

What's in a Debt? Rating Agency Methodologies and Firms' Financing and Investment Decisions

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Abstract

In July 2013, Moody's unexpectedly changed its credit risk methodology, increasing the amount of equity credit that speculative-grade firms receive for preferred stock from 50% to 100%. Firms affected by the rule change were suddenly considered less levered by Moody's even though their balance sheets did not change. We find that these firms responded by issuing more debt, targeting an adjusted leverage ratio as defined by Moody's, and using the proceeds to grow their assets. The announcement of the rule change triggered a positive stock price and negative bond price reaction for the affected firms, consistent with a transfer of value from bond to equity holders. Finally, firms rated speculative-grade by Moody's increased their preferred stock issuance relative to firms rated speculative by S&P. Rating agency methodologies have a significant causal impact on firms' financing, investment and security design decisions, and on asset prices.

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1 Introduction

Assessing a firm's creditworthiness is an imprecise and challenging task that routinely vexes financial market participants. Because investors and regulators rely heavily on credit ratings to measure credit risk, rating agencies exert a large influence on firms' financing decisions (e.g. Graham and Harvey (2001), Kisgen (2006), Kisgen (2009) and Hovakimian, Kayhan, and Titman (2009)). This paper shows that the methodologies and standards used by rating agencies to measure creditworthiness have a causal, pervasive effect on firms' financing and investment decisions, asset pricing, as well as the design of fixed income securities.

The most important metric used to measure the ability of a firm to meet its financial obligations is its financial leverage, defined as the ratio of debt over total capital. While such definition is uncontroversial, how to empirically measure debt and capital is a source of debate (e.g. see Welch, 2011). Rating agencies routinely adjust the debt of a company by also considering liabilities that are not defined as debt according to GAAP standards, such as defined benefit pension plans, operating leases, inventory on LIFO cost basis, and hybrid securities. In particular, the classification of hybrids, which carry both debt- and equity-like characteristics, is complex and subjective. Rating agency debt adjustments can drastically affect leverage ratios, influencing a firm's credit risk assessment. Further complicating the estimation of credit risk, rating agencies use different methodologies to adjust debt for non-debt liabilities.

Given the subjective nature of these debt adjustments, we investigate how the credit risk methodology used by rating agencies influence firms' financial decisions and shape the overall fixed income market. We exploit an unexpected change in Moody's methodology on the equity treatment of preferred stock as an exogenous shock to the way rating agencies measure credit risk of firms. On July 31st, 2013, Moody's increased the equity credit that speculative-grade, or junk, non-financial corporate issuers receive for preferred stock from 50% to 100%: Before the rule change, if a speculative-grade company had \$100m in preferred stock, \$50m would have counted as debt, and \$50m as equity. After

the rule change, all \$100m counted as equity.¹ Speculative-grade firms with preferred stock were suddenly deemed less levered by Moody's, and thus more creditworthy, even though their balance sheets did not change. Among speculative-grade firms with preferred stock at the time of the rule change, preferred stock made up an average of 9.6% of their book capital, leading to a sudden exogenous 4.8% decline in Moody's leverage from an average initial level of 61.9%.

To analyze the causal effect of the rule change, we construct a panel of firms affected by the rule change, i.e. with preferred stocks in their balance sheet and rated speculative grade by Moody's as of July 2013. At the time, 475 U.S., non-financial, public firms were rated speculative (Ba1 or below) by Moody's, of which 44 (9.2%) had preferred stock. To estimate what the financing decisions of these firms would have been absent the rule change, we choose a set of companies unaffected by the rule change, i.e. speculative-rated firms with no preferred stock, but with similar characteristics as the treated firms. To do so, we match treated firms to untreated firms based on their Moody's rating, market-to-book ratio, one year growth in leverage and industry at the time of the rule change. After matching, the treated and matched untreated firms are statistically indistinguishable based on balance sheet, income statement, ratings, and leverage variables.

First, we compare the debt levels and the leverage ratios of treated and matched untreated firms around the rule change. We find that after the change in methodology, treated firms increased their debt levels by 22%, with long-term debt driving most of the increase. As a consequence, firms' debt to capital ratios increase by 3.1pp. We find a sharp increase in leverage during the first quarter after the rule change with a small upward drift afterwards.

Second, firms appear to actively target a leverage ratio as defined by rating agencies. After the rule change exogenously lowered their Moody's leverage ratio, firms issued debt over the course of the following two years, until their Moody's leverage returned to the level it was prior to the rule change. Despite firms' large increase in leverage, we find no

¹Moody's also decreased the amount of equity credit junior subordinated debt receives, but only five speculative-grade, non-financial firms had junior subordinated debt in their capital structures according to Capital IQ. These firms did not also have preferred stock so they would not affect the main treatment group we focus on.

statistically significant change in the Moody's ratings of affected firms. This finding is consistent with firms targeting credit ratings rather than leverage levels (Kisgen (2009) and Hovakimian, Kayhan, and Titman (2009)).

Third, firms used the increase in debt capacity to expand their balance sheet through asset growth and investment, rather than simply recapitalize. The additional debt issuance led to a 8% increase in PP&E and assets. Our results suggest that treated firms are eager to finance investments and asset growth with debt but are unable to because of financial constraints.

What is the source of the increased in debt capacity? One possible explanation is that the rule change revealed that speculative-grade firms with preferred stock were less risky than expected, leading to greater creditworthiness and more debt capacity. Alternatively, the rule change could have created slack in ratings-based contracts. For example, many firms have covenants directly linked to ratings, or derivative contracts in which rating downgrades require them to post more collateral to their counterparties. Also, bank loans and bonds are often structured with increases in required coupon payments that are triggered once a firm drops below a particular rating. These contractual features can be used to disincentivize firms from debt-funded risk shifting.

We test these two channels by looking at the stock and bond price response around the announcement of the rule change. Increases in both bond and equity prices would support the information channel, while an increase in equity and a decrease in bond prices would support the risk-shifting channel. We find that the stock price of affected firms increased by an average of 2.8% in a short window around the announcement of the rule change, while their credit spreads widened by 16bps or 3.4%. The market reaction thus suggests that Moody's rule change was indeed unexpected, and is consistent with a transfer from existing creditors and counterparties to equity holders as the constrained firms are able to expand their investment while making their liabilities riskier, without leading to contractual increases in their cost of capital from being downgraded. Overall, we view our natural experiment as a way to illuminate the ex-ante rationale for rating based covenants by examining how firms react when those covenants are exogenously

relaxed. While we expect firms to adapt provisions for new liabilities to the new ratings methodologies, the existing liabilities cannot be contractually readjusted, thus firms engage in activities that resemble risk-shifting.

Finally, the rule change not only influenced the choice of debt levels, but ultimately affected the type of fixed-income securities issued by firms. The change in Moody's methodology made preferred stock more attractive for speculative-grade firms, as it became treated as pure equity. We find that firms rated speculative-grade only by Moody's more than doubled their levels of preferred stock relative to firms rated speculative-grade by both Moody's and S&P and only S&P following the rule change. As a placebo test, we perform the same analysis on investment-grade firms and find no change in preferred stock. To our knowledge, this is the first paper to show that rating agencies affect the types of fixed-income securities firms issue.

We perform a host of robustness tests to confirm the internal validity of our results. We conduct placebo tests, pretending the rule change occurred in July of other years besides 2013 and find no statistically significant change in debt levels outside of 2013. Our results remain if we use all speculative-grade firms without preferred stock as counterfactual, rather than matching on firm characteristics. We also find similar results if we use investment-grade firms with preferred stock as counterfactual.

Despite the numerous contributions of the paper to the literature on the role of rating agencies on firms and markets, it is important to highlight the limitations of the study. Most importantly, the findings relate only to the number of firms affected by the rule change. These firms have high levels of debt, and thus might be more sensitive to the influence of rating agencies than the average public firm. While we do not see any theoretical reason why the findings would not generalize to all other speculative-rated firms, we cannot formally test the external validity of the results. Second, preferred stock is not allocated to firms randomly, thus our difference-in-differences strategy relies on the following conditional independence assumption: after controlling for observable characteristics, a firm's choice of having preferred stock in its balance sheet in July 2013 is orthogonal to its financing and investment decisions made afterwards. While such

identifying assumption cannot be directly tested, we show that treated and matched control firms have similar levels for observable characteristics, similar parallel trends in outcome before the rule change, and there was no increase in debt among treated firms in any other year than 2013. Furthermore, preferred stock is a perpetual instrument that has been on the balance sheet of several of these firms for many years before the rule change. Finally, asset prices reacted in a small window around the rule change, suggesting both credit and equity markets did not anticipate it.

The paper contributes to various strands of finance literature. The effect of rating agencies on firm financing decisions has been widely studied, starting (among many, Kisgen (2006), Kisgen (2009), Sufi (2007), Hovakimian, Kayhan, and Titman (2009), and Begley (2013)). Our paper shows that rating agencies also influence firms through the way in which they define credit risk. The only other paper looking at leverage adjustments is Kisgen (2012), who uses Moody's 2006 changes in how underfunded pensions and operating leases are treated. Our paper differs significantly in five main aspects: First, the change in the treatment of preferred equity is large and precisely measurable, and it clearly defines a set of treatment and control groups; Second, we track the dynamics of leverage over time after the rule change, and show how firms target an optimal rating level. Third, we show that ratings do not change following the adjustment. Fourth, we find that the rule change has a meaningful impact on both equity and bond prices which allow us to distinguish the channel through which the rule change and rating agencies more generally affect firms' decisions. Finally, we show that rating agencies causally affect the type of securities firms issue.

We also contribute to the academic debate as to whether firms have leverage targets and if so, how quickly they adjust back towards them following shocks (e.g. Fama and French (2002), Baker and Wurgler (2002), Welch (2004), Leary and Roberts (2005), Flannery and Rangan (2006), Altı (2006) and Kayhan and Titman (2007)). One of the challenges in the literature is that leverage targets are endogenous and can be time-varying. It is also difficult to distinguish managing leverage to a target and alternate motives (Iliev and Welch (2010) and Graham and Leary, 2011). Our paper uses an

identification strategy where leverage changes but the balance sheets of firms does not. We find that firms target a specific leverage ratio, the one as defined by rating agencies, and that after a shock, it takes two years for firms to return to the target, with a 30% adjustment occurring in the first quarter. This initial response is much faster than the range of estimates in the existing literature that do not rely on exogenous variation in leverage.

Recent papers also question the objectivity of rating agencies in assigning credit ratings (Griffin and Tang (2012) and Fracassi, Petry, and Tate (2016)). In our paper, the treatment of preferred stock appears arbitrary given that S&P and Moody's use vastly different methodologies. Furthermore, there is evidence that standards appear to change over time. Alp (2013) finds that investment-grade ratings tightened while speculative-grade ratings loosened over the period of 1985-2002. Similarly, Baghai, Servaes, and Tamayo (2014) find that credit rating agencies have become more conservative after the financial crisis. Our analysis shows that subjectivity in credit methodologies influences firms' financing, investment and security design decisions.

Finally, we contribute to the empirical literature on risk-shifting and covenants (Gilje (2016), Rauh (2008), Gormley and Matsa (2011), and Smith Jr and Warner (1979)). In our paper, we interpret the rule change as having relaxed rating based covenants for a subset of firms which allowed them to engage in risky investment at the expense of existing debtholders. The majority of the existing empirical literature on covenants analyzes ex-post violation of covenants, while we arguably identify an interim relaxation of covenants.² Matvos (2013) and Green (2018) estimate structural models and find very large ex-ante benefits of covenants. Our findings suggest that tying contracts to ratings may be an imperfect tool for mitigating debtholder and shareholder conflict because of the sometimes arbitrary nature of rating agency methodologies.

²For example Chava and Roberts (2008), Roberts and Sufi (2009) and Nini, Smith, and Sufi (2009).

2 Background on Rating Agency Debt Adjustments

Traditional leverage metrics may not reflect the underlying credit risk of the firm.³ Items such as operating leases, unfunded pensions, capitalized interest, and hybrid securities may not appear as debt on a firm’s balance sheet but act as a “debt-like” obligation. Rating agencies recognize this discrepancy and use debt adjustments to better assess a firm’s creditworthiness. Such debt adjustments influence many of their own internal credit risk metrics, such as leverage and debt-to-EBITDA ratios.

