sanctions on CRAs and to bring claims against CRAs for material misstatements and fraud. Both of these changes take effect immediately with the passage of Dodd-Frank on July 2010, which is why we use July 2010 as our main event date. The remaining provisions either have not been

finalized as of the writing of this paper or have been implemented very recently. A summary of all nine sections of Subtitle C (Sec. 931 through Sec. 939) is provided in Appendix A of the paper.

2.1. Liability provisions

Arguably the most significant provisions within Dodd-Frank are those that increase CRAs' liability for issuing erroneous (or biased) ratings (Coffee (2011)). Traditionally, CRAs have been successful in claiming that credit ratings constitute opinions protected as free speech under the First Amendment. This defense requires plaintiffs to prove that CRAs issued ratings with knowledge they are false or with reckless disregard for their accuracy, effectively preventing most lawsuits from proceeding to trial.[6] Section 933 of Dodd-Frank explicitly lessens the pleading requirement in private actions under Rule 10b-5 of the Securities and Exchange Act of 1934, whereas plaintiffs must now only prove that CRAs knowingly or recklessly failed to conduct a *reasonable investigation* of the rating security. This change is likely to result in more lawsuits surviving CRAs' motion to dismiss, leading to potentially damaging revelations during pre-trial discovery.

Section 939G contains another material change to CRAs' liability for issuing erroneous ratings. It makes CRAs liable as experts under Section 11 of the Securities and Exchange Act of 1934 for material misstatements and omissions in registration statements filed with the SEC. Prior to Dodd-Frank, CRAs were effectively shielded from such liability by Rule 436(g), which allowed CRAs to avoid consenting to being "experts" for the purpose of Section 11. Section 939G expressly overrules Rule 436(g). The reaction of CRAs to this change has been swift; CRAs refused to consent to having their ratings included in the registration statements for both structured finance products and corporate bonds (Coffee (2011)). The result was that the market for asset-backed

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[6] See Alicanti (2011) for a thorough review of case law applicable to CRAs.

securities froze, leading the SEC to suspend Section 939G for structured finance products (but not for corporate bonds). The refusal of CRAs to provide any ratings for new corporate bond issues circumvents Section 939G, making this section less relevant for our findings. However, the CRAs' actions show how imposing strict penalties on CRAs can lead to a loss of information in the market for new corporate bonds.

2.2. Regulatory penalties

The second set of provisions of Dodd-Frank that ex-ante are likely to have an effect on corporate credit ratings concerns SEC's expanded role in the CRA market. Section 933 states that the enforcement and penalty provisions of federal securities law apply to statements made by CRAs to the same extent as these provisions apply to registered public accounting firms or securities analysts. Section 933 specifically states that CRAs' statements are no longer considered forward-looking for the purpose of the safe harbor provisions of the Securities and Exchange Act of 1934. These changes make it easier for the SEC to bring claims against CRAs for material misstatements and fraud.

The disclosures mandated under Section 932 of Dodd-Frank further increase the risk of regulatory penalties. According to Section 932, CRAs must file annual reports on internal controls with the SEC, disclose their rating methodologies, make third-party due-diligence reports public, and disclose the accuracy of their past credit ratings. Section 932 mandates that the SEC establish an Office of Credit Ratings to better monitor CRAs' compliance with the new rules. While many details regarding the disclosures are yet to be finalized by the SEC, CRAs have already begun to provide additional data to regulators (and investors). Annual reviews of CRAs by the SEC have been taking place since 2010, and the Office of Credit Ratings was established in 2012.

Section 932 also gives the SEC the authority to revoke or suspend the registration of a Nationally Recognized Statistical Rating Organizations (NRSRO) with respect to a particular class of securities if the NRSRO's ratings are deemed inaccurate.[7] In other words, if a NRSRO is perceived to issue erroneous or biased ratings of corporate bonds, it may lose its market share of the corporate bond market.[8] Given that CRAs are rarely accused of being overly conservative in their ratings, Section 932 can be interpreted as imposing regulatory penalties for issuing upwardly biased (or overly optimistic) ratings.

3. Related literature

Our paper builds on prior work examining the characteristics of credit ratings, including their informativeness, perceived bias, and changes over time. We briefly review the most relevant papers below.

Holthausen and Leftwich (1986), Hand, Holthausen, and Leftwich (1992), and Dichev and Piotroski (2001) show that investors react to credit rating announcements, and that the reaction is greater for credit rating downgrades than for upgrades. Ederington and Goh (1998) and Kao and Wu (1990) show that ratings are informative about subsequent operating performance and about credit risk, respectively. Kliger and Sarig (2000) study finer rating partitions instituted by Moody's and show that both bond prices and stock prices react to Moody's rating refinement. These results suggest that ratings contain relevant information not available from other sources. Nevertheless, investors and regulators have repeatedly accused CRAs of issuing biased ratings since the adoptions

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[7] Prior to the passage of Dodd-Frank, NRSROs' credit ratings were used in federal and state regulations. Under current practice, CRAs must apply to the SEC to be recognized as an NRSRO. According to the SEC, "The single most important factor in the Commission staff's assessment of NRSRO status is whether the rating agency is 'nationally recognized' in the United States as an issuer of credible and reliable ratings by the predominant users of securities ratings" (SEC (2003)).

[8] Previously, the SEC had the authority to revoke a CRAs' registration as a NRSRO if it deemed that the CRA does not have adequate resources to perform its duties as stipulated under the Credit Ratings Agency Reform Act of 2006.

of the issuer-pays model in 1974 (Jiang, Stanford, and Xie (2012)).[9] A number of papers find support for these claims (Skreta and Veldkamp (2009), Griffin and Tang (2011), Bolton, Freixas, and Shapiro (2012), Strobl and Xia (2012), He, Qian, and Strahan (2012), and Opp, Opp, and Harris (2013)).

Prior work shows that the properties of credit ratings change over time (see, for e.g., Blume, Lim, and MacKinlay (1998) and Baghai, Servaes, and Tamayo (2014)). Alp (2013) finds a structural shift towards more stringent ratings in 2002, possibly as a response to the increased regulatory scrutiny and investor criticism following the collapse of Enron and WorldCom. Jorion, Liu, and Shi (2005) find that the information content of both credit rating downgrades and upgrades is greater following the passage of Regulation Fair Disclosure (FD) in 2000. Similarly, Cheng and Neamtiu (2009) find that CRAs issue more timely downgrades, increase rating accuracy, and reduce rating volatility following the passage of the Sarbanes-Oxley Act in 2002. Cathcart, El-Jahel, and Evans (2013) analyze the credit default swaps market immediately following the 2008 financial crisis and find that corporate credit ratings are viewed as less credible. In contrast to prior work, we focus on the passage of Dodd-Frank, which is arguably the biggest change in financial regulations since the creation of the SEC in 1934. We extend the work of Becker and Milbourn (2011) by linking changes in the characteristics of credit ratings around the passage of Dodd-Frank to CRAs' reputation concerns.

