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 increased the amount of equity credit 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. These firms responded by issuing debt, targeting a leverage ratio as defined by Moody's, and growing their assets. The rule change transferred value from bond to equity holders, and led to an increase in preferred stock issuance. How rating agencies assess risk thus has a significant causal impact on firms' financing, investment, and security design decisions.

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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 can exert substantial influence on firms' financing decisions. 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 prices, as well as the design of fixed income securities.

The majority of metrics used to measure the ability of a firm to meet its financial obligations (e.g. financial leverage, or debt/EBITDA ratio) include variables such as debt and capital. While such metrics are usually not controversial, how to define debt, and how to empirically measure it is a source of debate (e.g. see Welch, 2011). Rating agencies routinely adjust the debt of companies 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.[1] 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 fixed income market. We exploit an unexpected change to Moody's methodology on the equity treatment of preferred stock as an exogenous shock to firms' perceived credit risk. Specifically, 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

[1] Eisfeldt and Rampini (2008) and Rampini and Viswanathan (2013) discuss the discrepancies between the accounting and economic treatment of leases.

stock, $50m counted as debt, and $50m as equity. After the rule change all $100m counted as equity.[2] 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 4.8pp 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 stock in their balance sheet and rated speculative grade by Moody's as of July 2013. At the time, 475 US, non-financial, public firms were rated speculative (Ba1 or below) by Moody's, of which 44 (9.3%) 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 and in the same industries as the treated firms. After matching, the treated and matched untreated firms are statistically indistinguishable based on balance sheet, income statement, ratings and leverage variables at the time of the rule change.

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 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 debt, we find no

[2]Moody'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 (Hovakimian, Kayhan, and Titman, 2009 and Kisgen, 2009).

What is the source of the increased in debt capacity? One possible explanation is the rule change revealed new information about the creditworthiness of speculative-grade firms with preferred stock, deeming them less risky than previously thought, and thus increasing their debt capacity. Alternatively, the rule change may have not revealed information about risk, but agents wrongly interpret an increase in ratings as new information because they rely on credit rating agencies to avoid costly information acquisition. Finally, the rule change could have relaxed firms' financial constraints by creating slack in rating-based contracts. For example, derivative contracts often require firms to post additional collateral if they are downgraded. Moreover, bank loans and bonds are frequently structured with increases in required coupon payments, puts or collateral calls that are triggered once a firm drops below a particular rating. Ratings triggers, like other covenants, can be used to disincentivize shareholders from taking actions that destroy firm value, such as risk-shifting. Thus, a relaxation of a rating trigger would lead to an increase in debt capacity.

We test these three channels by looking at the asset side of the balance sheet as well as stock and bond price responses around the announcement of the rule change. We find that 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 property plant and equipment (PP&E) and assets. We also find that the stock prices 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 3.5%. These results are inconsistent with an information-based channel as we would expect a recapitalization and an increase or no change in bond prices as the perceived creditworthiness of firms increases. The increase in investment and the wealth transfer from bondholders to equityholders suggest that 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. While we expect firms to adapt provisions for new liabilities to the new ratings methodologies, the existing liabilities are not automatically readjusted, thus firms increase their investment at the expense of debtholders once their existing rating triggers are relaxed. The market reaction also shows that Moody's rule change was indeed unexpected.

To further validate the covenant channel, we develop cross-sectional tests based on Green (1984), who shows that convertible debt reduces the incentives for firms to engage in risk-shifting. Intuitively, the more of a firm's debt that is convertible into equity, the lower the benefits of risk-shifting because convertible debtholders receive a portion of these benefits. Hence, we test whether firms respond less to the rule change the larger the fraction of their debt that is convertible debt. Consistent with our hypothesis, we find that firms with more convertible debt issue less debt, and increase their leverage and investment less following the rule change. In summary, we argue that Moody's methodology change relaxed rating-based covenants and firms issuance, leverage and investment responses were partially driven by the value they could extract from debtholders.

Finally, the rule change not only influenced the choice of debt and investment levels, but ultimately affected the type of 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 close to tripled their levels of preferred stock relative to firms rated speculative-grade by both Moody's and S&P or 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 issuance.

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 a counterfactual, rather than matching on firm characteristics. We also find similar results if we use investment-grade firms with preferred stock as a counterfactual.