Hybrid securities, such as preferred stock and junior subordinated debt, are particularly difficult to evaluate. Under GAAP accounting, preferred stock generally enters the balance sheet as equity (PwC, 2014). However, rating agencies consider preferred stock a hybrid due to the recurring fixed payment that is similar to a debt instrument and its seniority to common equity. Rating agencies use hybrid basket treatment tables to assess how much equity credit a specific preferred stock instrument receives. For example, a preferred stock with a finite maturity is given less equity credit than perpetual preferred stock by both Moody’s and S&P.

Because rating agencies give equity credit to hybrids, firms can use preferred stock to manage their ratings. In some circumstances, a firm that would be downgraded if it issued debt could issue preferred stock without affecting its credit rating as the preferred stock would receive equity credit that a pure debt instrument would not. If the distress costs from pure debt are high, firms can issue preferred stock when adverse selection is high, making equity costly to issue, or if managers believe their stock is undervalued. A theoretical treatment of preferred stock is Heinkel and Zechner (1990) who show that preferred issuance can increase total debt capacity. Nance, Smith, and Smithson (1993) argue that preferred stock reduces the probability of financial distress.

³See Graham and Leary (2011) for a summary.

2.1 Rule Change

Before July 2013, for both Moody's and S&P, \$100 of perpetual preferred stock counted as \$50 of equity, and the other \$50 was counted as debt for non-financial issuers of all ratings. On July 31st 2013, Moody's issued a report altering their leverage adjustments for hybrid securities, stating the following:

“Relative to investment-grade nonfinancial companies, speculative-grade nonfinancial companies are materially closer to default, have shorter dated and more complex capital structures, as well as debt with more covenants. Additionally, speculative-grade nonfinancial companies often opt to cease cash distributions associated with preferred stock and other hybrid instruments because such actions are contractually allowable without triggering a debt default...

...Given these characteristics, our approach to assessing the debt and equity characteristics of hybrid instruments of speculative-grade companies with a corporate family rating (CFR) or senior unsecured rating of Ba1 and below is to closely follow the legal treatment we expect these instruments would receive in a bankruptcy scenario. Instruments with a debt claim as set out herein, other than shareholder loans meeting defined criteria, receive 100% debt treatment while equity instruments, such as preferred stock, with no such debt claim receive 100% equity treatment”
Moody's Investor Service (2013).

The rule change thus increased the equity credit Moody's provides preferred stock for speculative-grade corporate issuers from 50% to 100%. \$100 of perpetual preferred stock would now count as \$100 of equity. At the time, Moody's rated 477 U.S., non-financial, public firms as speculative (Ba1 or below), of which 44 (9.2%) had perpetual preferred stock. On average, speculative rated firms with preferred stock had \$2.7bn in debt, \$395mil in preferred stock, and \$5.2bn in capital. Before the rule change, half of the \$395mil in preferred stock was counted as debt by Moody's, and none after the rule change. The average implied change in leverage as measured by Moody's thus declined by 4.8pp from 61.9% to 57.1% , which corresponds to more than a notch upgrade in credit ratings.⁴ Figure 1 shows the distribution of preferred stock speculative-grade firms have affected by the rule change.

This rule was permanent, as Moody's affirmed its new treatment in March 2015 (Moody's Investor Service, 2015). Moody's did not change the equity credit given to

⁴We estimate that one notch corresponds to approximately 4pp in leverage. See Table A.2 in the Online Appendix for more details.

preferred stock for investment-grade issuers and S&P maintained the original equity credit for both investment-grade and speculative-grade issuers.⁵ This gives several natural control groups to test in the empirical analysis.⁶

Investors are aware that rating methodologies could change over time, and acknowledge the potential for disruption in fixed income markets. “The behaviour of rating agencies is one of the biggest risks,” says Anne Velot, head of euro credit at AXA Investment Managers. Robert Emes, a credit analyst at JPMAM, says: “While not all changes will cause an issuer to redeem early, the agencies will constantly try to reform their methodologies to make them more indicative of the risks that they see, so I can’t rule out that this might happen.” While investors might be aware of the possibility of changes in rating methodologies, news surrounding the event described the rule change as a surprise to the market. For instance, a market commentator stated: “Moody’s decision to remove equity credit from all hybrid bonds issued by a company rated Ba1 or lower in August 2013 caused turbulence and was a reminder that rating methodologies can be subject to rapid change”, Euromoney (2015).

Why did Moody’s change their treatment for hybrids? The report stated that for investment grade firms, there is an expectation that preferred stock dividends go uninterrupted, while for riskier speculative-grade firms this is not the case. Since preferred stock dividends cannot trigger default and have no debt claim in bankruptcy, Moody’s decided to treat preferred stock as equity for speculative-grade firms.

2.2 Methodology to Measure Leverage Ratio

According to GAAP, preferred stock is considered 100% equity. The GAAP leverage, the most commonly used leverage ratio by academics and practitioners, is thus defined as following:

⁵On November 27th 2015, S&P suddenly changed the equity credit for a small group of European hybrids. See Euromoney (2015)

⁶Moody’s also reduced the equity credit junior subordinated debt receives for speculative-grade firms from 25% to 0%. Following the rule change, ArcelorMittal reportedly called an existing junior subordinated note because it no longer received equity credit IPE (2015). We do not analyze junior subordinated debt because they are rarely used by speculative-grade firms. Only five issuers with junior subordinated debt were in Capital IQ at the time of the rule change and none of these firms had preferred stock in their capital structure which could contaminate our treatment group.

$$Lev_{GAAP} = \frac{D}{D + E + P} \quad (1)$$

where D denotes the face value of debt, E the book value of the firm's common equity and P the principal of the preferred stock the firm has. In defining leverage, we follow Welch (2011) and avoid the debt to asset ratio; however, the results hold with this measure as well and are displayed in the Online Appendix.

As discussed above, credit rating agencies make debt adjustments to reflect debt-like liabilities in firms' balance sheet. For the purpose of this study, we only look at the debt adjustments related to preferred stock, as the study focuses on an exogenous change to Moody's methodology relative to the amount of equity credit that preferred stock receives. Moody's leverage is thus defined as:

$$Lev_{Moody's} = \begin{cases} \frac{D+0.5P}{D+E+P} & \text{before July 31st, 2013} \\ \frac{D}{D+E+P} & \text{after July 31st, 2013} \end{cases} \quad (2)$$

3 Hypothesis Development and Research Design

3.1 Rating methodology and firm decisions.

A large body of literature has shown the effect of credit ratings on firms (e.g. Kisgen (2006), Kisgen (2009), Begley (2013)). The objective of this paper is twofold: to test whether changes in the methodology used by credit rating agencies have a causal impact on firms' financing, investment and security design decisions and to understand through which channel these methodologies matter.

We believe there are two main channels through which rating methodologies may affect a firm's financing and investment decisions. First, many financial contracts such as bank loans, derivative contracts and trade agreements are contingent on the creditworthiness

of the parties signing the contract. Given that credit spreads are for the most part not available or sufficiently liquid, contracts often rely on the credit rating of a firm.⁷ If counterparties are concerned that a firm will engage in debt-funded risk-shifting, rating provisions can be used as a deterrence that leads to a sudden increase in a firm's cost of capital or debt acceleration due to covenant violations. In 2002, Moody's did a survey of US corporate issuers and found that 87.5% of respondents had ratings triggers with an average of over four triggers per company (Moody's Investor Service (2002)).⁸ Similarly, Kraft (2015) finds that 47% of loan contracts were tied to ratings in 2008. If the use of ratings in contracts is the dominant channel, we expect the rule change will lead to an increase in leverage and investment at the expense of existing debt-holders and counterparties, causing an increase in stock price and decrease in bond prices around the rule change.⁹ We also expect that firms' Moody's ratings remain the same, and that firms that are at lower risk of being downgraded by S&P will respond more, consistent with firms targeting a minimum credit rating to avoid ratings based triggers.

Second, many investors depend on ratings to perform credit risk assessments. Tang (2009) finds that after Moody's transition from broad rating categories to narrower notches, credit spreads responded depending on the direction in which the rating moved. The reliance of stakeholders and investors on ratings reduces costly individual information acquisition.¹⁰ Debt investors may not be aware of the rule change and merely follow the credit rating of the firm or may view Moody's announcement as a real reduction in credit risk for the affected firms. If information is the dominant channel, we would expect firms to issue debt and use the proceeds to buyback stock or increase dividends. Under the behavioral story, Ma (2016) shows that firms act as cross-market arbitrageurs in their own securities by buying (selling) underpriced (overpriced) securities. Under a rational story, the firm learns that the probability of distress is lower and thus can issue more

⁷CDS are generally more liquid but are only traded on a small universe of issuers.

⁸A caveat to this analysis is the firms were all investment grade.

⁹Firms may also simply issue more debt and use the proceeds to return capital to shareholders, diluting existing liabilities.

¹⁰On the other hand, ratings can potentially be manipulated or inaccurate because of ratings shopping (Skreta and Veldkamp, 2009 and Bolton, Freixas, and Shapiro, 2012), catering (Griffin, Nickerson, and Tang (2013) and conflicts of interest (Griffin and Tang (2011)). These problems were particularly pronounced among structured products in the financial crisis.

debt to take advantage of the increased tax shield. Since the new information is about the riskiness of the firm's liabilities not their marginal investment, we would not expect an increase in investment. In terms of asset prices, we would expect credit spreads to either decrease because of the new information, or remain flat if investors anticipate firms will issue more debt afterwards. We also expect equity prices to increase because of the new information about the riskiness of the firm's liabilities and/or because of the ability of the firm to issue more debt that is either overpriced or simply takes advantage of the increase in tax shields.

There may also be regulatory frictions as explored in Kisgen and Strahan (2010); for instance certain institutional investors may be required to hold investment-grade bonds. However, this channel is less likely among speculative-grade, non-financial firms.

3.2 Experiment Design

Moody's change in the treatment of preferred stock only applied to a subset of US public firms, enabling us to compare firms that were affected by the change relative to similar firms that were not affected. First, we select firms that were affected by the rule change. Using Compustat Fundamentals Quarterly, Thomson Eikon, CRSP, and ICE, we collect financial data for all U.S. public non-financial firms that have a speculative-grade rating from Moody's (Ba1 or lower) on July 31st 2013, finding 477 firms.¹¹ Among these firms, we then proceed to select those that have a positive amount of preferred stock (Compustat item `prstkq`) on their balance sheet in the last quarter prior to July 2013. We hand check these firms and remove any that only have mandatory convertible preferred, trust preferred, preferred with any maturity or puts or no preferred at all, as these types of preferred are not treated as preferred stock by Moody's and were not subject to any changes in treatment. We also look through reports by Moody's to see if there is mention

¹¹We exclude financial firms and non-operating establishments (SIC codes with 6000 - 6999 and 9995) because financial firms are not affected by the rule change; there is one firm with preferred stock in non-operating establishments but is classified as a financial institution by Moody's; thus for consistency we remove all non-operating establishments.

of Moody’s treatment of particular securities.¹² We also collect the proper principal value from SEC 10-q and 10-k filings as Compustat often has the incorrect face value. Overall, we find 44 firms that are rated speculative by Moody’s, and with perpetual preferred stock. These firms constitute our treatment group. Because preferred stock is perpetual, many of these firms issued the preferred years before the rule change, making reverse causality explanations unlikely.

Second, we proceed to find firms that are as similar as possible to the treated firms, but that were not affected by the rule change. We draw from the pool of speculative-grade rated firms without preferred stock on their balance sheet to find our counterfactual. Table 2 shows that firms affected by the rule change (treated firms) have greater market-to-book, and worse ratings relative to the rest of the speculative-rated firms. We thus use a matching strategy to select the set of control firms used as a counterfactual. For each treated firm, we proceed to find four speculative-grade firms in the same Fama-French 49 industry that are as similar as possible in terms of Moody’s ratings, growth in leverage, and market-to-book at the time of the rule change. As commonly standard in the literature, we use the Mahalanobis metric as distance measure, i.e. the inverse of the sample variance/covariance matrix of the three continuous non-exact matching variables. We also control for profitability, tangibility, market-to-book and log of sales in all specifications, as these are the most common controls in the capital structure literature (e.g. Rajan and Zingales (1995) and DeAngelo and Roll (2015)). The precise definition of all variables used in the paper is shown in Table 1. We winsorize the control variables at the 1% and 99% levels to make sure that outliers do not influence our results.