Closely related to our work is the paper of Goel and Thakor (2011), who are the first to examine analytically the potential effects of liability reform on the incentives of CRAs. Goel and Thakor (2011) show that increasing the litigation or regulatory risk in the credit ratings industry is

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[9] The issuer-pays model was introduced in part because of the adoption of copying machines, which made it easy for investors to copy existing CRA reports. At the same time, demand for credit ratings increased substantially in 1975 following the SEC requirement that public debt issues be rated by NRSROs. See Jiang et al. (2012) for a thorough discussion of the decision to switch to the issuer-pays model.

a "two-edged" sword. On the one hand, CRAs may expend greater due-diligence, resulting in more informative ratings (as predicted under our disciplining hypothesis). On the other hand, CRAs may obfuscate their ratings, resulting in a downward bias in ratings when legal liability is asymmetric (i.e., CRAs are only sued for ratings that ex-post are shown to be too high).[10] This prediction parallels that of Morris (2001). We examine these two possibilities empirically, and find that increasing the litigation and regulatory risk in the credit ratings industry leads to less informative ratings.

4. Sample selection, variable measurement, and summary statistics

4.1. Sample selection

We obtain all credit rating announcements during the period from January 2006 to May 2012 from Mergent's Fixed Investment Securities Database (FISD). The sample begins in 2006 to avoid any ongoing market adjustments to the 2002 Sarbanes-Oxley Act (see, for e.g., Cheng and Neamtiu (2009)). The sample includes U.S. domestic corporate bonds rated by Moody's, S&P, or Fitch, and excludes Yankee bonds and bonds issued through private placement. Ratings of D (indicating default) are excluded because these ratings are assigned ex-post. We require that each bond issuer is covered by Compustat and has market value data on CRSP (Center for Research in Security Prices) for the most recent quarter prior to the respective credit rating announcement. For cases in which more than one CRA issues a credit rating on the same date for the same bond, we keep the observation with the greatest rating change. We exclude bonds rated only by Moody's. Moody's does not provide default ratings and hence it is not possible to determine whether a bond rated only by Moody's is currently in default. We also exclude bond issuers from the financial

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[10] In a follow-up paper, Goel and Thakor (2014) show that an increase in litigation costs is unlikely to reduce the bias in credit ratings that exists due to the coarseness of the credit rating scale.

industry. The resulting sample consists of 26,625 credit rating upgrades, credit rating downgrades, initial ratings, and ratings that are reaffirmed.

4.2. Variable measurement

Table 1 summarizes the variables used in the study and their measurement. We discuss the main variables below. Rating levels are numerical transformations of the alphanumerical rating codes issued by CRAs, from 1 to 22 (AAA to D), as detailed in Appendix B. Following Cheng and Neamtiu (2009) and Bonsall (2014), we define a rating's Type II error (or false warning) as a dichotomous variable which equals one for a BB+ or lower rated issue that does not default within one year, and zero otherwise.

Announcement bond returns are calculated as the percentage change in bond prices from trades surrounding rating announcements.[11] Bond prices are obtained from FINRA's Trade Reporting and Compliance Engine (TRACE) database. The bond price before the rating announcement is the volume-weighted trade price on the day closest and prior to the rating announcement date. The bond price after the rating announcement is the volume-weighted trade price on the day closest to and following the rating announcement date. We measure announcement bond returns only for bond issues with at least one trade during the five days before, and the five days after, the rating announcement date.

Stock prices are obtained from CRSP and are used to calculate CAPM beta, return volatility, and excess stock returns surrounding announcements of rating changes. Announcement stock returns are calculated as buy-and-hold stock returns over the three-day period centered at the rating

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[11] Because of the different maturities, credit quality, and characteristics of the various bond issues in the sample, there is no readily available benchmark for announcement bond returns. Hence, we examine raw announcement bond returns in our analysis in Section 5.3. The contrast between credit rating upgrades and credit rating downgrades, and between industries with high and low Fitch market share, alleviates concerns that market-wide movements in interest rates might account for our findings.

announcement date minus the corresponding return on the CRSP value-weighted index. We measure announcement stock returns only for issuers with non-missing returns on all three days. CAPM beta is estimated using the CRSP value-weighted index as the market index and daily returns over the most recent fiscal quarter ending prior to the rating announcement date. Idiosyncratic stock return volatility is the standard deviation of the residual from the CAPM model. Total stock return volatility is the standard deviation of daily returns over the most recent fiscal quarter ending prior to the rating announcement date.

The remaining variables are described in detail in Table 1. All financial ratios are measured for the most recent fiscal quarter ending prior to the rating announcement date. Variables with large outliers are winsorized at the 1% and the 99% level.

*** Table 1 ***

4.3. Summary statistics

Table 2 reports summary statistics for the variables used in the study. We refer to the period from January 2006 to July 21, 2010 as the pre-Dodd-Frank period, and the period from July 22, 2010 to May 2012 as the post-Dodd-Frank period. There are 18,606 corporate bond credit rating announcements during the pre-Dodd-Frank period and 8,019 announcements during the post-Dodd-Frank period. There are fewer observations for announcement bond returns (7,120 during the pre-Dodd-Frank period and 3,715 during the post-Dodd-Frank period) because many bond issues do not trade around the rating announcement date. The average credit rating increases from 10.85 before Dodd-Frank to 10.125 after Dodd-Frank, corresponding to a change in S&P rating from BB+ to BBB-. The incidence of false warnings (type II rating errors) decreases from 0.448 during the pre-Dodd-Frank period to 0.392 during the post-Dodd-Frank period. The increase in credit ratings and the reduction in false warnings correspond to an improvement in market conditions following

the passage of Dodd-Frank. Return on assets (ROA) and operating margins are higher after Dodd-Frank. Firms' balance sheets also strengthen after Dodd-Frank. For example, the long-term debt-to-assets ratio is 0.316 during the pre-Dodd-Frank period and 0.304 during the post-Dodd-Frank period. The other leverage measures show similar improvement. Both total and idiosyncratic volatility are lower during the post-Dodd-Frank period than during the pre-Dodd-Frank period. In the next section, we examine whether credit ratings are higher and false warnings are lower during the post-Dodd-Frank period holding firm characteristics fixed.

*** Table 2 ***

5. Empirical tests

In this section, we test whether the data are consistent with the reputation hypothesis or the disciplining hypothesis. Section 5.1 examines whether credit ratings are lower during the post-Dodd-Frank period than during the pre-Dodd-Frank period. Section 5.2 examines the incidence of false warnings before and after Dodd-Frank. Section 5.3 examines the information content of credit rating changes using bond returns data and stock returns data. Section 5.4 presents the results of several robustness tests. We report results for the full sample and for subsamples based on Fitch's market share in each industry.

Before turning to our main results, we confirm that Fitch's market share is a meaningful proxy for reputation concerns during our sample period. First, we find that Fitch's market share varies significantly across industries and time within our sample. The average Fitch market share across the 11 Fama-French industries in 2006 is 37%, and that number increases to 53% by 2012.[12] In 2006, Fitch's market share varies from a low of 28% for consumer durables to a high of 50% for

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[12] We exclude Financials from the original list of 12 Fama-French industries. The results are similar when we group firms into industries based on two-digit North American Industry Classification System (NAICS) codes.

utilities. In 2012, Fitch's market share varies from 28% for business equipment to 75% for telecoms. Second, we confirm that Moody's and S&P continue to issue higher credit ratings in industries with higher Fitch market share after 2006. This result is consistent with Becker and Milbourn (2011)'s findings for the period from 1995 to 2006. It indicates that Moody's and S&P are less concerned with their reputation and hence more likely to inflate ratings in industries with high Fitch market share.[13]

5.1. Credit rating levels before and after Dodd-Frank

In this section we examine how credit rating levels change after the passage of Dodd-Frank using the credit ratings model of Blume et al. (1998). We estimate an ordered logit model of credit rating levels, ranging from 1 to 22 (AAA to D), as a function of operating margin, interest coverage, long-term debt-to-assets, total debt-to-assets, market value of equity, stock beta, and idiosyncratic stock return volatility as explanatory variables.[14] We also differentiate between ratings issued by Moody's, S&P, and Fitch, and include a dummy variable for the post-Dodd-Frank period (After Dodd-Frank). Because a single firm can have multiple rating announcements in the sample, we cluster standard errors by firm.