Despite the numerous contributions of the paper to the literature on the effect of rating agencies on firm behavior and financial markets, it is important to highlight the limitations of the study. Most importantly, the findings relate only to the 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 compared to control 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. While several papers have studied the effect of ratings on firm financing decisions (among many, Graham and Harvey, 2001, Kisgen, 2006, Sufi, 2007, Kisgen, 2009, Hovakimian, Kayhan, and Titman, 2009, Begley, 2013 , Adelino, Cunha, and Ferreira, 2017, Cornaggia, Cornaggia, and Israelsen (2018) and Almeida et al., 2017), our paper shows that rating agencies also influence firms through the way in which they define credit risk. We also provide evidence of the channel through which ratings influence firms' decisions. The only other paper analyzing corporate debt adjustments is Kisgen (2019), 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 stock is precisely measurable and 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 find that the rule change has a meaningful impact on both equity and bond prices. Fourth, we show how firms' responses depends on their incentives to risk-shift, which, coupled with the asset price responses, helps us distinguish the channel through which the rule change and rating agencies more generally affect firms' decisions.[3] Finally, we show that rating agencies causally affect the type of fixed-income securities firms issue.

We also contribute to the 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, Alti, 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 do not.[4] 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. The overall speed-of-adjustment is consistent with the higher end of estimates in the existing literature.

Recent papers also question the objectivity of rating agencies in assigning credit ratings (e.g. Griffin and Tang, 2012, Fracassi, Petry, and Tate, 2016, Cornaggia, Cornaggia, and Xia, 2016, Kempf and Tsoutsoura (2018) and Wang and Weitzner (2021)). In our setting, the treatment of preferred stock appears subjective 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

[3]Kliger and Sarig (2000) analyze security price responses to Moody's refinement of its ratings in 1982; however, this refinement clearly revealed new information, i.e., Moody's view of the creditworthiness of firms, to market participants, while we argue Moody's change in treatment of preferred stock did not.

[4]Or equivalently, GAAP leverage targets change.

over time. Our analysis shows that subjectivity in credit methodologies influences firms' financing, investment and security design decisions.[5]

Finally, we contribute to the empirical literature on shareholder/debtholder conflicts, risk-shifting, and covenants (Eisdorfer, 2008, Gilje, 2016, Rauh, 2008, and Gormley and Matsa, 2011). In our paper, we find evidence consistent with the rule change relaxing rating-based triggers for a subset of firms, allowing them to engage in risky investment at the expense of existing debtholders. Furthermore, the response is stronger among firms with a higher incentive to risk-shift. The majority of the existing empirical literature on covenants analyzes ex-post violation of covenants, while we arguably identify an interim relaxation of covenants.[6] Matvos (2013) and Green (2018) estimate structural models and find large ex-ante benefits of covenants. Admati et al. (2018) show theoretically that leverage ratios are inherently unstable in the absence of covenants, which is consistent with the increase in leverage we observe once rating triggers are relaxed. Our analysis suggests that tying contracts to ratings may be an imperfect tool for mitigating conflicts between debtholders and shareholders because of the sometimes arbitrary nature of rating agency methodologies.

2 Background on Rating Agency Debt Adjustments

The amount of debt of a firm may not reflect its underlying credit risk (Graham and Leary, 2011). 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 "debt-like" obligations. 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/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

[5]S&P also changed a different aspect of their methodology in 2013, as analyzed by Liu and Shivdasani (2018); however, the portion of firms rated by S&P is not statistically different across our treatment and control groups. Given this fact, it seems difficult to rationalize why the methodology change would drive our results which compare Moody's rated speculative-grade firms with and without preferred stock.

[6]For example Chava and Roberts (2008), Roberts and Sufi (2009) and Nini, Smith, and Sufi (2009).

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.

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. Heinkel and Zechner (1990) show that preferred issuance can increase total debt capacity. Nance, Smith, and Smithson (1993) argue that preferred stock can act as a substitute for hedging by reducing the probability of financial distress.

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 amount of equity credit that Moody's provides perpetual preferred stock for speculative-grade corporate issuers from 50% to 100%, e.g. $100 of perpetual preferred stock would now count as $100 of equity. At the time, Moody's

rated 475 US, non-financial, public firms as speculative (Ba1 or below), of which 44 (9.3%) 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. Suddenly, speculative-grade firms with preferred stock were deemed less levered by Moody's, even though their balance sheet did not change. The average implied change in leverage as measured by Moody's declined by 4.8pp from 61.9% to 57.1%, which corresponds to more than a notch upgrade in credit ratings.[7] Figure 1 shows the distribution of preferred stock over capital among speculative-grade firms affected by the rule change.