Thus, the identification relies on the conditional independence assumption that after we match and control on observable characteristics, the unobserved time-series trends in the financing and investment decisions of firms are orthogonal to whether these firms had preferred stock in their balance sheet on July 2013. While the main identifying

¹²For instance, according to Compustat iGate had a positive amount of preferred stock prior to the rule change; however, the preferred instrument had a put, thus it was treated as debt by Moody’s. “Moody’s views the \$350 million of preferred stock issued to the financial sponsor as debt like due to the six year maturity at which time the holders may require iGate to redeem its shares for cash equal to the accrued liquidation preference” (Moody’s Investor Service, 2011).

assumption cannot be tested explicitly, three pieces of evidence are consistent with such assumption: (i) As shown in Table 2, the difference between the treated and the matched untreated firms is not statistically significant not only for the matched variables, but also for the unmatched ones; (ii) in all regressions, we test for parallel trends before the change in Moody’s methodology, and there is no difference in the time-series behavior of treated and matched untreated firms; and (iii) the decision to have perpetual preferred stock in the balance sheet occurred years before the rule change.

An alternative, and in our opinion weaker, approach would be to choose as control group investment-grade firms with preferred stock. While this approach controls for the decision of firms to use preferred stock, it would relies on the assumption that a firm’s status as investment grade or not is orthogonal to its financing and investment decisions, an assumption that is harder to justify. Nonetheless, in the Online Appendix, Table A.11 shows that results are robust to using such alternative counterfactual.

Finally, after having identified cohorts of treated and matched control firm, our main empirical analysis employs a cohort generalized difference-in-differences strategy. Essentially, we take the difference in outcome $y_{i,c,t}$ for each treated firm i after the rule change relative to before and compare it with the difference in outcome of its matched control firms within the same cohort c .

$$y_{i,c,t} = \beta(d_{i,c} \times p_{t,c}) + \gamma X_{i,t} + \alpha_{i,c} + \delta_{t,c} + u_{i,c,t} \quad (3)$$

All regressions are estimated from 4 quarters before the July 2013 event to 8 quarters afterwards. We choose the pre-event window to have enough periods to test the parallel pre-trend assumption. We selected the post-event window to give enough time to firms to respond to the rule change. It is also consistent with the speed of adjustment found in Leary and Roberts (2005). In all tables, we use two types of treatment variables $d_{i,c}$: One where the treatment variables $d_{i,c}$ is a dummy variable identifying treated firms, irrespective of the amount of preferred stock held at the time of treatment; The second is a continuous treatment variable defined as the amount of preferred stock relative to capital that the firm had at the time of the rule change. $p_{t,c}$ is a dummy variable equal to

one if the time period is after the rule change. $X_{i,t}$ are the control variables profitability, tangibility, and log of sales. The coefficient β represents the difference-in-differences effect of the rule change on the outcome variable relative to a matched counterfactual. The firm-cohort fixed effect $\alpha_{i,c}$ ensures that we compare the change in outcome within the same firm. The time-cohort fixed effect $\delta_{t,c}$ ensures that the treatment firm is compared only with the three matched control firms at each point in time. The standard errors are clustered at the firm level to adjust for heteroskedasticity and serial correlations in the error term (Petersen, 2009 and Thompson, 2011).

We also estimate the impact of the rule change quarter-by-quarter, using the equation below:

$$y_{i,c,t} = \sum_{k=-4}^8 \beta_k (d_{i,c} \times \lambda_{t,k,c}) + \gamma X_{i,t} + \alpha_{i,c} + \delta_{t,c} + u_{i,c,t} \quad (4)$$

$\lambda_{t,k,c}$ is a dummy equal to one if quarter t is equal to k and zero otherwise. Standard errors are also clustered at the firm level. Given the large number of fixed effects and observations, all regressions in the paper are estimated using the fixed point iteration procedure implemented by Correia (2016). The quarter-by-quarter regression help us to make sure that the evolution of the outcome variable before the event is similar between the two groups. A positive or negative pre-trend could invalidate the interpretation of the difference-in-differences results. In addition, we can also learn how quickly firms respond to the rule change, and infer what the speed-of-adjustment to shocks to leverage is.

Table 2 shows the summary statistics as of the last quarter prior to the rule change for the three groups of firms in the sample: the treated firms, (the ones affected by the rule change); all untreated firms (all the speculative-grade firms which were not affected by the rule change) and the matched firms (subset of untreated firms which are as close as the treated firms as possible). There are 44 speculative-grade firms with preferred stock at the time of the rule change, which is about 9% of the total number of speculative-grade firms in the sample at that time. Table A.1 shows the full list of treated firms and their Fama-French 49 industry classification. Treated firms belong to a variety of industries, including energy, housing, media, industrial and retail. The characteristics of

the treated and matched firms are fairly similar at the time of the treatment, and none of the difference is statistically significant. The average book GAAP leverage of the firms is 58.7% , corresponding to a credit rating of B2 using the Moody’s rating scale.¹³ The average market capitalization is \$3.0bn, which is slightly smaller than the average public firm in the Compustat universe of \$3.8bn.

4 Results

4.1 Moody’s Rule Change and Firms’ Financing Decisions

Moody’s change in the treatment of preferred equity caused several speculative-rated firms to be deemed less levered by Moody’s, even though their balance sheet did not change. We thus investigate whether firms responded to this rule change by altering their capital structure using the difference-in-differences specifications in Equations (3) and (4).

First, Table 3 shows that speculative-grade firms with preferred stock increased the amount of debt in their balance sheet after the rule change, relative to a matched group of comparable speculative-grade firms with no preferred stock. On average the total debt held by treated firms increased by over 22% after the rule change (Column (1)). The effect is greater for firms with large amount of preferred stock in the balance sheet at the time of the rule change (Column (2)). The effect is statistically significant for long term debt, and not for short term debt (Columns (3) to (6)). Thus, firms actively issue bonds and bank debt to increase their leverage ratio. Figure 2 shows the trend over time of such increase in debt and long term debt. Treated firms have comparable levels of debt relative to matched control firms during the year before the treatment, but then they rapidly increase in the first two quarters after the rule change, and then it plateaus.

Second, we check whether the rule change led to an increase in GAAP leverage

¹³Moody’s and S&P issuer level ratings are translated to a number with 1 being the least likely and 22 being the most likely to default. Moody’s actually has 21 notches: Moody’s second worst rating, Ca, is comparable to S&P’s CC and C so we simply count Ca as 21 and assign a value of 19 to Moody’s rating Caa3. Very few firms are rated this low at any point in the sample.

Lev_{GAAP} (Equation (1)). The increase in debt could be offset by an equal increase in the issuance of preferred stock, which received more favorable treatment after the rule change, maintaining the leverage ratio constant.¹⁴ In Table 4, we find that GAAP leverage increases after the rule change. Column (1) shows that the average book GAAP leverage of speculative-grade firms with preferred stock increases by 3.1% (from 57.0% to 60.1% for the average firm) relative to matched speculative-grade firms without preferred stock. The results show that the exogenous rule change led to a significant change in the financing and capital structure decisions of affected firms.

Third, we study the evolution of leverage using Moody's definition $Lev_{Moody's}$ (Equation (2)). At the time of the rule change, we should observe a sharp mechanical drop in leverage: given that preferred stock receives 100% equity credit after the rule, if companies did not respond to the rule change, the Moody's leverage should drop by half of the amount in preferred stock (i.e the β coefficient right after the change should be -0.5). If firms responded immediately issuing enough debt to offset the drop, Moody's leverage should not change over time. Panel B of Figure 3 show that $Lev_{Moody's}$ drops after the rule change, but not by the full amount triggered by the rule change: firms respond to the rule change quickly offsetting 30% of the newly available debt capacity within the first two months. Then, A slow uptrend seem to emerge over the subsequent seven quarters, until the drop in Moody's leverage become statistically insignificant after 18 months, and almost completely disappearing two years after the rule change. This evidence suggests that firms target a leverage ratio defined by rating agencies, and that they respond to exogenous shocks to their rating agency leverage quickly. This evidence contributes to the literature on the speed of adjustment of leverage ratios. The shock to rating agency leverage can also be interpreted as a shock to a firm's GAAP leverage target as the firm must increase its GAAP leverage to return to its target rating agency leverage. The estimated adjustment speeds in the literature ranges from 0% to 39% per

¹⁴For simplicity, we assume the amount of preferred stock is unchanged over the sample. In reality this may not be the case, because the rule change could lead firms to use more preferred stock. However, the incentive would be the same both for treated and control firms.

year.¹⁵ The 30% initial adjustment during the first quarter in our sample is substantially higher speed than existing findings in the literature. This can be due to the fact that we exploit truly exogenous variation in leverage, unlike other studies that have to rely on partial adjustment models, GMM, dynamic panel models, structural models and other methods. The higher speed of adjustment could also be due to the firms in our sample having high levels of debt, and thus more likely to be financially constrained and respond quickly to increases in debt capacity.

Finally, we run a battery of tests to make sure that the results are robust to alternative research design choices. First, Table 5 shows the results of a placebo test, where we rerun the regression specification in Equation (3) for each calendar year from 2008 to 2015 with total debt as the dependent variable. To avoid overlapping periods, we restrict the sample period to be only one calendar year. The “After July” variable is equal to one if the calendar quarter ends after the month of July, and zero otherwise. The table shows that treated firms increase their debt significantly relative to matched control firms only in 2013, which is the year of the rule change. This shows that the evidence presented in Table 3 is not driven by any seasonal pattern, and it does not occur in any other year except the year of the rule change. Second, we rerun all our regressions using a regular difference-in-differences approach without matching, and find very similar results (see Tables A.4-A.10 in the Online Appendix). Third, we use investment-grade firms with preferred stock as control group, to alleviate the concern that the effect is being driven purely by firms with preferred stock, and the results are unchanged (Table A.11). Finally, we use debt over assets as definition of leverage, and find again similar results (Table A.12).

4.2 Moody’s Rule Change and Firms’ Investment Decisions

After Moody’s changed their methodology for preferred stock, firms responded by increasing their debt levels and leverage. The additional capital raised can be used to

¹⁵Graham and Leary (2011) synthesizes the findings of Fama and French (2002), Kayhan and Titman (2007), Flannery and Rangan (2006), Lemmon, Roberts, and Zender (2008), Huang and Ritter (2009) Elsas and Florysiak (2015) and Iliev and Welch (2010) who use different methods to measure the speed of adjustment

either shrink their equity base through dividends and share buybacks, or to increase their balance sheet. We thus proceed to test whether the rule change has an impact on the real asset side of the balance sheet. In Table 6, we use the natural logarithm of capex, property, plant and equipment (PP&E), and total assets as outcome variables. Column (1) shows that capital expenditures increase by 10% for treated firms relative to matched control firms; however, the estimate is not quite statistically significant. The increase in capex leads to a statistically significant 8% increase in PP&E (Column (3)) and assets (Column (5)). The results are very similar when we use a continuous treatment variable instead of a treatment dummy (Columns (2), (4), and (6)). Figure 4 shows that, consistent with the time-series trend in debt and leverage levels, the increase in the balance sheet occurs in the first year, and then it plateaus.

The evidence suggests that the treated firms are constrained by their ratings, and providing them with extra debt capacity leads to more investments and a larger balance sheet. It is also consistent with Begley (2013) and Kisgen (2012) in that firms' investment decisions appear to be influenced by rating agencies.

4.3 Market Reactions to Moody's Rule Change

In the Section 4.1, we find that the rule change increased the debt capacity of treated firms. We now provide some evidence on the channel through which the rule change allowed firms to raise more debt.

One might argue that the announcement of the rule change revealed that speculative-grade firms with preferred stock were less risky than we originally thought. An alternative explanation is that ratings are used in covenants, derivative contracts, and bank loans, all of which are used to prevent risk-shifting and value transfer from bond-holders to equity-holders when firms are in financial distress. In the Online Appendix, we include excerpts from treated firms filings that explicitly reference contractual ties to credit ratings.

We thus test these assumptions by investigating the effect of the announcement of Moody's rule change on equity and debt prices. Both stock and bond prices would increase if new positive information was revealed about the creditworthiness of the firm,

while we would expect equity price to increase and bond prices to decrease if risk-shifting occurred.

In Table 7 we include regressions with cumulative abnormal returns (CAR), over various windows. To be consistent with the other tests, we always compare the CAR of treated relative to matched control firms. We find statistically significant and positive stock price reactions around the announcement of the rule change, but not before or after the event window. In Columns (1) - (2), we test if there is any run-up in the period of 30 to 2 days prior to the rule change. We find no statistically or economically significant estimate using a binary or continuous treatment. Columns (3) - (6), we look at various windows beginning 1 day prior to the announcement up to 1 or 3 days after the announcement. All estimates are positive and statistically significant. For instance from 1 day prior to 3 days post, Column (5), we find a 2.8% positive stock price reaction. This suggests that the equity market viewed the expanded debt capacity as a positive surprise. In Columns (7) - (8), we test if there is a continued run-up after the rule change over the period of 4 days to 30 days after the announcement. The estimates are statistically insignificant for both the binary and continuous treatment. These results also further validate the rule change as being a truly unexpected exogenous event to firms' financing and investment decisions.