The results of the estimation are reported in Model 1 of Table 3. We find that credit ratings are significantly lower in the post-Dodd-Frank period. The coefficient on the After Dodd-Frank dummy is 0.171, with a z-statistic of 2.14. The economic magnitude is large. After the passage of Dodd-Frank, the odds that a corporate bond is rated as non-investment grade are 1.19 times greater

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[13] These results are available from the authors upon request.

[14] This has become the standard model in the literature. Our results are similar when we augment Blume et al. (1998)'s model with industry fixed effects.

than before the passage of Dodd-Frank, holding all else constant.[15] This result is consistent with the reputation hypothesis, whereas CRAs issue lower credit ratings to protect their reputation following the increase in legal and regulatory costs in the post-Dodd-Frank period. The result is also consistent with the disciplining hypothesis, whereas the increase in legal and regulatory penalties motivates CRAs to issue less optimistically biased ratings following Dodd-Frank.

We next examine how the results vary with ex-ante reputational costs. Becker and Milbourn's (2011) show that Moody's and S&P are more protective of their reputation in industries where Fitch's market share is lower. We measure Fitch's market share in each industry for the calendar year prior to the ratings announcement, and divide the sample into two subsamples – rating announcements in industries within the lowest 25th percentile of Fitch market share, and rating announcements in industries within the highest 75th percentile of Fitch market share. Model 2 includes a dummy variable for rating announcements in industries with the lowest Fitch market share (Fitch market share), and an interaction of After Dodd-Frank with Fitch market share. If reputation concerns drive CRAs to lower their ratings, we expect to find that the coefficient on the interaction variable is positive and significant (i.e., ratings are lower in the post-Dodd-Frank period within industries with low Fitch market share). The disciplining hypothesis makes the opposite prediction: any reduction in the optimistic bias of credit ratings as a result of Dodd-Frank should be greater within industries with high Fitch market share because the optimistic bias in these industries is greater prior to Dodd-Frank (Becker and Milbourn (2011)).

The results are reported in Model 2 of Table 3. As in Becker and Milbourn (2011), the sample is restricted to rating announcements made only by Moody's or S&P. Consistent with the

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[15] The proportional odds ratio in ordered logit models is given by $e^{coefficient}$ (in this case, $e^{0.171} = 1.19$). It captures the proportional change in the odds that a bond is rated below a certain credit rating level, such as BBB, for a unit change in a predictor variable, given the other variables are held constant in the model.

reputation hypothesis, we find that credit ratings are lower in the post-Dodd-Frank period within industries with low Fitch market share. The coefficient on the interaction of After Dodd-Frank with Fitch market share is 0.908 with a z-statistic of 3.39. Within industries in the bottom quartile of Fitch market share, the passage of Dodd-Frank increases the odds of a non-investment grade rating 2.27 times (calculated as $e^{0.908-0.090}$). In contrast, within industries in the top three quartiles of Fitch market share, the passage of Dodd-Frank does not significantly affect credit ratings. These results indicate that CRAs lower their ratings after Dodd-Frank when their reputation is more valuable.

*** Table 3 ***

5.2. Incidence of false warnings before and after Dodd-Frank

In this section, we analyze whether the lower credit ratings following Dodd-Frank are warranted by subsequent outcomes. In our sample there are no defaults of corporate bonds within a year of an investment-grade rating (type I error). Hence, we focus on the incidence of false warnings (type II errors). If the lower ratings following Dodd-Frank are warranted, we should observe that the incidence of false warnings following Dodd-Frank either decreases or remains the same. In contrast, if CRAs lower credit ratings to protect their reputation (and not necessarily because credit quality has deteriorated), we should observe that the incidence of false warnings is higher following the passage of Dodd-Frank. Furthermore, the effect should be stronger within industries with higher expected reputation concerns.

We estimate a logit model of false warnings as a function of firm characteristics (ROA, interest coverage, long-term debt-to-assets, book-to-market, log of market value, years to maturity, total stock return volatility) and recent bond market conditions as proxied by the return on the 30-year Treasury bond index over the calendar year prior to the rating announcement date. The model differentiates between ratings issued by Moody's, S&P, and Fitch, and includes a dummy variable

for the post-Dodd-Frank period (After Dodd-Frank). The dependent variable is a dummy variable with a value of one for a BB+ or lower rated issue that does not default with one year, and zero otherwise.

*** Table 4 ***

The results are reported in Model 1 of Table 4. We find a significant increase in the incidence of false warnings in the post-Dodd-Frank period. The coefficient on the After Dodd-Frank dummy is 0.607, with a z-statistic of 4.77. After the passage of Dodd-Frank, the odds of a false warning are 1.84 times greater than before the passage of Dodd-Frank, holding all else constant. This corresponds to a marginal increase in the probability of a false warning after Dodd-Frank of 14.3% (evaluated at the mean). Hence, the lower ratings following the passage of Dodd-Frank are not warranted ex-post. The results are consistent with the reputation hypothesis, wherein CRAs lower ratings to protect their reputation. As a result, the usefulness of ratings for predicting actual defaults is reduced.

The results for Model 2 in Table 4 provide further support for the reputation hypothesis. We find that the effect of Dodd-Frank on false warnings is significantly stronger within industries where Moody's and S&P have stronger reputation concerns. The interaction between After Dodd-Frank and Fitch market share is 1.80~~10~~05 with a z-statistic of 4.~~21~~22. Within industries in the bottom quartile of Fitch market share, the passage of Dodd-Frank increases the odds of a false warning 8.~~24~~ 21 times (calculated as $e^{1.8\underline{10805}\cancel{10}+0.3\underline{00299}\cancel{00}}$). This corresponds to a marginal increase in the probability of a false warning after Dodd-Frank of 42.3%. In contrast, within industries in the top three quartiles of Fitch market share, the passage of Dodd-Frank increases the odds of a false warning only 1.35 times. The larger the economic rents at stake, the more protective the CRAs are of their reputation as evidenced by the lower assigned ratings.

The definition of false warnings in the above tests is admittedly stringent given that actual defaults are rare in the data. We examine the robustness of the results with respect to the definition of false warnings in Table IA1 of the Internet Appendix of the paper. In Panel A of Table IA1, we define false warnings as speculative grade rated issues (BB+ or lower) that do not default within two years. In Panel B of Table IA1, we define false warnings as B+ or lower rated issues that do not default within two years. In both cases, we find no change in our results.[16]

5.3. Information content of credit rating changes

In this section, we examine the effect of Dodd-Frank on the informativeness of credit ratings by comparing the reaction of investors to rating changes before and after the passage of Dodd-Frank. We examine the reaction of both the bond market and the stock market. The advantage of using bond data is that bond prices are more directly affected by changes in default probabilities, which credit ratings ostensibly measure. However, bonds are relatively illiquid and many bonds do not trade around rating changes. Using stock price data allows us to capture investors' reaction to nearly all credit rating changes, albeit with the caveat that stock prices are less sensitive to changes in default probabilities.