The rule change was permanent, as Moody's affirmed its new treatment in March 2015 (Service, 2011). Moody's did not change the equity credit given to preferred stock for investment-grade issuers and S&P maintained the original equity credit for both investment-grade and speculative-grade issuers. The rule change thus provides several natural control groups to test in the empirical analysis. Moody'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).[8]

Investors seem aware that rating methodologies can change over time, and acknowledge the potential for disruption in fixed income markets. "The behaviour of rating agencies is one of the biggest risks," said Anne Velot, head of Euro credit at AXA Investment Managers. Robert Emes, a credit analyst at JPMAM, said: "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

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

[8] 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.

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).[9]

Why did Moody's change their treatment for hybrids? The report stated that for investment grade firms, preferred stock dividends more often go uninterrupted, while riskier speculative-grade firms that are closer to default often cease preferred dividend payments. Thus, they deemed preferred stock more debt-like for investment grade firms and more equity-like for speculative-grade firms. 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

GAAP leverage, the most commonly used leverage ratio by academics and practitioners, is defined as follows:

$$Lev_{GAAP} = \frac{D}{D + E + P} \tag{1}$$

where D denotes the face value of debt, E the book value of the firm's equity besides preferred stock and P the principal of the firm's preferred stock. In defining leverage, we follow Welch (2011) and avoid the debt to asset ratio; however, the main results hold with this measure 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 analyze debt adjustments related to preferred stock because this adjustment was suddenly changed by Moody's. Moody's leverage is thus defined as:

[9] On November 27^{th} 2015, S&P suddenly changed the equity credit for a small group of European hybrids. See Euromoney (2015)

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

3 Hypothesis Development and Research Design

3.1 Rating Methodologies and Firm Decisions

In our view there are three main channels that can explain how rating methodologies affect a firm's financing and investment decisions.

Many financial contracts such as bank loans, derivative contracts, leases and trade agreements include terms that 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.[10] Covenants can be used to prevent shareholders from taking actions, such as risk-shifting, that benefit shareholders, but decrease firm value when risky debt is in place (Smith Jr and Warner, 1979).[11] Counterparties can use rating triggers to prevent firms from taking on risky investment by causing a sudden increase in the security's coupon, a collateral call, or debt acceleration when the firm is downgraded.[12] In 2002, Moody's conducted 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). According to this view, we would expect firms to respond to the rule change by increasing leverage and investment at the expense of existing debtholders and counterparties, causing an increase in stock

[10] CDS are generally more liquid but are only traded on a small universe of issuers.

[11] See also Bhanot and Mello (2006) for a theoretical motivation of rating triggers when there is a risk-shifting problem.

[12] A rating trigger may be more useful to prevent risk-shifting than a financial leverage covenant such as debt/EBITDA as a firm could easily increase its average future risk without affecting its debt/EBITDA ratio, while credit ratings reflect the expected future risk of the firm's assets. Parlour and Rajan (2018) rationalize the use of ratings for contracting purposes in an investment management context when contracts are incomplete.

prices and decrease in bond prices around the rule change.[13] We also expect that firms' Moody's ratings remain the same, and that firms that are not at risk of being downgraded by S&P will respond more, consistent with firms targeting a minimum credit rating to avoid rating-based triggers.

The second channel through which rating methodologies can affect firms is new information revealed by rating agencies. Many investors depend on ratings to perform credit risk assessments. Kliger and Sarig (2000) and Tang (2009) find that after Moody's transition from broad rating categories to narrower notches, credit spreads responded depending on the direction in which the rating moved. Firms and investors may view Moody's announcement as a real reduction in credit risk for the affected firms because Moody's revealed new information about the riskiness of preferred stock for speculative-grade firms. Suppose a firm is at its optimal leverage under the trade-off theory. After the announcement, the firm and markets learn that its expected cost of distress is lower and thus the firm issues more debt to equate the marginal cost of distress to the marginal benefit of tax shields. Since the new information is about the riskiness of the firm's liabilities not its marginal investment opportunities, we would expect a recapitalization rather than an increase in investment. In terms of asset prices, we would expect bond prices to either increase because of the new information, or remain flat if investors anticipate firms will issue more debt afterwards to offset the decrease in credit risk. We would also expect equity prices to increase because of the new information about the riskiness of the firm's liabilities and because of the ability of the firm to issue more debt to take advantage of higher tax shields.