In Table 8 we analyze firms' credit spread responses to the rule change. We obtain daily credit spread data from ICE.¹⁶ In particular, we use constituent bond-level option-adjusted spreads from the ICE BofAML US High Yield Index. To properly compare credit spreads we exclude all subordinated and secured bonds. At each date we create a firm-level average credit spread weighted by each bond's amount outstanding. We are able to find credit spreads for 22 treated firms. Several treated firms only have bank debt, convertible debt or both which lead them to be excluded from the index. In order to increase the power of the test we perform the same matching on the treated firms but also match on credit spreads on the day before the rule change (July 30, 2013). We find similar

¹⁶The benefit of using ICE data over TRACE is that ICE prices do not depend entirely on executed TRACE eligible trades. The prices may reflect quotes from ICE clients, such as investment banks, and trades of bonds that are not TRACE eligible. Furthermore, TRACE often has only a few trades per month, while the index constituents data updates on a daily basis.

results with the unmatched regression as shown in Table A.9 in the Online Appendix. We use the same form of analysis as in Table 7; however, we define our dependent variable as the change in credit spreads (in bps) over each window. In Columns (1) - (2) and (7) - (8) we find no change in spreads before or after the announcement of the rule change, while in Columns (3) - (6), we find an increase in credit spreads that is statistically significant over the window beginning 1 day prior up to 3 days post for both the binary and continuous treatment variable. In Column (5), we find a 16.2bp increase in credit spreads around the same period that stock prices increase by 2.8%. This compares to the starting average credit spread of 461bps (3.5% increase).

We view these results as narrowing down the potential explanations of why firms respond to changes in rating methodologies. The negative bond price response coupled with the positive stock price response is evidence that the increase in debt capacity is caused by added slack in covenants and contracts tied to ratings.

4.4 Moody's Rule Change and Firms' Security Design

So far, we have shown that Moody's rule change caused treated firms to increase their debt levels, their leverage, and their investments in real assets. However, the rule change had a broader impact beyond the treated firms. The new methodology treats preferred stock more favorably for all speculative-grade firms. Thus we should expect other firms rated speculative-grade by Moody's to have more preferred stock in their balance sheets after the rule change. A problem is that the new methodology applies to all firms rated speculative by Moody's, limiting the options to choose a natural counterfactual. To address this issue, we consider as treated firms all firms that are rated speculative-grade only by Moody's, and as a control group, firms that are rated speculative-grade by S&P and Moody's, or just by S&P. At the time of the rule change there were 66 firms rated speculative-grade only by Moody's. The firms only rated speculative by Moody's represent only a subset of the firms that should be affected by the rule change, but it helps with identification as one group clearly has a higher incentive to issue preferred over the other since S&P did not change its methodology for preferred stock. We expect that

Moody's-only rated speculative-grade firms should have more preferred stock after the rule change compared to other speculative-grade firms.

Table 9 shows the coefficients of a generalized difference-in-differences where we compare the percent of preferred stock relative to capital and simply the total amount of preferred between Moody's-only-junk firms and all other speculative-grade firms, before vs. after Moody's rule change. The sample is restricted to speculative-grade firms in Columns (1) and (3). We find that the use of preferred stocks increases after the rule change for Moody's-only junk firms. The coefficient is not only statistically significant, but it is also economically very large: Before the rule change, preferred stock accounted for only 0.33% of total capital, so the coefficient of 0.54pp in Column (1) means that the use of preferred stock almost triples after the rule change. As a placebo test, we perform the same analysis on firms rated investment-grade by either Moody's or S&P and find no change in the use of preferred stock by firms only rated IG by Moody's (Columns (2) and (4)). We would expect no change given that the new rule did not apply to investment-grade firms, and for those firms, Moody's and S&P maintained their 50% equity credit for preferred stock. Our evidence of increased preferred issuance is also consistent with anecdotal evidence suggesting the rule change affected the design of hybrid securities for investment grade issuers (Journal (2015)). These results also relate to Rauh and Sufi (2010) who show that there is substantial heterogeneity in the types of debt firms use. Some of the observed heterogeneity in debt structure may be due to rating agency methodologies as firms adjust their security design decisions according to how those securities are treated by Moody's.

4.5 Moody's Rule Change and Credit Ratings

The change in Moody's methodology on preferred stock mechanically lowered the leverage of affected firms, as measured by Moody's and the reduction in leverage amounts to approximately a one-notch improvement in the credit ratings. However, firms responded to such an increase in debt capacity by issuing more debt. We would thus not expect any change in the ratings of firms. Consistent with this hypothesis, Columns (1) and

(2) of Table 10 show that Moody's ratings did not significantly change after the new methodology, and confirming that firms seem to target an optimal rating level.

However, over 89% of the treated firms are rated both by S&P and Moody's, and S&P did not alter their methodology. If firms issued more debt in response to the extra debt capacity allowed by Moody's, then we should observe a higher likelihood of S&P downgrading the treated firms. Columns (3) and (4) of Table 10 show that the S&P ratings do not change significantly between treated and control firms after the rule change. A possible explanation of this finding is that the response of firms to Moody's rule change is heterogeneous: firms that are also rated by S&P respond less to the rule change because they are concerned that increasing debt might lead to a downgrade by S&P. We test this hypothesis use a triple-difference specification, and thus comparing the effect of the rule change for firms only rated by Moody's, and firms that are rated both by Moody's and S&P. Table A.3 in the Online Appendix shows that S&P appear to respond less, although the power of the test is weak given the small number of firms in our treated sample. It also suggests that firms have a joint problem in targeting a leverage ratio that may depend on multiple rating agencies. Having multiple ratings also seems to mitigate the effect of rating agency specific methodologies on firm's financing and investment decisions.

5 Conclusion

This paper shows that rating agency methodologies have a causal effect on firms' financing, investment and security design decisions. We also provide evidence that ratings and rating agency methodologies are an important ex-ante contracting tool to mitigate shareholder and liabilityholder conflicts.

A methodological change by Moody's related to the equity credit assigned to preferred stock caused a large and persistent increase in debt levels and leverage, for speculative-grade firms with preferred stock in their capital structure, even though their balance sheet did not change. Our evidence suggests that firms target a leverage ratio defined by rating agencies, and not by GAAP. We also find a substantially larger adjustment speed

than the existing leverage targeting literature that does not rely on exogenous variation in leverage. Furthermore, firms use the proceeds from the new debt to increase their asset base through investment, rather than simply recapitalize. Stock prices of treated firms increased while bond prices decreased, suggesting that the change increased shareholders' value at the detriment of existing debtholders. Finally, rating agencies causally influence firms' security design problem: we find that preferred stock usage more than doubled after the methodology change. Collectively, our evidence is consistent with contracts being written on credit ratings to prevent debt funded risk shifting.

The findings of the paper inform firms, investors, rating agencies, and regulators about the unintended consequences of even apparently small changes in methodologies used by rating agencies. It also further highlight the importance of ratings and rating agency actions for firms and financial markets.

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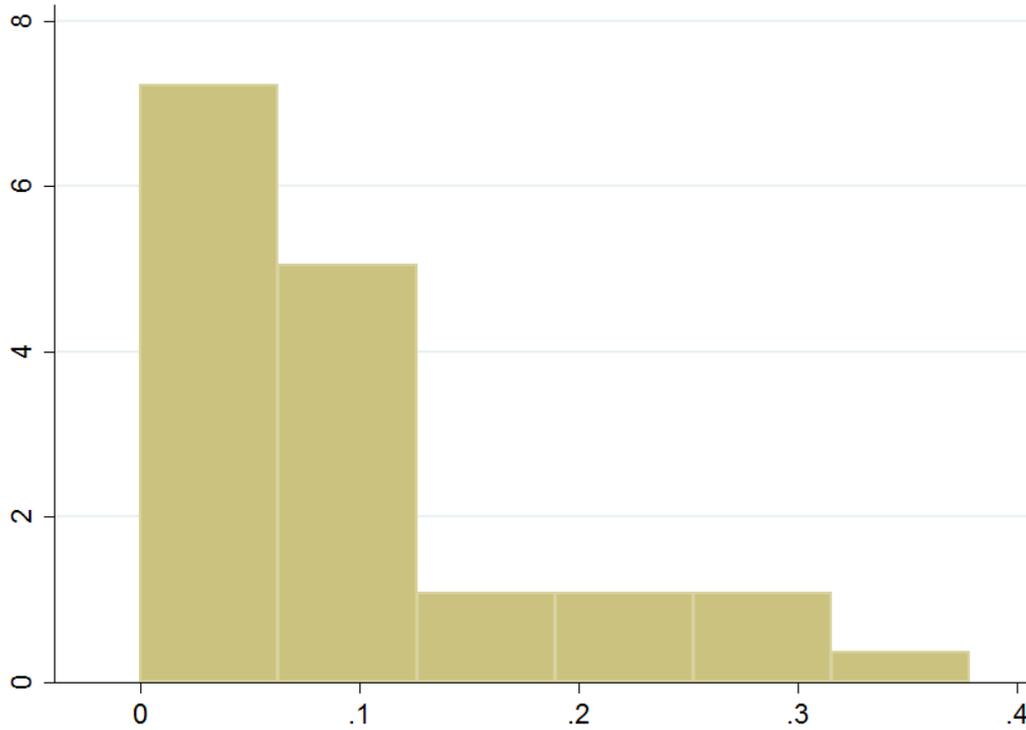
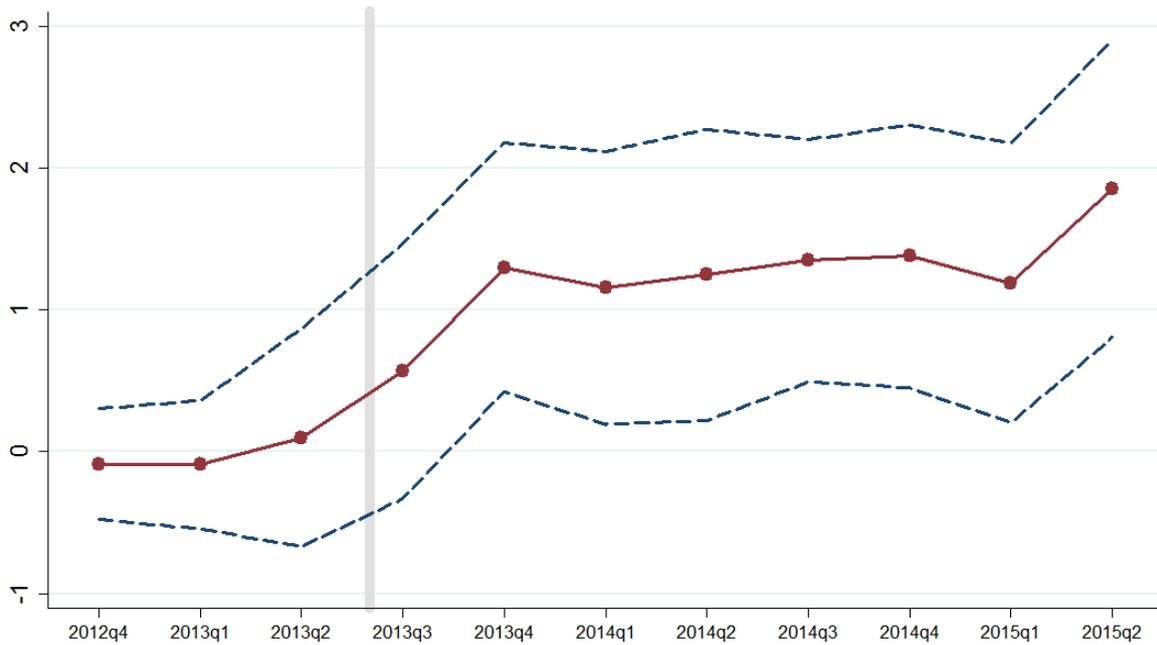


Figure 1: Preferred Stock Histogram

Figure 1 includes a histogram of *Preferred/Capital*, the ratio between the amount of preferred stock and the sum of debt and shareholders' equity in the last quarter prior to July 2013, when Moody's changed its debt adjustment methodology. Leverage as calculated by Moody's immediately dropped by half of this number at the time of the rule change.