The disciplining and reputation hypotheses make different predictions about the effect of Dodd-Frank on the informativeness of credit rating changes. According to the disciplining hypothesis, Dodd-Frank improves the quality of credit ratings, making both upgrades and downgrades more informative. According to the reputation hypothesis, rating downgrades are less

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[16] We also considered using ex-ante default probabilities such as distance-to-default to test whether the lower credit ratings following Dodd-Frank are warranted. The problem with this approach is that the correct ex-ante default probability associated with a given credit rating is not known. Without a correct mapping between credit ratings and ex-ante default probabilities, it is difficult to interpret the change in the default probability of a credit rating from the pre- and post-Dodd-Frank period. If there is a decline in the default probability of speculative grade bonds after Dodd-Frank, it is not clear if this change indicates a greater likelihood of false warnings or a better mapping between credit ratings and default probabilities.

informative following Dodd-Frank because CRAs issue downgrades partly to protect their reputation. In contrast to downgrades, rating upgrades following Dodd-Frank are more costly because they expose CRAs to legal and regulatory penalties. To avoid the perception of biased ratings, CRAs may expand greater effort when issuing an upgrade, making upgrades potentially more informative. Nevertheless, the effect of Dodd-Frank on upgrades may be less apparent in the data because rating upgrades are significantly less timely than rating downgrades (see Holthausen and Leftwich (1986), Hand, Holthausen, and Leftwich (1992), and Dichev and Piotroski (2001)).

The distribution of rating changes over the sample period is shown in Panel A of Table 5. The frequency of upgrades is noticeably higher after Dodd-Frank, which corresponds to the improvement in economic conditions following the financial crisis. We also find that CRAs are more cautious after Dodd-Frank in the sense that ratings change by fewer notches.

Panel B.1 of Table 5 reports rating announcement bond returns for the full sample of credit rating downgrades and credit rating upgrades. Consistent with the reputation hypothesis, we find that the informativeness of credit rating downgrades is significantly lower after Dodd-Frank. Specifically, mean bond returns around rating downgrades are -1.023% before Dodd-Frank but only -0.654% after Dodd-Frank.[17] The difference of 0.369% is significant at the five percent level. In contrast, there is no change in the informativeness of credit rating upgrades; mean bond returns around rating upgrades are very similar before and after Dodd-Frank.

*** Table 5 ***

Panel B.2 & B.3 of Table 5 report rating announcement bond returns for two subsamples based on Fitch market share. The subsamples are limited to ratings of Moody's and S&P. The

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[17] Both our hypotheses make predictions in terms of mean returns. Medians are reported along with means for completeness.

effect of Dodd-Frank on the informativeness of rating downgrades is significantly stronger within industries with the lowest Fitch market share. In Panel B.2, mean bond returns around rating downgrades are -1.485% before Dodd-Frank but only -0.402% after Dodd-Frank. The difference of 1.083 is significant at the five percent level. In contrast, Dodd-Frank has no effect on the informativeness of ratings downgrades within industries with high Fitch market share (Panel B.3 of Table 5). Overall, the evidence indicates that the loss of information in rating downgrades following Dodd-Frank is due to the heightened reputation concerns of CRAs.

Table 6 reports the results for the stock market's reaction to credit rating changes before and after Dodd-Frank. When there are rating changes for multiple bonds by the same company on the same date, we keep the observation with the greatest rating change. As a result, there are significantly fewer observations in Panel A of Table 6 than in Panel A of Table 5. Still, the results in Panel B of Table 6 parallel those in Panel B of Table 5. In Panel B.1 of Table 6, we find that mean stock returns around rating downgrades are -2.461% before Dodd-Frank but only -1.248% after Dodd-Frank. The difference of 1.212% is significant at the ten percent level. In Panel B.2 of Table 6, we find that the negative effect of Dodd-Frank on the informativeness of credit rating downgrades is significantly stronger within industries with lower Fitch market share. In this case, Dodd-Frank leads to a reduction in the reaction to credit rating downgrades of 2.976% (significant at the five percent level). These results are even more notable considering the small number of observations involved.

There is preliminary evidence in Table 6 that rating upgrades might be more informative following Dodd-Frank. In Panel B.1 of Table 6, we find that mean stock returns around rating upgrades are 0.062% before Dodd-Frank and 0.369% after Dodd-Frank. However, the difference of 0.308% is statistically insignificant. Furthermore, this effect is absent in industries with lower

Fitch market share (Panel B.2 of Table 6), and is absent for bond returns (Table 5). Based on these results we conclude that Dodd-Frank has not had a significant effect on credit rating upgrades.

*** Table 6 ***

One potential concern with the stock market tests is that equity values at the time of Dodd-Frank's passage were abnormally low relative to historical values. If equities were priced for a worst-case scenario, then any bad news may be less value relevant during the post-Dodd-Frank period.[18] We address this potential concern in two ways. First, we note that equity prices and valuations are not different between the pre- and post-Dodd-Frank periods. Equity prices reached their lowest levels following the recession on March 6, 2009, with the S&P closing at 683. By the time Dodd-Frank became law in July 2010, S&P had recovered drastically, closing the month at 1,100. The levels of the S&P are similar before and after Dodd-Frank: 1,225 during the pre-period and 1,297 during the post-period. S&P's earnings-to-price ratios are also similar during the two periods. The comparable valuations of the S&P before and after Dodd-Frank, and the fast ascend of the market following March 2009, suggest there was ample room for equities to fall during the post-Dodd-Frank period.

Second, we include S&P 500's level and earnings-to-price ratio as control variables in a regression of stock returns around rating downgrades on a dummy variable for the post-Dodd-Frank period. Consistent with our results in Table 6, we find that the stock market responds significantly less to downgrades following the passage of Dodd-Frank within industries where Fitch has the lowest market share. These results are not tabulated but are available from the authors.

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[18] We thank the referee for pointing this out.

In summary, the results are consistent with the prediction of Morris (2001) and Goel and Thakor (2011) that imposing large asymmetric penalties on CRAs may lead to a loss of information in equilibrium.

5.4. Robustness tests

5.4.1. Business cycle effects

Dodd-Frank's passage takes place during the early stages of U.S.' recovery from the financial crisis. In this section, we examine whether our results can be explained by business cycle dynamics rather than the passage of Dodd-Frank. First, we augment the regression models in Table 3 and Table 4 with variables that vary with the business cycle. These include log of GDP, past one year market returns (using the S&P 500 Index), S&P 500 Index level, perceived firm profitability (calculated as analysts' forecasted earnings per share for the next fiscal year divided by price per share), and the firm's lagged quarterly stock returns. We find that the results in Table 3 and Table 4 are not sensitive to the inclusion of these additional controls. The results are shown as Table IA2 in the Internet Appendix to this article.