The third way rating methodologies could influence firm's behavior is through investor herding. Firms and investors may not be aware of the rule change and merely follow the credit rating of the firm to assess credit risk. The reliance of stakeholders and investors

[13]Firms may also simply issue more debt and use the proceeds to return capital to shareholders, diluting existing liabilities. However, leverage covenants would seem to be a better tool to prevent this from occurring.

on ratings could reduce costly individual information acquisition.[14] Therefore, investors and firms would need to see changes in ratings to spur changes in firm behavior and asset prices. Under this channel, we would expect firms to increase their debt and investment following an upgrade because they would wrongly believe they are less risky. Similarly, if ratings immediately rise, we would predict the same asset price responses as in the rational information channel: stock prices would increase and bond prices would increase, or remain flat. However, we would expect not see a response from either the firm or investors unless firms' ratings increase after the rule change.

Finally, there may also be regulatory frictions as explored in Bruno, Cornaggia, and Cornaggia (2015), Kisgen and Strahan (2010), Chen et al. (2014), Almeida et al. (2017) and Bernstein (2017). For instance certain institutional investors may be required to hold investment-grade bonds.[15] In addition, capital requirements often depend on ratings for financial firms.[16] However, these channels are less likely among speculative-grade, non-financial firms. Almeida et al. (2017) exploits corporate downgrades due to rating agency policies that require corporate ratings remain below the sovereign rating of their country of domicile. Given, that the affected firms in our natural experiment are all below investment-grade and domiciled in the US, this policy does not apply.

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 rule 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 Intercontinental Exchange (ICE), we collect financial data for all US public non-financial firms that have a speculative-grade rating from Moody's (Ba1 or lower) on July 31st

[14] On 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. Cornaggia, Cornaggia, and Hund (2017) show that ratings are more optimistic in asset classes that are more profitable for rating agencies.

[15] Very few of the affected firms in our sample are even near the investment-grade boundary.

[16] Hybrids are popular securities among financial firms because of the regulatory capital they receive from them. However, the rule change we analyze in this paper only applies to non-financial firms.

2013, finding 475 firms.[17] 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 perpetual preferred stock by Moody's and were not subject to any changes in treatment. We search through reports by Moody's to see if there is mention of Moody's treatment of particular securities.[18] 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 both rated speculative-grade by Moody's and have perpetual preferred stock on their balance sheet. These firms constitute our treatment group.

Second, we proceed to find firms that are as similar as possible to the treated firms, but 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 lower market-to-book, lower profitability 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

[17] We 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.

[18] For 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).

(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.

Our identification strategy 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 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 variables used for matching, but also for other observables; (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) because preferred stock is a perpetual security, for many firms the decision to issue preferred stock 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 relies on the assumption that a firm's status as investment grade is orthogonal to its financing and investment decisions, an assumption that is harder to justify. Nonetheless, in the Online Appendix, Table A.12 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.

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

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 tests found in Leary and Roberts (2005). In all tables, we use two types of treatment variables $d_{i,c}$: (i) a discrete dummy treatment variables $d_{i,c}$ equal to one if the firm has a positive amount of preferred stock at the time of the rule change, and (ii) 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.[19] $p_{t,c}$ is a dummy variable equal to one if the time period is after the rule change. $X_{i,t}$ are the control variables profitability, market-to-book, 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.[20] The time-cohort fixed effect $\delta_{t,c}$ ensures that the treatment firm is compared only with the four 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:

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

where $\lambda_{t,k,c}$ 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

[19] For all firms unaffected by the rule change this variable equals zero.

[20] To alleviate concerns that the control variables were also affected by the rule change, causing a bias in the coefficients, we also estimate regressions keeping the value of the control variables constant as of the time of treatment throughout the sample period. In untabulated results, we find that the economic magnitude of the point estimates is even larger.

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 is to shocks to leverage.