Panel A: Total Debt



Panel B: Long-term Debt

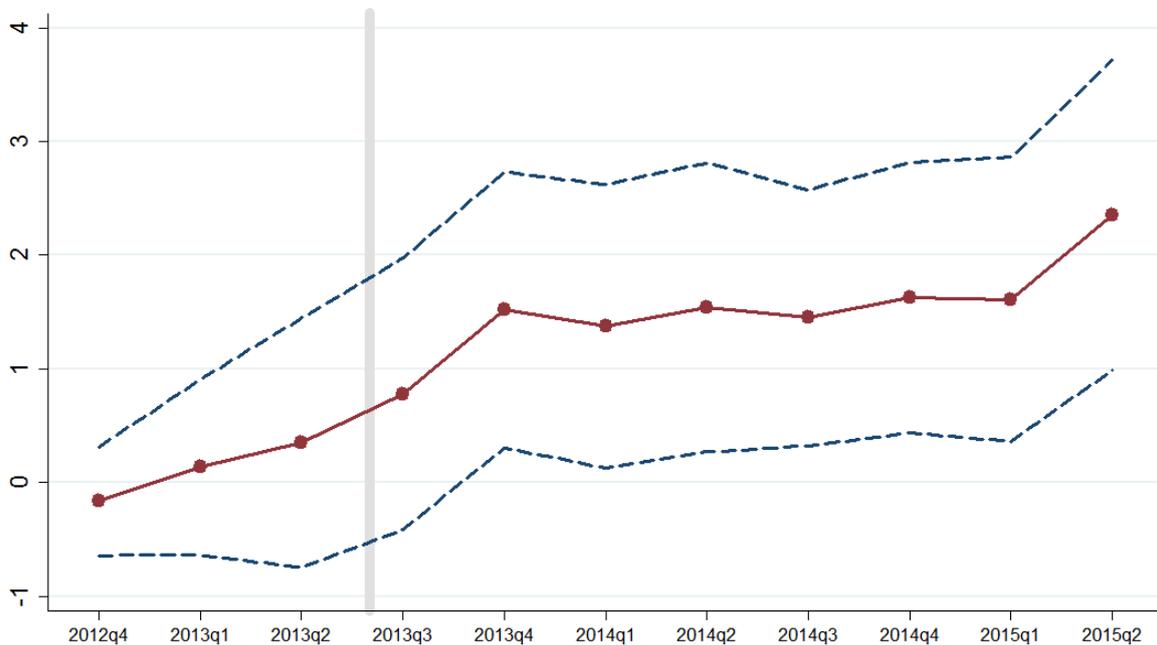


Figure 2: Diff-in-Diff Time Trends of Debt Levels

Figure 2 plots regression coefficients of $Preferred/Capital \times \lambda_{t,k}$ with 90% confidence intervals estimated from equation (4). Controls include: profitability, tangibility, sales and market-to-book. The sample period is 2012Q3 - 2015Q2 and includes treated and matched control firms. In Panel A the dependent variable is Total Debt and in Panel B the dependent variable is Long-term Debt. Standard errors are clustered by firm.

Panel A: Lev_{GAAP}



Panel B: $Lev_{Moody's}$

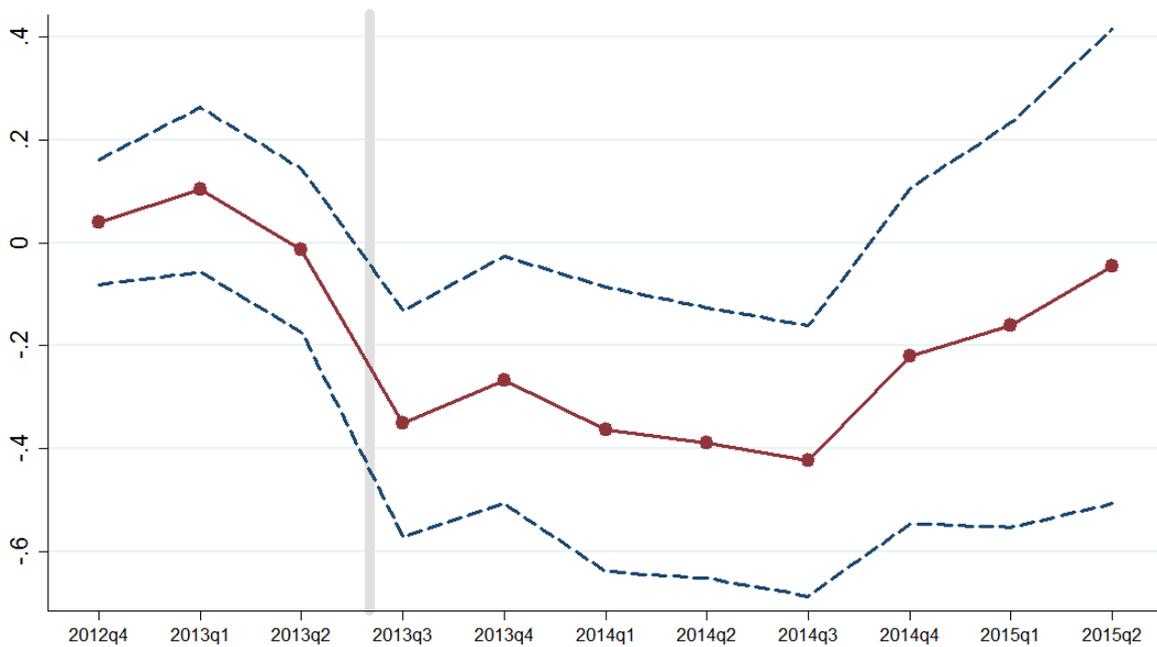
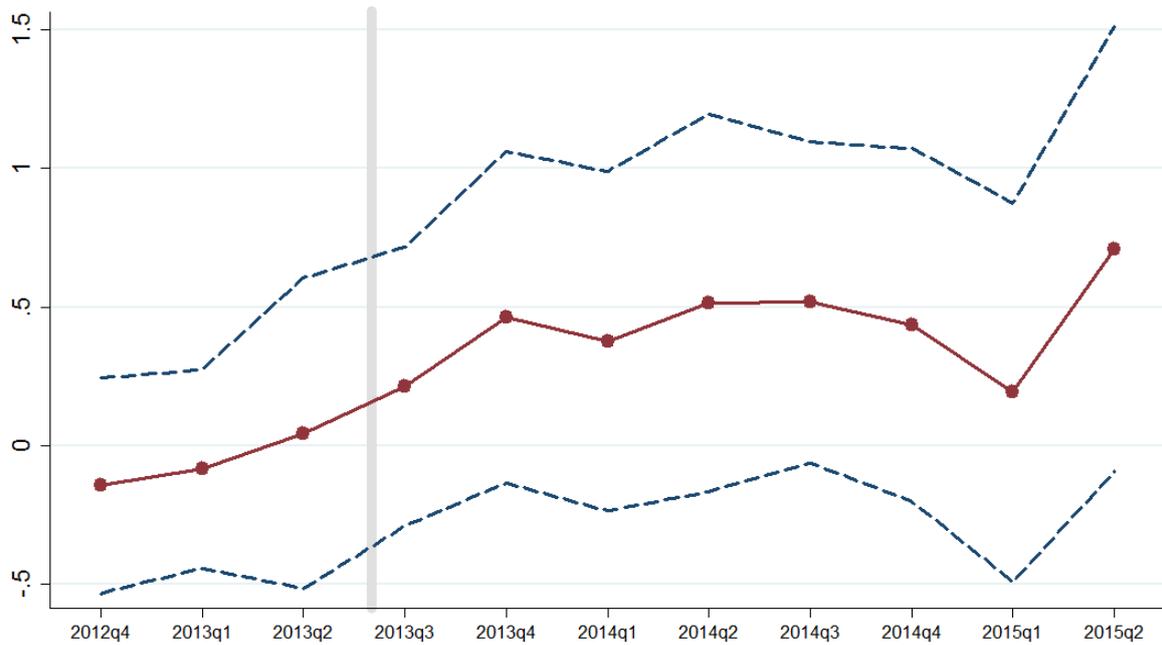


Figure 3: Diff-in-Diff Time Trends of Leverage Ratios

Figure 3 plots regression coefficients of $Preferred/Capital \times \lambda_{t,k}$ with 90% confidence intervals estimated from equation (4). Controls include: profitability, tangibility, sales and market-to-book. The sample period is 2012Q3 - 2015Q2 and includes treated and matched firms. In Panel A the dependent variable is Lev_{GAAP} and in Panel B the dependent variable is $Lev_{Moody's}$. Standard errors are clustered by firm.

Panel A: PP&E



Panel B: Assets

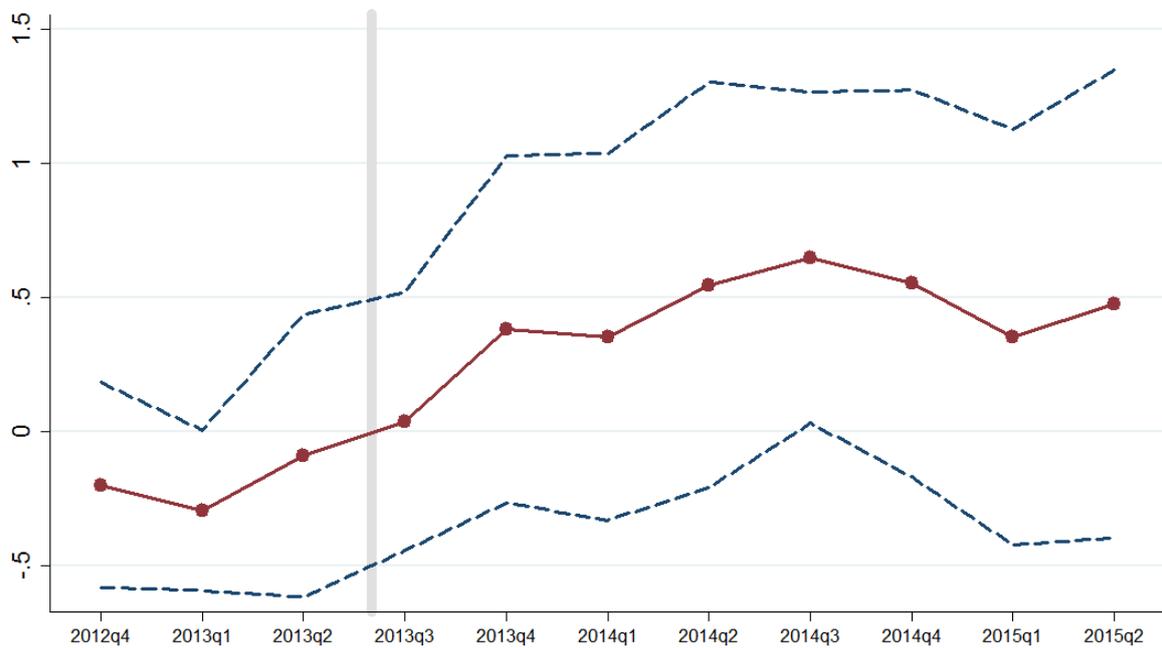


Figure 4: Diff-in-Diff Time-Trends of Assets Levels

Figure 4 plots regression coefficients of $Preferred/Capital \times \lambda_{t,k}$ with 90% confidence intervals estimated from equation (4). Controls include: profitability, tangibility, sales and market-to-book. The sample period is 2012Q3 - 2015Q2 and includes treated and matched firms. In Panel A the dependent variable is PP&E and in Panel B the dependent variable is Assets. Standard errors are clustered by firm.

Table 1: Variable Definitions

This table identifies the data sources and describes the construction of variables used in the analysis. Quarterly financial data is from Compustat, ratings data is from Thomson Eikon, stock returns are from CRSP and credit spreads are from ICE.