Second, we perform a placebo test around the recession of 2001. We focus on the relatively mild 2001 recession because Fitch was not a significant competitor in the corporate bond ratings market during the more severe but earlier recessions of 1991-1992 and 1981-1982. Consistent with Alp (2013), we find that rating levels are significantly lower and more conservative (i.e., there are more false warnings) in the post-recession period. However, there is no evidence that the increased conservatism in the post-recession period is related to reputation concerns. Furthermore, there is no significant difference in the stock market reaction to credit rating downgrades (or upgrades) during the pre- and post-recession period. The results are shown as Table IA3 in the Internet

Appendix. Overall, the results indicate that our findings in support of the reputation hypothesis are unlikely to be driven by the business cycle alone.

5.4.2. Evolution of Dodd-Frank

Dodd-Frank underwent several major changes prior to becoming law. In July 2009, the first version of the legislation was introduced in the House of Representatives. It contained limited CRA provisions, primarily related to regulatory reliance on ratings. In December 2009, revised versions were introduced in the House of Representatives by Financial Services Committee Chairman Barney Frank, and in the Senate Banking Committee by Chairman Chris Dodd. These versions contained the outlines of the CRA provisions that were eventually included in the final bill. Further negotiations from December 2009 until the law's final passage in July 2010 altered many of the original provisions. We expect that the uncertainty regarding the passage of the bill is reduced as the legislative process moves closer to the final signing of the bill by President Obama. The initial introduction of the bill may have a muted effect on credit ratings, but the effect should strengthen as the uncertainty is reduced.

*** Table 7 ***

In Table 7, we redefine the post-Dodd-Frank period to start in July 2009, December 2009, or May 2011, respectively. We then reestimate the regression specifications for rating levels and false warnings for each of the alternative starting dates. Panel A of Table 7 reports the results for regression specifications corresponding to the results in Table 3 for rating levels; Panel B of Table 7 reports the results for regression specifications corresponding to the results in Table 4 for false warnings. For brevity, we only show the coefficients on the two relevant variables – the After Dodd-Frank dummy from Model 1, and the interaction of the After Dodd-Frank dummy with Fitch market share dummy from Model 2. We also report the original results for comparison. We find

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that our results for credit rating levels and false warnings get stronger as the uncertainty regarding the passage of Dodd-Frank is reduced. For example, in Panel A, the coefficient on the interaction of the Dodd-Frank dummy with the Fitch market share dummy increases from 0.342 for the July 2009 date, to 0.754 for the December 2009 date, and to 0.908 for the July 2010 date. The pattern is similar in Panel B.[19] We also find that results do not change notably following May 2011, when the SEC issued proposed rules on CRAs' internal controls and corporate governance. This finding reinforces our conclusion that the CRAs' response to Dodd-Frank is mostly driven by the legal and regulatory penalties stipulated under Dodd-Frank.

5.4.3. Sample composition

In this section, we examine whether the riskiness of firms accessing the public bond market increases following the passage of Dodd-Frank. In addition to the variables reported in Table 2 (debt-to-equity ratios, long-term debt-to-assets, interest coverage, systematic risk, and operating margin), we also examine cash-to-assets and sales-to-assets of bond issuers before and after Dodd-Frank. Consistent with the findings in Table 2, we find that issuers' balance sheets improve significantly during the post-Dodd-Frank period despite the low yields during this period (results not tabulated). Hence, our results in the paper are unlikely to reflect deteriorating issuer quality in the post-Dodd-Frank period.

We also examine whether changes in the sample composition from the pre- to the post-Dodd-Frank period affect our results. We restrict our sample to firms with ratings both before and after the passage of Dodd-Frank. We find that the results for this subsample are similar to the results for the full sample of firms, indicating that changes in issuer characteristics do not account

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[19] Given the small samples in Tables 5 and 6, we do not find any significant variation in the effect of Dodd-Frank on the informativeness of rating downgrades as we alter the starting date of the post-Dodd-Frank period.

for the results reported in the paper. For brevity, these tests are not reported in the paper and are available from the authors.

6. Conclusions

In response to the recent financial crisis, Congress passed the Dodd-Frank Wall Street Reform and Consumer Protection Act in July 2010 to temper the incentives of CRAs to issue upwardly biased ratings. We find no evidence that Dodd-Frank encourages CRAs to provide corporate bond ratings that are more accurate and informative. Instead, we find that following Dodd-Frank CRAs issue lower ratings, give more false warnings, and issue downgrades that are less informative (i.e., the stock market and the bond market react less to corporate bond rating downgrades). These results are consistent with the reputation model of Morris (2001), and suggest that CRAs in the post-Dodd-Frank period are more protective of their reputation. We use Becker and Milbourn's (2011) argument that industries with low Fitch market share are those where incumbent CRAs have high reputation concerns to examine how our results vary with exogenous variation in reputation. Consistent with Morris (2001), we find that our results are stronger within industries where CRAs' reputation is more likely to be important. Our results caution against attempts to increase the legal and regulatory costs to CRAs for providing biased ratings. Such actions may lead to a loss of information in the market if CRAs take steps to protect their reputation.

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Appendix A: Summary of Subtitle C of Dodd-Frank

Section	Title	Main Provisions	Implementation
931	Findings	(1) The activities of CRAs are matters of national public interest; (2) CRAs' role is similar to that of analysts and auditors and justifies a similar level of public oversight and accountability; (3) CRAs' activities are fundamentally commercial in character and should be subject to the same standards of liability and oversight as those that apply to auditors, securities analysts, and investment bankers; (4) CRAs face conflicts of interest that should be regulated under the authority of the SEC; (5) Inaccuracies in the ratings of structured finance products contributed to the recent financial crisis and necessitate increased accountability by CRAs.	Immediate.
932	Enhanced regulation, accountability, and transparency of NRSROs	(1) NRSROs shall "file" rather than "furnish" statements with the SEC; (2) NRSROs shall establish internal controls over the ratings process; (3) The SEC shall prescribe appropriate internal control factors to NRSROs; (4) The SEC shall have the power to suspend or revoke NRSRO's registration with respect to a particular class of securities if ratings are inaccurate; (5) The SEC shall perform annual reviews of NRSROs; (6) Mandates rules for the separation of ratings from sales and marketing activities; (7) NRSROs shall perform look-back reviews when rating analysts join the issuer within a year of issuing a rating; (8) The SEC shall establish the Office of Credit Ratings; (9) Mandates additional disclosure of NRSROs' ratings and rating methodologies; (10) The SEC shall prescribe rules with respect to the procedures and methodologies used by NRSRO to determine credit ratings; (11) Prescribes requirements for NRSROs' board of directors.	Immediate for (1), (2), (4), (5), & (11). SEC proposed rules in May 2011 regarding (3), (6), (7), (9), & (10). No final rules issued as of April 2014. Office of Credit Ratings (8) formed in June 2012.
933	State of mind in private actions	(1) Statements made by CRAs are subject to the same provisions under the securities law as those made by a registered public accounting firm or a securities analyst; (2) CRAs' statements are no longer deemed "forward-looking" for the purposes of securities law; (3) When pleading any required state of mind, plaintiff must show that CRAs "knowingly or recklessly failed to conduct a reasonable investigation of the rated security" or "to obtain reasonable verification" of factual elements from third parties.	Immediate.

934	Referring tips to law enforcement or regulatory authorities	NRSROs have duty to report information alleging a violation of law that has not been adjudicated by a Federal or State court.	Immediate.
935	Consideration of information from sources other than the issuer in rating decisions	NRSROs shall consider credible information about an issuer from third parties.	Immediate.
936	Qualification standards for credit rating analysts	The SEC shall issue rules for the minimum qualification of credit rating analysts including standards of training, experience, competence, and testing.	SEC proposed rules in May 2011.
937	Timing of regulation	Unless otherwise specified, the SEC shall issue final regulation no later than one year after the date of enactment of the Act.	Immediate.
938	Universal rating symbols	The SEC shall require each NRSROs to establish, maintain, and enforce written policies and procedures with regards to determining default probabilities, the meaning and definition of rating symbols, and the consistent application of these rating symbols.	SEC proposed rules in May 2011.
939	Removal of statutory references to credit ratings	Requires the removal of statutory references to credit ratings from the Federal Deposit Insurance Act, the Federal Housing Enterprises Financial Safety and Soundness Act of 1992, the Investment Company Act of 1940, the Revised Statues of the United States, the Securities and Exchange Act of 1934, and the World Bank Discussion.	Effective dates vary across acts and statutes; most changes completed as of 7/21/2012.
939A	Review of reliance on ratings	Each federal agency shall remove reference to or requirement of reliance on credit ratings and make appropriate substitutions using alternative measures of credit-worthiness.	Effective dates vary by federal agency; SEC rules effective as of 9/2/2011; OCC rules effective as of 1/1/2013.

939B	Elimination of exemption from Fair Disclosure rule	The SEC shall revise Regulation FD to remove the exemption of CRAs.	Effective as of 10/4/2010.
939C 939D 939E	Mandated studies by the SEC and the GAO	(1) The SEC shall conduct a study of the independence of NRSROs and the effect of such independence on credit ratings; (2) GAO shall study alternative means of compensating NRSROs for credit ratings; (3) GAO shall study "the feasibility and merits of creating an independent professional organization for rating analysts".	(1) completed in November 2013; (2) completed in January 2012; (3) not completed as of April 2014.
939F	Study and rulemaking on assigned credit ratings	"The SEC shall carry out a study of the credit rating process for structured finance products and the conflict of interest associated with the issuer-pay and the subscriber-pay models" and "the feasibility of establishing a system in which a public or private utility or a self-regulatory organization assigns NRSROs to determine the credit rating of structured finance products". After issuing the report, the SEC shall "establish a system for the assignment of NRSROs to determine the initial credit ratings of structure finance produces" that prevents the issuers from selecting the NRSROs.	Study completed in December 2012; as of April 2014, no alternative system has been established.
939G	Effect of rule 436(g)	Rule 436(g) under the Securities Act of 1933 shall have no force or effect; Rule 436 (g) originally states that in the case of new securities issues, credit ratings are not considered part of a registration statement or certified by an "expert".	Immediate.
939H	Sense of Congress	The SEC shall exercise its authority under the Securities Exchange Act of 1934 to prevent conflict of interests arising from NRSROs providing consulting, advisory, or other services to issuers.	Immediate.

Appendix B: Numerical transformation of alphanumerical rating codes

Credit Rating	Moody's	Standard & Poor's	Fitch	Numerical Code
Highest grade	Aaa	AAA	AAA	1
	Aa1	AA+	AA+	2
High grade	Aa2	AA	AA	3
	Aa3	AA-	AA-	4
	A1	A+	A+	5
Upper medium grade	A2	A	A	6
	A3	A-	A-	7
	Baa1	BBB+	BBB+	8
	Baa2	BBB	BBB	9
	Baa3	BBB-	BBB-	10
Non-investment grade	Ba1	BB+	BB+	11
	Ba2	BB	BB	12
	Ba3	BB-	BB-	13
	B1	B+	B+	14
Low grade	B2	B	B	15
	B3	B-	B-	16
	Caa1	CCC+	CCC+	17
	Caa2	CCC	CCC	18
	Caa3	CCC-	CCC-	19
	Ca	CC	CC	20
	C	C	C	21
Default	N/A	D	DDD/DD/D	22

This table presents the numerical codes associated with the alphanumerical ratings assigned by Moody's, S&P, and Fitch. Ratings coded 1 through 21 are assigned ex-ante and represent predictions of default probability while ratings coded as 22 are assigned ex-post indicating an actual default. Moody's does not issue a rating for an actual default.

Table 1: Variable measurement

Variable name	Variable measurement
Rating announcement bond returns	Bond returns are calculated based on the volume-weighted trade price for the closest trade date within a five-day period prior to a rating announcement date, and the volume-weighted trade price for the closest trade date within a five-day period following the rating announcement date.
Rating announcement stock returns	Stock returns are calculated as the buy-and-hold returns over the three-day period centered at the rating announcement date minus the corresponding return on the CRSP value-weighted index.
Rating level	Numerical credit rating. See Appendix B for numerical rating conversion.
Rating type II error	Dichotomous variable which equals one for a bond issue rated as speculative grade that does not default within one year, and zero otherwise.
Years to maturity	The number of years to maturity of a bond issue relative to the rating announcement date.
ROA	Return on assets, calculated as net income divided by total assets, for the fiscal quarter ending prior to the rating announcement date.
Market value	Share price times number of common shares outstanding for the fiscal quarter ending prior to the rating announcement date.
Interest coverage	Income before extraordinary items divided by interest expense for the fiscal quarter ending prior to the rating announcement date.
Book-to-market	Book value of equity divided by market value of equity for the fiscal quarter ending prior to the rating announcement date.
LT debt-to-equity	Total long-term debt divided by book value of equity for the fiscal quarter ending prior to the rating announcement date.
Operating margin	Operating income before depreciation divided by total sales for the fiscal quarter ending prior to the rating announcement date.

Table 1 Continues: Variable measurement

Variable name	Variable measurement
LT debt leverage	Total long-term debt divided by total assets for the fiscal quarter ending prior to the rating announcement date.
Total debt leverage	Total debt divided by total assets for the fiscal quarter ending prior to the rating announcement date.
Bond index return	CRSP 30-year treasury bond index return over the year ending the month prior to the rating announcement date.
Stock beta	CAPM beta estimated using the CRSP value-weighted index as the market index and daily stock returns over the fiscal quarter ending prior to the rating announcement date.
Total stock return volatility	Standard deviation of daily stock returns measured over the fiscal quarter ending prior to the rating announcement date.
Idiosyncratic stock return volatility	Standard deviation of residual stock returns relative to the CAPM model, estimated using the CRSP value-weighted index as the market index and daily stock returns over the fiscal quarter ending prior to the rating announcement date.