Variable	Definition	Comments
Total Debt	Log total debt [log(dlcq + dlttq)]	Trimmed [1,99]
Long-Term Debt	Log long-term debt [log(dlttq)]	Trimmed [1,99]
Short-Term Debt	Log short-term debt [log(dlcq)]	Trimmed [1,99]
Lev _{GAAP}	Total debt [dlcq + dlttq]	
	/ (total debt + equity [seqq (teqq if missing seqq)])	Winsorized [0,1]
Lev _{Moody's}	$= \begin{cases} \frac{D+0.5P}{D+E+P} & \text{before July 31st, 2013} \\ \frac{D}{D+E+P} & \text{after July 31st, 2013} \end{cases}$	Winsorized [0,1]
Preferred	preferred _{t=0} / 1000	
Log(Preferred)	Log(1+preferred)	
Preferred/Capital	preferred _{t=0} / (total debt + equity [seqq (teqq if missing seqq)])	Winsorized [0,1]
Market Equity	Total shares outstanding [cshoq/1000] × Price [prccq]	
Assets	Log assets [log(atq)]	Trimmed [1,99]
PPE	Log ppe [log(ppentq)]	Trimmed [1,99]
Capex	Log capex [log(1+capxq)]	Trimmed [1,99]
Market-to-Book	(Market equity + total debt [dlcq +dlttq] + preferred [pstq] + deferred taxes [txditq]) / total assets [atq]	Winsorized [1,99]
Tangibility	Property plant & equipment [ppentq] / total assets [atq]	Winsorized [1,99]
Profitability	EBITDA [oibdpq] / total assets [atq]	Winsorized [1,99]
Sales	Log sales [log(1+saleq)]	Winsorized [1,99]
Moody's Rating	1 - 22 corresponding to letter ratings (highest to lowest)	
S&P Rating	1 - 22 corresponding to letter ratings (highest to lowest)	
SP	$= \begin{cases} 1 & \text{if rated by S\&P on July 31st 2013} \\ 0 & \text{otherwise} \end{cases}$	
MJOnly	$= \begin{cases} 1 & \text{if only rated junk by Moody's on July 31st 2013} \\ 0 & \text{otherwise} \end{cases}$	
MIGOnly	$= \begin{cases} 1 & \text{if only rated IG by Moody's on July 31st 2013} \\ 0 & \text{otherwise} \end{cases}$	
CAR[-1,1]	Sum of the firm's daily stock return minus the value-weighted CRSP market return from t-1 to t+1	
Credit Spread	Firm's average option-adjusted spread, weighted by amount outstanding from ICE	
$\Delta CS[-1, 1]$	Change in firm's credit spread from t-1 to t+1	

Table 2: Summary Statistics

This table compares treated firms, all untreated speculative-grade firms and matched untreated speculative-grade firms at the time of Moody's rule change. All variable definitions are included in the Table 1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, based on a t-test.

	Treated Firms				All Untreated Speculative-grade Firms					Matched Speculative-grade Firms				
	N	Mean	Median	SD	N	Mean	Median	SD	Diff w.r.t Treated	N	Mean	Median	SD	Diff w.r.t Treated
Preferred Stock	44	0.395	0.10	1.112	431	0.000	0.00	0.000	-0.395**	164	0.000	0.00	0.000	-0.395**
Preferred/Capital	44	0.096	0.07	0.094	431	0.000	0.00	0.000	-0.096***	164	0.000	0.00	0.000	-0.096***
Book Leverage	44	0.571	0.54	0.232	431	0.588	0.55	0.248	0.017	164	0.571	0.53	0.210	0.000
Long-Term Debt	44	6.929	6.88	1.312	422	6.825	6.77	1.338	-0.104	163	6.940	6.77	1.112	0.011
Short-Term Debt	33	3.462	3.50	2.282	328	3.114	3.08	2.340	-0.348	111	2.909	3.01	2.817	-0.554
Market Equity	44	3.053	1.04	7.170	417	2.988	1.84	4.239	-0.066	164	2.894	1.14	6.407	-0.159
Market to Book	44	0.930	0.91	0.311	417	1.241	1.12	0.537	0.311***	164	0.988	0.92	0.266	0.058
Moodys Rating	44	15.227	15.00	2.078	431	14.188	14.00	1.914	-1.039***	164	14.817	15.00	1.749	-0.410
S&P Rated	44	0.886	1.00	0.321	431	0.919	1.00	0.273	0.032	164	0.945	1.00	0.228	0.059
S&P Rating	39	14.333	15.00	1.782	396	13.240	13.00	1.796	-1.093***	155	13.794	14.00	1.557	-0.540*
PPE	44	6.776	6.69	1.625	422	6.475	6.64	1.653	-0.300	164	6.689	7.01	1.837	-0.087
Profitability	44	0.012	0.01	0.014	425	0.019	0.02	0.021	0.007***	164	0.013	0.02	0.014	0.001
Tangibility	44	0.445	0.44	0.308	422	0.377	0.33	0.276	-0.068	164	0.454	0.42	0.307	0.010
Sales	44	5.974	5.96	1.546	431	6.173	6.09	1.157	0.199	164	5.958	5.75	1.292	-0.016
Assets	44	8.008	7.83	1.350	425	7.876	7.81	1.063	-0.133	164	7.938	7.81	1.067	-0.071
Observations	44				431				475	164				208

Table 3: The Effect of Rule Change on Debt Levels

This table contains results testing whether treated firms increase their debt levels after the rule change compared to matched firms. Coefficient are estimated using equation (3). The dependent variables are total debt (Columns 1 and 2), long-term debt (Columns 3 and 4) and short-term debt (Columns 5 and 6) and are all in logs. *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Preferred/Capital* is the ratio between the amount of preferred stock and the sum of debt and shareholders' equity in the last quarter prior to the rule change. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Total Debt		LT Debt		ST Debt	
	(1)	(2)	(3)	(4)	(5)	(6)
Preferred Dummy x Post	0.223*** (3.53)		0.242*** (3.64)		0.177 (0.61)	
Preferred/Capital x Post		1.267*** (3.30)		1.440*** (3.19)		2.859 (1.10)
Profitability	-0.008 (-0.03)	-0.021 (-0.09)	-0.749** (-2.03)	-0.794** (-2.08)	-1.550 (-1.46)	-1.515 (-1.41)
Tangibility	0.209 (0.46)	0.210 (0.44)	-0.028 (-0.06)	-0.032 (-0.06)	-0.219 (-0.13)	-0.208 (-0.12)
Sales	0.357*** (5.82)	0.364*** (5.98)	0.440*** (5.57)	0.447*** (5.68)	-0.202 (-0.89)	-0.222 (-0.98)
Market-to-Book	-0.036 (-0.19)	-0.041 (-0.21)	-0.063 (-0.35)	-0.073 (-0.39)	-0.301 (-0.80)	-0.316 (-0.84)
Firm FE	Y	Y	Y	Y	Y	Y
Quarter x Cohort FE	Y	Y	Y	Y	Y	Y
Firm Quarters	2448	2448	2425	2425	1730	1730
R ²	0.128	0.114	0.149	0.137	0.007	0.009

Table 4: The Effect of Rule Change on Leverage

This table contains results testing whether treated firms increase their GAAP leverage after the rule change compared to matched firms. Coefficient are estimated using equation (3). The dependent variables are Lev_{GAAP} and $Lev_{Moody's}$. *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Preferred/Capital* is the ratio between the amount of preferred stock and the sum of debt and shareholders' equity in the last quarter prior to the rule change. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firmr. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Lev_{GAAP}		Lev_{Moody's}	
	(1)	(2)	(3)	(4)
Preferred Dummy x Post	0.031*		-0.016	
	(1.69)		(-0.86)	
Preferred/Capital x Post		0.225		-0.313**
		(1.60)		(-2.05)
Profitability	-0.217**	-0.220**	-0.236**	-0.229**
	(-1.99)	(-2.02)	(-2.10)	(-2.07)
Tangibility	0.367**	0.369**	0.369**	0.361**
	(2.38)	(2.38)	(2.41)	(2.34)
Sales	-0.011	-0.011	-0.014	-0.012
	(-0.53)	(-0.51)	(-0.66)	(-0.59)
Market-to-Book	-0.070**	-0.072**	-0.079**	-0.074**
	(-1.99)	(-2.00)	(-2.17)	(-2.06)
Firm FE	Y	Y	Y	Y
Quarter x Cohort FE	Y	Y	Y	Y
Firm Quarters	2454	2454	2454	2454
R ²	0.050	0.049	0.056	0.065

Table 5: Yearly Placebo Tests

This table contains results testing whether there are similar changes in total debt in the second half of other years in which the rule change did not take place among treated and matched firms. Coefficient are estimated using equation (3). *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *After July* is a dummy variable that equals 1 if the quarter end is after July. Controls include: profitability, tangibility, sales and market-to-book. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively

	Total Debt							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Preferred x After July	0.037 (0.48)	0.049 (0.85)	-0.138 (-1.48)	-0.025 (-0.60)	-0.029 (-0.69)	0.132*** (3.03)	0.043 (1.04)	0.081 (1.15)
Year	2008	2009	2010	2011	2012	2013	2014	2015
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter x Cohort FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm Quarters	695	707	742	800	825	823	814	760
R ²	0.068	0.006	0.035	0.392	0.452	0.222	0.050	0.053

Table 6: The Effect of Rule Change on Balance Sheets

This table contains results testing whether treated firms increase their balance sheets after the rule change compared to matched firms. Coefficients are estimated using equation (3). The dependent variables are Assets, PPE and Capex and are all in logs. *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Preferred/Capital* is the ratio between the amount of preferred stock and the sum of debt and shareholders' equity in the last quarter prior to the rule change. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Capex		PPE		Assets	
	(1)	(2)	(3)	(4)	(5)	(6)
Preferred Dummy x Post	0.103 (1.38)		0.081** (2.31)		0.083** (2.23)	
Preferred/Capital x Post		0.874* (1.83)		0.473* (1.74)		0.563* (1.81)
Profitability	0.017 (0.05)	0.002 (0.01)	0.332** (2.47)	0.327** (2.39)	0.449*** (3.56)	0.442*** (3.43)
Tangibility	1.678** (2.38)	1.691** (2.38)	1.966*** (4.67)	1.967*** (4.63)	-0.410 (-1.24)	-0.407 (-1.22)
Sales	0.402*** (4.69)	0.403*** (4.70)	0.352*** (7.38)	0.354*** (7.48)	0.339*** (6.71)	0.341*** (6.78)
Market-to-Book	0.303** (2.39)	0.296** (2.26)	-0.144** (-2.21)	-0.146** (-2.22)	-0.139** (-2.07)	-0.143** (-2.11)
Firm FE	Y	Y	Y	Y	Y	Y
Quarter x Cohort FE	Y	Y	Y	Y	Y	Y
Firm Quarters	2450	2450	2454	2454	2454	2454
R ²	0.075	0.075	0.337	0.334	0.302	0.299

Table 7: Stock Price Response to the Announcement of Moody's Rule Change

This table contains an event study testing if treated firms experienced positive cumulative abnormal returns compared to matched firms. The dependent variable is the sum of the firm's daily stock return minus the market return over the return period. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Pre-Period		Event				Post-Period	
	CAR[-30,-2]		CAR[-1,1]		CAR[-1,3]		CAR[4,30]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Preferred Dummy	0.009 (0.53)		0.017** (2.04)		0.028** (2.60)		0.002 (0.10)	
Preferred/Capital		0.209 (1.31)		0.112* (1.72)		0.211* (1.75)		0.029 (0.13)
Profitability	0.115 (0.18)	0.074 (0.12)	0.916*** (2.85)	0.903*** (2.79)	1.437*** (3.66)	1.409*** (3.55)	2.121** (2.27)	2.116** (2.26)
Tangibility	0.024 (0.50)	0.027 (0.56)	-0.002 (-0.06)	-0.002 (-0.08)	-0.009 (-0.29)	-0.010 (-0.30)	-0.027 (-0.43)	-0.027 (-0.43)
Sales	-0.007 (-1.08)	-0.006 (-0.97)	0.003 (1.02)	0.004 (1.18)	0.000 (0.07)	0.001 (0.34)	0.012 (1.65)	0.012* (1.70)
Market-to-Book	-0.011 (-0.25)	-0.005 (-0.11)	0.022 (1.16)	0.020 (1.03)	0.027 (1.16)	0.023 (1.00)	-0.084 (-1.63)	-0.084 (-1.64)
Cohort FE	Y	Y	Y	Y	Y	Y	Y	Y
Firms	197	197	197	197	197	197	197	197
R ²	0.346	0.354	0.307	0.300	0.374	0.366	0.315	0.315