Table 2: Summary statistics

Variable	Before Dodd-Frank					After Dodd-Frank			
	#Obs	Mean	Min	Max		#Obs	Mean	Min	Max
Rating announcement bond returns	7,120	-0.002	-0.159	0.094		3,715	-0.001	-0.159	0.094
Rating announcement stock returns	17,687	-0.005	-0.355	0.262		7,648	0.000	-0.355	0.262
Rating level	18,606	10.850	1.000	21.000		8,019	10.125	1.000	21.000
Rating type II error	18,606	0.448	0.000	1.000		8,019	0.392	0.000	1.000
Years to maturity	18,600	10.439	0.000	98.564		8,019	9.824	0.000	100.080
ROA	18,601	0.004	-0.126	0.050		8,019	0.010	-0.126	0.050
Log Market value	18,606	8.693	0.033	12.944		8,019	9.052	1.858	12.391
Interest coverage	18,238	2.499	-15.309	26.599		7,933	4.304	-15.309	26.599
Book-to-market	17,218	0.641	0.010	4.275		7,486	0.561	0.011	4.275
LT debt-to-equity	17,266	1.657	0.000	19.449		7,502	1.508	0.000	19.449
Operating margin	18,189	0.171	-0.539	0.880		7,962	0.217	-0.539	0.827
LT debt leverage	18,599	0.316	0.014	0.968		8,009	0.304	0.014	0.968
Total debt leverage	17,711	0.352	0.027	1.031		7,834	0.337	0.027	1.031
Bond index return	18,606	0.053	-0.260	0.417		8,019	0.135	-0.044	0.392
Stock beta	17,903	1.159	-1.768	5.294		7,701	1.112	-0.772	3.147
Total stock return volatility (%)	17,658	2.895	0.731	12.098		7,642	2.126	0.731	12.098
Idiosyncratic stock return volatility (%)	17,903	2.346	0.142	37.392		7,701	1.516	0.079	17.946

This table reports descriptive statistics for key variables. The sample consists of all rating announcements for U.S. corporate bonds between January 2006 and May 2012, excluding the financial industry as defined according the Fama-French 12 industry classification. The Before Dodd-Frank period incorporates rating actions between January 2006 and July 21, 2010 while the After Dodd-Frank period incorporates rating actions after July 21, 2010. Variable definitions are provided in Table 1.

Table 3: Rating levels before and after Dodd-Frank

Variable	Pred. Sign	Model 1 Main Model Coefficient	z-stat.	Pred. Sign	Model 2 Fitch Market Share Interaction Coefficient	z-stat.
After Dodd-Frank	+	0.171**	2.14	+/-	-0.090	-0.91
Fitch market share	/			+/-	-0.426**	-2.39
After Dodd-Frank x Fitch market share	/			+	0.908***	3.39
Moody	+/-	0.096*	1.77	+/-	0.103*	1.94
Fitch	+/-	-0.325***	-3.68	+/-		
Operating margin	+/-	1.009**	2.15	+/-	0.635	1.47
LT debt leverage	+	2.383	0.86	+	1.682	0.78
Total debt leverage	+	1.195	0.36	+	1.467	0.55
Log of market value	-	-1.004***	-6.73	-	-1.004***	-7.67
Stock beta	+	0.652***	5.10	+	0.540***	4.89
Idiosyncratic stock return volatility	+	0.179***	3.44	+	0.161***	3.81
Interest coverage	-	-0.061***	-5.50	-	-0.047***	-4.78
# Observations		23,687			12,895	
Pseudo R^2		20.26%			19.58%	

This table shows ordered logistic regression results for numerical rating codes for all credit rating announcements between January 2006 and May 2012. The sample excludes financial industry firms. The dependent variable is the numerical rating for a bond, ranging from 1-21 (AAA-C). After Dodd-Frank is a dummy variable with a value of one for ratings assigned after July 21, 2010, and zero for ratings assigned between January 2006 and July 21, 2010. Fitch market share is a dummy variable with a value of one for ratings in industries with Fitch market share below the 25th percentile, and zero otherwise. Industries are defined according to the Fama-French 12 industry classification and Fitch market share percentiles are calculated by year and industry. Moody and Fitch are dummy variables indicating which agency rated the bond. The remaining variables are defined in Table 1. Standard errors are clustered by firm. ***,**,* represent significance beyond the 1st, 5th, and 10th percentile levels, respectively.

Table 4: False warnings before and after Dodd-Frank

Variable	Pred. Sign	Model 1 Main Model Coefficient	z-stat.	Pred. Sign	Model 2 Fitch Market Share Interaction Coefficient	z-stat.
After Dodd-Frank	+	0.607***	4.77	+/-	0.300*	1.86
Fitch market share	/			+/-	-0.215	-0.88
After Dodd-Frank x Fitch market share	/			+	1.805***	4.22
Bond index return	-	-3.379***	-6.52	-	-4.944***	-7.82
Moody	+/-	-0.096	-1.02	+/-	-0.064	-0.70
Fitch	+/-	-0.704***	-5.15	+/-		
Years to maturity	+/-	-0.009*	-1.71	+/-	-0.009	-1.53
ROA	+	2.582	0.50	+	-1.225	-0.25
Log of market value	-	-1.126***	-8.66	-	-1.197***	-11.74
Interest coverage	-	-0.074***	-3.33	-	-0.050**	-2.52
Total stock return volatility	+	0.310***	3.93	+	0.239***	3.13
Book-to-market	-	-0.491**	-2.06	-	-0.482*	-1.92
LT debt-to-equity	+	0.416***	3.76	+	0.327***	3.09
Intercept	/	9.104***	7.45	/	10.043***	10.62
# Observations		23,105			12,462	
Pseudo R^2		44.17%			43.13%	

This table shows logistic regression results for type II errors (false warnings) for all credit rating announcements between January 2006 and May 2012. The sample excludes financial industry firms. The dependent variable is a dummy variable with a value of one for a BB+ or lower rated issue that does not default within one year, and zero otherwise. After Dodd-Frank is a dummy variable with a value of one for ratings assigned after July 21, 2010, and zero for ratings assigned between January 2006 and July 21, 2010. Fitch market share is a dummy variable with a value of one for ratings in industries with Fitch market share below the 25th percentile, and zero otherwise. Industries are defined according to the Fama-French 12 industry classification and Fitch market share percentiles are calculated by year and industry. Moody and Fitch are dummy variables indicating which agency rated the bond. The remaining variables are defined in Table 1. Standard errors are clustered by firm. ***,**,* represent significance beyond the 1st, 5th, and 10th percentile levels, respectively.

Table 5: Bond price response to rating downgrades and upgrades before and after Dodd-Frank

Panel A: Sample of rating changes

	Credit Rating Downgrades			Credit Rating Upgrades	
Year	# Observations	Magnitude of Rating Change		# Observations	Magnitude of Rating Change
2006	510	1.46		394	1.15
2007	468	1.42		261	1.18
2008	542	1.36		176	1.29
2009	510	1.46		161	1.73
2010	252	1.15		433	1.53
2011	398	1.21		464	1.20
2012	161	1.11		162	1.04
Before Dodd-Frank	2,170	1.41		1,216	1.33
After Dodd-Frank	671	1.17		835	1.24
Total	2,841	1.35		2,051	1.30

Panel B: Rating announcement bond returns

Panel B.1.: Full sample

	Credit Rating Downgrades				Credit Rating Upgrades		
	# Obs.	Mean Return %	Median Return %		# Obs.	Mean Return %	Median Return %
Before Dodd-Frank	2,170	-1.023***	-0.251***		1,216	0.300***	0.197***
After Dodd-Frank	671	-0.654***	-0.246***		835	0.344***	0.165***
Difference (After-Before)		0.369**	-0.005			0.044	-0.032
T-statistic		2.11	0.36			0.52	0.12

Panel B.2.: Bottom quartile of Fitch market share

		Credit Rating Downgrades			Credit Rating Upgrades	
	# Obs.	Mean Return %	Median Return %	# Obs.	Mean Return %	Median Return %
Before Dodd-Frank	411	-1.485***	-0.563***	151	0.425*	0.077
After Dodd-Frank	148	-0.402***	-0.234**	225	0.201	0.050
Difference (After-Before)		1.083**	0.329		-0.224	-0.027
T-statistic		2.47	1.39		1.25	1.17

Panel B.3.: Top three quartiles of Fitch market share

		Credit Rating Downgrades			Credit Rating Upgrades	
	# Obs.	Mean Return %	Median Return %	# Obs.	Mean Return %	Median Return %
Before Dodd-Frank	1,237	-0.869***	-0.233***	858	0.341***	0.254***
After Dodd-Frank	330	-0.904***	-0.404***	414	0.391***	0.145***
Difference (After-Before)		0.035	-0.171**		0.050	-0.109
T-statistic		0.15	2.14		0.45	1.20

This table shows bond returns surrounding credit rating downgrade and upgrade announcements before and after the Dodd–Frank Wall Street Reform and Consumer Protection Act. The sample excludes financial industry firms. Before (After) Dodd-Frank is the period between January 2006 and July 21, 2010 (July 21, 2010 and May 2012). Industries are defined according to the Fama-French 12 industry classification and Fitch market share percentiles are calculated by year and industry. Panel A shows the sample of credit rating downgrades and upgrades by year. Panel B shows bond returns surrounding the rating announcement date. Panel B.1 shows bond returns for the entire sample. Panel B.2 is restricted to downgrades/upgrades in industries with Fitch market share below the 25th percentile. Panel B.3 is restricted to downgrades/upgrades in industries with Fitch market share above the 25th percentile. Mean and median returns are shown as percentages. Mean and median differences are tested using the T and Wilcoxon two-sample tests, respectively. Variables are defined in Table 1. ***,**,* represent significance beyond the 1st, 5th, and 10th percentile levels, respectively.

Table 6: Stock price response to rating downgrades and upgrades before and after Dodd-Frank

Panel A: Sample of rating changes

	Credit Rating Downgrades			Credit Rating Upgrades	
Year	# Observations	Magnitude of Rating Change		# Observations	Magnitude of Rating Change
2006	300	1.36		286	1.12
2007	269	1.35		216	1.25
2008	307	1.35		221	1.27
2009	319	1.47		113	1.58
2010	124	1.21		269	1.24
2011	181	1.20		237	1.16
2012	65	1.19		112	1.06
Before Dodd-Frank	1,273	1.38		983	1.26
After Dodd-Frank	292	1.20		471	1.15
Total	1,565			1,454	

Panel B: Rating announcement stock returns

Panel B.1.: Full sample

	Credit Rating Downgrades				Credit Rating Upgrades		
	# Obs.	Mean Return %	Median Return %		# Obs.	Mean Return %	Median Return %
Before Dodd-Frank	1,273	-2.461***	-0.982***		983	0.062	0.095
After Dodd-Frank	292	-1.248**	-0.384		471	0.369**	0.235*
Difference (After-Before)		1.212*	0.598***			0.308	0.140
T-statistic		1.81	2.63			1.14	1.26

Panel B.2.: Bottom quartile of Fitch market share

	Credit Rating Downgrades			Credit Rating Upgrades		
	# Obs.	Mean Return %	Median Return %	# Obs.	Mean Return %	Median Return %
Before Dodd-Frank	255	-3.890***	-2.394***	121	-0.060	-0.259
After Dodd-Frank	79	-0.914	-0.832	108	-0.237	-0.274
Difference (After-Before)		2.976**	1.562**		-0.177	-0.015
T-statistic		2.05	2.52		0.29	0.12

Panel B.3.: Top three quartiles of Fitch market share

	Credit Rating Downgrades			Credit Rating Upgrades		
	# Obs.	Mean Return %	Median Return %	# Obs.	Mean Return %	Median Return %
Before Dodd-Frank	812	-2.138***	-0.736***	743	0.227	0.142
After Dodd-Frank	160	-1.472*	-0.287	299	0.607***	0.377**
Difference (After-Before)		0.666	0.449*		0.380	0.235
T-statistic		0.73	1.65		1.20	1.42

This table shows market-adjusted stock returns surrounding credit rating downgrade and upgrade announcements before and after the Dodd–Frank Wall Street Reform and Consumer Protection Act. The sample excludes financial industry firms. Before (After) Dodd-Frank is the period between January 2006 and July 21, 2010 (July 21, 2010 and May 2012). Industries are defined according to the Fama-French 12 industry classification and median percentiles are calculated by year and industry. Panel A shows the sample of credit rating downgrades and upgrades by year. Panel B shows stock returns surrounding the rating announcement date. Panel B.1 shows stock returns for the entire sample. Panel B.2 is restricted to downgrades/upgrades in industries with Fitch market share below the 25th percentile. Panel B.3 is restricted to downgrades/upgrades in industries with Fitch market share above the 25th percentile. Mean and median returns are shown as percentages. Mean and median differences are tested using the T and Wilcoxon two-sample tests, respectively. Variables are defined in Table 1. ***,**,* represent significance beyond the 1st, 5th, and 10th percentile levels, respectively.

Table 7: Rating levels and false warnings for alternative start dates of the post-Dodd-Frank period

Panel A: Rating levels

		Start of the Post-Dodd-Frank Period		
Coefficients	July 2009	December 2009	July 2010	May 2011
After Dodd-Frank (Corresponds to Model 1 of Table 3)	0.018	0.150*	0.171**	0.130
After Dodd-Frank x Fitch market share (Corresponds to Model 2 of Table 3)	0.342	0.754***	0.908***	0.826***

Panel B: False warnings

		Start of the Post-Dodd-Frank Period		
Coefficients	July 2009	December 2009	July 2010	May 2011
After Dodd-Frank (Corresponds to Model 1 of Table 4)	0.~~135~~158	0.354***	0.607***	0.784***
After Dodd-Frank x Fitch market share (Corresponds to Model 2 of Table 4)	1.473***	1.809***	1.~~810~~805***	1.781***

This table shows ordered logistic regression results for numerical rating codes (Panel A) and logistic regression results for type II errors (false warnings) (Panel B) for all credit rating announcements between January 2006 and May 2012, conditional on the starting date of the post-Dodd-Frank period. The sample excludes financial industry firms. Panel A & Panel B correspond to the regression specifications in Table 3 & Table 4, respectively, with the coefficients on the control variables omitted for brevity. In Panel A, the dependent variable is the numerical rating for a bond, ranging from 1-21 (AAA-C). In Panel B, the dependent variable is a dummy variable with a value of one for a BB+ or lower rated issue that does not default within one year, and zero otherwise. After Dodd-Frank is a dummy variable with a value of one for ratings assigned after the corresponding date in the table, and zero otherwise. Fitch market share is a dummy variable with a value of one for ratings in industries with Fitch market share below the 25th percentile, and zero otherwise. Industries are defined according to the Fama-French 12 industry classification and Fitch market share percentiles are calculated by year and industry. Variables are defined in Table 1. Standard errors are clustered by firm. ***,**,* represent significance beyond the 1st, 5th, and 10th percentile levels, respectively.