Table 8: Credit Spread Response to the Announcement of Moody's Rule Change

This table contains an event study testing if treated firms' credit spreads increased around the rule change compared to matched firms. The dependent variable is the change in the firm's credit spread over the period in basis points. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Pre-Period		Event				Post-Period	
	$\Delta CS[-30,-2]$		$\Delta CS[-1,1]$		$\Delta CS[-1,3]$		$\Delta CS[4,30]$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Preferred Dummy	-19.9 (-1.64)		13.5 (1.43)		16.2* (1.70)		2.3 (0.27)	
Preferred/Capital		-107.9 (-1.21)		74.2* (1.68)		96.4** (2.26)		-52.2 (-1.33)
Profitability	109.0 (0.20)	202.3 (0.38)	-489.4* (-1.97)	-552.3** (-2.36)	-385.4 (-1.62)	-456.1** (-2.12)	-8.0 (-0.03)	-60.2 (-0.22)
Tangibility	-6.2 (-0.18)	-0.8 (-0.02)	-28.4 (-1.44)	-32.3 (-1.49)	-15.2 (-0.82)	-19.9 (-0.96)	35.3 (1.46)	34.4 (1.43)
Sales	-6.8 (-1.32)	-7.6 (-1.51)	3.3 (0.90)	3.9 (1.03)	3.7 (1.15)	4.4 (1.30)	5.4 (1.27)	5.2 (1.25)
Market-to-Book	-5.2 (-0.24)	-7.1 (-0.34)	14.0 (0.94)	15.1 (0.97)	14.7 (1.02)	16.1 (1.11)	0.7 (0.04)	1.0 (0.06)
Cohort FE	Y	Y	Y	Y	Y	Y	Y	Y
Firms	83	83	88	88	88	88	88	88
R ²	0.282	0.274	0.260	0.248	0.295	0.279	0.312	0.320

Table 9: The Effect of Rule Change on Preferred Stock Levels

This table contains results testing whether firms only rated speculative-grade by Moody's at the time of the rule change increased their preferred stock levels relative to other firms rated speculative grade by either Moody's or S&P at the time of the rule change. The dependent variables are preferred divided by capital in percentage points and the log of total preferred. *MJOnly* is a dummy variable that equals 1 if the firm is only rated speculative-grade by Moody's. *MIGOnly* is a dummy variable that equals 1 if the firm is only rated IG by Moody's. The sample is restricted to firms that are rated speculative-grade by either Moody's or S&P at the time of the rule change in Columns (1) and (3). In Columns (2) and (4), the sample is restricted to firms that are rated IG by either Moody's or S&P at the time of the rule change. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Preferred/Capital (pp)		Log(Preferred)	
	(1)	(2)	(3)	(4)
MJOnly x Post	0.543** (2.36)		0.158** (2.47)	
MIGOnly x Post		-0.333 (-1.08)		-0.352 (-1.09)
Profitability	-1.081 (-1.23)	7.886 (1.13)	-0.400 (-1.32)	2.234 (1.36)
Tangibility	1.907 (0.93)	-10.453 (-0.98)	-0.603 (-0.88)	0.617 (1.05)
Sales	0.254 (1.55)	-1.091 (-1.04)	0.200* (1.95)	-0.016 (-0.18)
Market-to-Book	-0.184 (-1.32)	0.275 (1.27)	-0.009 (-0.15)	0.131** (2.40)
Sample	Junk	IG	Junk	IG
Firm FE	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y
Firm Quarters	6285	5074	6285	5074
R ²	0.003	0.081	0.008	0.013

Table 10: The Effect of Rule Change on Credit Ratings

This table contains results testing whether treated firms' ratings change after the rule change. The dependent variables, Moody's Rating and S&P Rating, are categorical variables that take values between 1 and 22 that are mapped from Moody's and S&P letter ratings where 1 is the highest rating and 22 the lowest. *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Preferred/Capital* is the ratio between the amount of preferred stock and the sum of debt and shareholders' equity in the last quarter prior to the rule change. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Moody's Rating		S&P Rating	
	(1)	(2)	(3)	(4)
Preferred Dummy x Post	-0.103 (-0.57)		-0.219 (-1.56)	
Preferred/Capital x Post		-1.423 (-1.17)		-1.000 (-1.08)
Profitability	-1.135 (-1.19)	-1.125 (-1.17)	-2.752*** (-2.83)	-2.753*** (-2.84)
Tangibility	2.271* (1.68)	2.227 (1.64)	2.145 (1.63)	2.122 (1.61)
Sales	-0.178 (-0.70)	-0.177 (-0.70)	-0.776*** (-4.32)	-0.782*** (-4.35)
Market-to-Book	-1.145*** (-3.39)	-1.132*** (-3.34)	-1.053*** (-3.35)	-1.043*** (-3.33)
Firm FE	Y	Y	Y	Y
Quarter x Cohort FE	Y	Y	Y	Y
Firm Quarters	2340	2340	2222	2222
R ²	0.079	0.081	0.212	0.208

6 Appendix

Table A.1: List of Treated Firms

Company Name (Compustat)	Fama French 49 Industry
Alcoa Inc	Steel Works Etc
Alere Inc	Pharmaceutical Products
Atlas Pipeline Partner LP	Utilities
Century Aluminum Co	Steel Works Etc
Chesapeake Energy Corp	Petroleum and Natural Gas
Cincinnati Bell Inc	Communication
Colfax Corp	Machinery
Cooper-Standard Holdings Inc	Automobiles and Trucks
Cumulus Media Inc	Communication
Dana Inc	Automobiles and Trucks
Endeavour International Corp	Petroleum and Natural Gas
EnLink Midstream Partners LP	Utilities
Erickson Inc	Business Services
Forbes Energy Services Ltd	Petroleum and Natural Gas
Gastar Exploration Inc	Petroleum and Natural Gas
General Cable Corp/De	Steel Works Etc
General Motors Co	Automobiles and Trucks
Goodrich Petroleum Corp	Petroleum and Natural Gas
HealthSouth Corp	Healthcare
Hecla Mining Co	Precious Metals
Hovnanian Entrprs Inc -Cl A	Construction
HRG Group Inc	Electrical Equipment
ION Geophysical Corp	Measuring and Control Equipment
LSB Industries Inc	Chemicals
M/I Homes Inc	Construction
Magnum Hunter Resources Corp	Petroleum and Natural Gas
Navistar International Corp	Automobiles and Trucks
NRG Energy Inc	Utilities
Nuance Communications Inc	Computer Software
Office Depot Inc	Retail
Officemax Inc	Wholesale
Penn Virginia Corp	Petroleum and Natural Gas
PetroQuest Energy Inc	Petroleum and Natural Gas
PNM Resources Inc	Utilities
Post Holdings Inc	Food Products
Regency Energy Partners Lp	Petroleum and Natural Gas
Rite Aid Corp	Retail
Sanchez Energy Corp	Petroleum and Natural Gas
SandRidge Energy Inc	Petroleum and Natural Gas
Spanish Broadcasting Sys Inc	Communication
Universal Corp/Va	Wholesale
Vanguard Natural Resources	Petroleum and Natural Gas
Warren Resources Inc	Petroleum and Natural Gas
Westmoreland Coal Co	Coal

Table A.2: Ratings and Lev_{GAAP}

The top table displays the average Lev_{GAAP} levels for speculative-grade firms in July 2013. Moody's Rating are categorical variables that can take values between 1 and 22 that are mapped from Moody's letter ratings where 1 is the highest rating and 22 the lowest. The bottom portion includes a simple cross-sectional regression in July of 2013 with Lev_{GAAP} as the dependent variable and the firm's Moody's rating as the independent variable. In Column (1), the sample is all speculative-grade firms, while in Column (2) the sample is firms rated between Caa1 and Ba3.

	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Ca	C
Lev _{GAAP}	0.397	0.460	0.502	0.549	0.623	0.580	0.640	0.780	0.356	0.885	-
N	34	48	83	72	61	61	33	11	2	1	0

	Lev _{GAAP}	
	(1)	(2)
Moody's Rating	0.039*** (7.17)	0.041*** (4.71)
Sample	All	Caa1 - Ba3
Industry FE	Y	Y
N	406	306
R ²	0.305	0.283

Table A.3: Heterogeneity in Firms' Response to Rule Change

This table contains results testing whether treated firms respond to the rule change less if they are rated by S&P. The dependent variables are *TotalDebt*, *PPE*, *Assets* and *Moody'sRating*. *PreferredDummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Preferred/Capital* is the ratio between the amount of preferred stock and the sum of debt and shareholders' equity in the last quarter prior to the rule change. *SP* is an indicator variable that equals 1 if the firm is rated by S&P at the time of the rule change. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Total Debt	PPE	Assets	Moody's Rating
	(1)	(2)	(3)	(4)
Preferred Dummy x Post x SP	-0.285 (-1.28)	-0.201 (-1.57)	-0.284** (-2.15)	-0.614 (-1.41)
Preferred Dummy x Post	0.485** (2.33)	0.267** (2.27)	0.344*** (2.83)	0.453 (1.24)
Post x SP	0.123 (1.32)	0.127** (1.99)	0.129* (1.79)	0.014 (0.05)
Profitability	0.000 (0.00)	0.340** (2.54)	0.458*** (3.66)	-1.135 (-1.19)
Tangibility	0.217 (0.47)	1.968*** (4.66)	-0.403 (-1.22)	2.314* (1.71)
Sales	0.356*** (5.91)	0.352*** (7.50)	0.339*** (6.86)	-0.187 (-0.74)
Market-to-Book	-0.038 (-0.21)	-0.146** (-2.25)	-0.142** (-2.11)	-1.155*** (-3.42)
Firm FE	Y	Y	Y	Y
Quarter x Cohort FE	Y	Y	Y	Y
Firm Quarters	2448	2454	2454	2340
R ²	0.131	0.342	0.310	0.082

6.1 Unmatched Regressions

Table A.4: The Effect of Rule Change on Debt Levels

This table contains results testing whether treated firms increase their debt levels after the rule change compared to other firms rated speculative-grade by Moody's. The dependent variables are total debt, long-term debt and short-term debt and are all in logs. *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Preferred/Capital* is the ratio between the amount of preferred stock and the sum of debt and shareholders' equity in the last quarter prior to the rule change. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Total Debt		LT Debt		ST Debt	
	(1)	(2)	(3)	(4)	(5)	(6)
Preferred Dummy x Post	0.204*** (2.68)		0.236*** (2.75)		0.059 (0.30)	
Preferred/Capital x Post		1.547*** (3.71)		1.662*** (3.36)		0.126 (0.05)
Profitability	-1.085*** (-2.62)	-1.089*** (-2.66)	-2.241*** (-5.25)	-2.234*** (-5.31)	-2.776*** (-3.96)	-2.784*** (-3.98)
Tangibility	0.318 (1.01)	0.331 (1.04)	0.269 (0.76)	0.285 (0.80)	-0.537 (-0.62)	-0.537 (-0.62)
Sales	0.414*** (6.52)	0.411*** (6.53)	0.423*** (4.86)	0.420*** (4.84)	0.316** (2.02)	0.317** (2.03)
Market-to-Book	-0.141** (-2.42)	-0.145** (-2.49)	-0.130** (-2.29)	-0.135** (-2.38)	-0.176 (-1.23)	-0.178 (-1.25)
Firm FE	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y
Firm Quarters	5259	5259	5228	5228	4133	4133
R ²	0.110	0.111	0.095	0.094	0.009	0.009

Table A.5: The Effect of Rule Change on Leverage

This table contains results testing whether treated firms increase their leverage after the rule change compared to other firms rated speculative-grade by Moody's. The dependent variables are Lev_{GAAP} and $Lev_{Moody's}$. *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Preferred/Capital* is the ratio between the amount of preferred stock and the sum of debt and shareholders' equity in the last quarter prior to the rule change. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Lev_{GAAP}		Lev_{Moody's}	
	(1)	(2)	(3)	(4)
Preferred Dummy x Post	0.043** (2.36)		-0.010 (-0.61)	
Preferred/Capital x Post		0.471*** (3.61)		-0.148 (-1.44)
Profitability	-0.325* (-1.92)	-0.320* (-1.92)	-0.310* (-1.91)	-0.312* (-1.90)
Tangibility	0.303*** (2.69)	0.305*** (2.72)	0.296*** (2.63)	0.296*** (2.63)
Sales	0.019 (1.22)	0.016 (1.12)	0.011 (0.78)	0.012 (0.84)
Market-to-Book	-0.022 (-1.00)	-0.023 (-1.04)	-0.023 (-1.04)	-0.023 (-1.03)
Firm FE	Y	Y	Y	Y
Quarter x Cohort FE	Y	Y	Y	Y
Firm Quarters	5291	5291	5291	5291
R ²	0.040	0.046	0.032	0.033

Table A.6: Yearly Placebo Tests

This table contains results testing whether there are similar changes in total debt in the second half of other years in which the rule change did not take place among treated and untreated firms rated speculative-grade by Moody's. *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *After July* is a dummy variable that equals 1 if the quarter end is after July. Controls include: profitability, tangibility, sales and market-to-book. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively

	Total Debt							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Preferred x After July	0.041 (0.54)	-0.023 (-0.43)	-0.125*** (-2.66)	-0.025 (-0.59)	-0.039 (-1.02)	0.173*** (3.04)	0.049 (1.16)	0.004 (0.14)
Year	2008	2009	2010	2011	2012	2013	2014	2015
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm Quarters	1533	1556	1615	1691	1758	1791	1729	1639
R ²	0.026	0.005	0.045	0.107	0.116	0.081	0.047	0.032

Table A.7: The Effect of Rule Change on Balance Sheet

This table contains results testing whether treated firms increase the size of their balance sheets after the rule change compared to other firms rated speculative-grade by Moody's. The dependent variables are Assets, PPE and Capex and are all in logs. *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Preferred/Capital* is the ratio between the amount of preferred stock and the sum of debt and shareholders' equity in the last quarter prior to the rule change. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Assets		PPE		Capex	
	(1)	(2)	(3)	(4)	(5)	(6)
Preferred Dummy x Post	0.046 (0.72)		0.053 (1.43)		0.048 (1.30)	
Preferred/Capital x Post		0.366 (1.08)		0.584** (1.97)		0.428* (1.70)
Profitability	-0.083 (-0.26)	-0.081 (-0.25)	-0.116 (-0.42)	-0.109 (-0.40)	-0.364 (-1.08)	-0.360 (-1.07)
Tangibility	1.060*** (2.94)	1.063*** (2.94)	-0.053 (-0.23)	-0.050 (-0.22)	2.785*** (5.67)	2.787*** (5.67)
Sales	0.369*** (6.88)	0.368*** (6.81)	0.389*** (9.90)	0.386*** (9.94)	0.434*** (7.16)	0.432*** (7.10)
Market-to-Book	0.151*** (3.14)	0.150*** (3.14)	-0.135*** (-4.07)	-0.136*** (-4.11)	-0.105*** (-3.08)	-0.106*** (-3.11)
Firm FE	Y	Y	Y	Y	Y	Y
Quarter x Cohort FE	Y	Y	Y	Y	Y	Y
Firm Quarters	5278	5278	5291	5291	5291	5291
R ²	0.054	0.054	0.300	0.303	0.373	0.374

Table A.8: Stock Price Response to the Announcement of Moody's Rule Change

This table contains an event study testing if treated firms experienced positive cumulative abnormal returns compared to other junk firms. The dependent variable is the sum of the firm's daily stock return minus the market return over the return period. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Pre-Period		Event				Post-Period	
	CAR[-30,-2]		CAR[-1,1]		CAR[-1,3]		CAR[4,30]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Preferred Dummy	-0.018 (-0.78)		0.014 (1.43)		0.028** (2.29)		0.013 (0.63)	
Preferred/Capital		-0.008 (-0.05)		0.078 (1.21)		0.170 (1.62)		0.148 (0.82)
Profitability	-1.657 (-0.99)	-1.647 (-0.99)	0.816** (2.56)	0.803** (2.52)	0.883** (2.36)	0.855** (2.29)	0.671 (1.17)	0.653 (1.15)
Tangibility	-0.068 (-0.86)	-0.066 (-0.84)	-0.000 (-0.02)	-0.001 (-0.05)	-0.019 (-0.81)	-0.020 (-0.87)	0.024 (0.70)	0.024 (0.69)
Sales	-0.001 (-0.15)	-0.001 (-0.13)	0.003 (0.93)	0.003 (0.98)	0.003 (0.67)	0.003 (0.81)	0.012* (1.88)	0.013** (1.99)
Market-to-Book	-0.016 (-0.95)	-0.014 (-0.85)	0.000 (0.05)	0.000 (0.02)	-0.002 (-0.19)	-0.002 (-0.23)	-0.005 (-0.35)	-0.004 (-0.30)
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Firms	426	426	426	426	426	426	426	426
R ²	0.140	0.139	0.163	0.162	0.181	0.177	0.163	0.164

Table A.9: Credit Spread Response to the Announcement of Moody's Rule Change

This table contains an event study testing if treated firms' credit spreads increased around the rule change compared to other junk firms. The dependent variable is the change in the firm's credit spread over the period in basis points. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Pre-Period		Event				Post-Period	
	[-30,-2]		[-1,1]		[-1,4]		[4,30]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Preferred Dummy	-16.5 (-1.22)		12.1 (1.29)		17.7* (1.85)		-2.6 (-0.25)	
Preferred/Capital		-53.1 (-0.51)		32.8 (1.09)		67.5* (1.75)		-15.3 (-0.21)
Profitability	103.3 (0.28)	131.1 (0.36)	-225.6* (-1.95)	-247.1** (-2.27)	-191.9 (-1.26)	-220.6 (-1.52)	-282.5 (-0.91)	-279.0 (-0.92)
Tangibility	-31.2 (-1.32)	-29.0 (-1.24)	-16.6* (-1.79)	-18.3* (-1.87)	-8.8 (-0.88)	-10.9 (-1.05)	-0.6 (-0.03)	-0.4 (-0.02)
Sales	-9.6** (-2.36)	-9.5** (-2.36)	3.5** (2.56)	3.4*** (2.62)	4.2*** (2.68)	4.3*** (2.84)	3.3 (0.75)	3.2 (0.73)
Market-to-Book	-4.3 (-0.56)	-3.9 (-0.52)	7.4** (2.06)	7.0** (2.01)	8.3** (2.19)	8.0** (2.15)	12.4* (1.93)	12.4* (1.94)
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Firms	216	216	222	222	222	222	221	221
R ²	0.179	0.174	0.264	0.247	0.328	0.304	0.114	0.114

Table A.10: The Effect of Rule Change on Credit Ratings

This table contains results testing whether treated firms ratings change after the rule change. The dependent variables, Moody's Rating and S&P Rating, are categorical variables that take values between 1 and 22 that are mapped from Moody's and S&P letter ratings where 1 is the highest rating and 22 the lowest. *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Preferred/Capital* is the ratio between the amount of preferred stock and the sum of debt and shareholders' equity in the last quarter prior to the rule change. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Moody's Rating		S&P Rating	
	(1)	(2)	(3)	(4)
Preferred Dummy x Post	0.003 (0.02)		-0.065 (-0.46)	
Preferred/Capital x Post		-1.069 (-1.21)		-0.299 (-0.38)
Profitability	-1.026 (-1.17)	-1.047 (-1.20)	-1.794 (-1.56)	-1.794 (-1.56)
Tangibility	0.214 (0.35)	0.193 (0.32)	0.274 (0.58)	0.271 (0.57)
Sales	-0.188** (-2.16)	-0.184** (-2.11)	-0.428*** (-4.35)	-0.428*** (-4.35)
Market-to-Book	-0.315*** (-3.00)	-0.315*** (-3.00)	-0.399*** (-3.99)	-0.398*** (-3.98)
Firm FE	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y
Firm Quarters	5051	5051	4835	4835
R ²	0.026	0.027	0.085	0.085

6.2 Additional Robustness Test

Table A.11: The Effect of Rule Change on GAAP Leverage: Different Control Groups

This table contains results testing whether treated firms increase their GAAP leverage after the rule change compared to other firms with preferred stock. The dependent variable is Lev_{GAAP} . *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Junk* is an indicator variable that equals one if the firm was rated speculative-grade by Moody's at the time of the rule change. In Columns 1 - 2 the sample is restricted to firms with preferred stock at the time of the rule change and in Columns 3 - 4, the sample includes all treated and untreated firms. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Lev_{GAAP}			
	(1)	(2)	(3)	(4)
Junk x Post	0.109*** (4.84)	0.058*** (2.62)	0.050*** (7.41)	-0.003 (-0.51)
Preferred x Post x Junk			0.060** (2.56)	0.059*** (2.58)
Preferred x Post			-0.007 (-0.62)	-0.012 (-1.09)
Profitability		0.043*** (3.36)		0.036*** (7.49)
Tangibility		-0.005 (-0.05)		0.101*** (3.00)
Sales		0.002 (0.21)		0.020*** (3.61)
Market-to-Book		-0.000 (-0.11)		-0.000*** (-3.00)
Sample	Preferred	Preferred	All	All
Firm FE	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y
Quarter x Cohort FE	N	N	N	N
Firm Quarters	5761	4922	55732	46543
R ²	0.005	0.016	0.002	0.020

Table A.12: The Effect of Rule Change on GAAP Leverage: Debt/Assets

This table contains results testing whether treated firms increase their GAAP leverage after the rule . The dependent variable is *Debt/Assets*. *Preferred Dummy* is an indicator variable that equals one if the firm had preferred stock in its capital structure in the last quarter prior to the rule change. *Preferred/Assets* is preferred stock over assets at the time of the rule change. The samples include and matched and unmatched firms. T-statistics are shown below the parameter estimates in parenthesis and are calculated using robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Debt/Assets			
	(1)	(2)	(3)	(4)
Preferred Dummy x Post	0.050*** (3.16)	0.036** (2.39)		
Preferred/Assets x Post			0.639*** (4.36)	0.370* (1.92)
Profitability	-0.526*** (-5.77)	-0.422*** (-4.03)	-0.517*** (-5.97)	-0.425*** (-4.11)
Tangibility	0.170* (1.81)	0.274** (2.50)	0.170* (1.82)	0.277** (2.52)
Sales	0.024** (2.01)	0.004 (0.21)	0.021** (1.97)	0.005 (0.27)
Market-to-Book	0.028 (1.01)	0.035 (1.12)	0.027 (0.98)	0.033 (1.03)
Sample	Junk	Matched	Junk	Matched
Firm FE	Y	Y	Y	Y
Quarter FE	Y	N	Y	N
Quarter x Cohort FE	N	Y	N	Y
Firm Quarters	5291	2454	5291	2454
R ²	0.067	0.113	0.073	0.110

6.3 Sample Language in Filings from Treated Firms

In this section we include sample language from filings of treated firms relating to ratings based triggers.

“Any further downgrade of Alcoa’s credit ratings could limit Alcoa’s ability to obtain future financing, increase its borrowing costs, increase the pricing of its credit facilities, adversely affect the market price of its securities, trigger letter of credit or other collateral postings, or otherwise impair its business, financial condition, and results of operations.” [Alcoa 10-q](#)

“Chesapeake has significant flexibility with regard to releases and/or substitutions of pledged reserves, provided that certain requirements are met including maintaining specified collateral coverage ratios as well as maintaining credit ratings with either of the designated rating agencies at or above current levels

Although the applicable interest rates under our corporate credit facility fluctuate slightly based on our long-term senior unsecured credit ratings, our credit facilities do not contain provisions which would trigger an acceleration of amounts due under the respective facilities or a requirement to post additional collateral in the event of a downgrade of our credit ratings” [Chesapeake Energy 10-q](#)

“Any further downgrade in our credit ratings and any resulting negative publicity could adversely affect our continued access to trade credit on customary terms as well as our ability to access capital in the future under acceptable terms and conditions.” [Navistar 10-k](#)

“We may be unable to issue additional debt or equity securities, or to issue these securities on attractive terms, due to a number of factors including a lack of demand, unfavorable pricing, poor economic conditions, unfavorable interest rates, or our financial condition or credit rating at the time.” [Century Aluminum 10-q](#)

“FGL’s access to funding and its related cost of borrowing, the attractiveness of certain of its products to customers and requirements for derivatives collateral posting are affected by its credit ratings and insurance financial strength ratings, which are periodically reviewed by the rating agencies. Financial strength ratings and credit ratings are important factors affecting public confidence in an insurer and its competitive position in marketing products.” [HRG Group 10-k](#)

“If there is a change of control of the Company and if the Company’s corporate credit rating is withdrawn or downgraded to a certain level (together constituting a “change of control event”), the dividends on the Series A Preferred Shares will increase to 10.75% per year.” [M/I Homes 10-k](#)

“In addition, liquidity requirements are dependent on the Company’s credit ratings and general perception of its creditworthiness.” [NRG Energy 10-k](#)

“PNMR, PNM, and TNMP cannot be sure that any of their current ratings will remain in effect for any given period of time or that a rating will not be put under review for a downgrade, lowered, or withdrawn entirely by a rating agency. Downgrades or changing requirements could result in increased borrowing costs due to higher interest rates in future financings, a smaller potential pool of investors, and decreased funding sources. Such conditions also could require the provision of additional support in the form of letters of credit and cash or other collateral to various counterparties.” [PNM Resources 10-k](#)

“Any such downgrade, or any perceived decrease in our creditworthiness, could impede our ability to refinance existing debt or secure new debt or otherwise increase our future cost of borrowing and could create additional concerns on the part of our customers, partners, investors and employees about our financial condition and results of operations.” [Westmoreland Coal 10-k](#)