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: only S&P ratings are statistically different at the 10% level; however, if we use a Sidak correction to control for false discoveries, we fail to reject that the treated and matched control variables are statistically different across all variables. The average book GAAP leverage of the firms is 57.1%, corresponding to a credit rating of B1 using the Moody's rating scale.[21] Hence, the average rating of firms in our sample is well below investment grade and only four firms are within two notches of investment grade. This is important, as firms near the investment-grade threshold might have strong incentive to not issue debt after the rule change, as they could see it as an opportunity to be upgraded to investment-grade and lower their cost of capital because of regulatory and institutional frictions. The average market capitalization is $3.0bn, which is slightly smaller than the average public firm in the Compustat universe of $3.8bn.

[21] Moody'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.

4 Results

4.1 Moody's Rule Change and Firms' Financing Decisions

Moody's change in the treatment of preferred stock 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 treated firms 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 the increase in total debt. Treated firms have comparable levels of debt relative to matched control firms in the year before the rule change, but then the difference rapidly increases in the first two quarters after the rule change, before plateauing.

Second, we check whether the rule change led to an increase in GAAP leverage Lev_{GAAP} (Equation (1)). 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 57.1% to 60.2% for the average firm) relative to matched speculative-grade firms without preferred stock. Assuming, the firm's book equity is unchanged, the increase in leverage is consistent with the 22% increase in debt.[22] 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 $Lev_{Moody's}$ (Equa-

[22] A 22% increase in debt corresponds to a 4.8pp increase in debt to capital assuming the firm does not adjust its book equity, which is within the confidence interval of the point estimate for leverage.

tion (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 fraction of capital 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. Figure 3 shows 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. After the first quarter, 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. 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 30% initial adjustment during the first quarter after the rule change is substantially higher than what is predicted by existing findings in the speed-of-adjustment literature. However, the adjustment speed over the full period is consistent with the literature, in which estimates range from 0% to 39% per year.[23]

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

[23]Graham 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.

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, where the control group includes all speculative-grade firms without preferred stock and find very similar results (see Tables A.4-A.11 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.12). Finally, we use debt over assets as an alternative definition of leverage, and find again similar results (Table A.13).

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 could be used to 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 similar in terms of sign and statistical significance when we use a continuous treatment variable instead of a treatment dummy (Columns (2), (4), and (6)). The 8% increase in assets is consistent with the 22% increase in debt assuming firms do not use the proceeds to return capital.[24] In untabulated results we find no increase in share repurchases or dividends, which is also consistent with firms using the proceeds from the debt issuance to increase their investment. Consistent with the time-series trend in debt and leverage levels, Figure 4 shows that the increase in the balance sheet occurs in the first year, and then it plateaus. Firms appear to be constrained by their ratings, and

[24]The average debt to assets ratio is 41.7% which translates to a 9.1% increase in assets, which is within the confidence interval of the point estimate for assets (Column (1) of Table 6).

providing them with extra debt capacity leads to more investments and a larger balance sheet. The investment response of firms is thus consistent with the contracting channel as described in Section 3.1. To provide further evidence of this channel, we next turn to the market's response to the announcement of the rule change.

4.3 Market Reactions to Moody's Rule Change

As mentioned in the hypothesis development section, the announcement of the rule change may have revealed new information that speculative-grade firms with preferred stock were less risky than originally thought, or investors simply believed there was new information because of changes in ratings. An alternative explanation is that rating triggers are used in contracts to prevent shareholders from taking actions that destroy firm value when risky debt is in place. We view the increase in investment as consistent with the contracting channel; however, we further test these channels by analyzing bond and stock price responses to the rule change.

In Table 7 we include regressions with cumulative abnormal returns (CAR), over various windows around the announcement date of the rule change. 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. In 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' prior 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.[25] 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 as 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 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 argue this negative bond price reaction, coupled with a positive price reaction in the equity market is a transfer in value from debtholders to equityholders. Note that as long as the new investment we observe following the rule change is risky, unsecured debtholders will be made worse off. Furthermore, if the new debt is pari-passu or senior to the existing debt, debtholders will also be diluted. In untabulated results we find that there is no increase in subordinated debt following the rule change; hence, the new debt

[25]The 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. Although CDS spreads would be ideal, they are not as commonly traded among speculative-grade firms.

is at least pari-passu to senior unsecured debt, which would be dilutive for the existing unsecured debtholders.[26]

We also argue these asset price responses to the rule change are evidence that the increase in debt capacity is caused by added slack in rating-based triggers in financial contracts. If an information-based channel was dominant, we would expect debt prices to increase or remain flat.

4.4 The Effect of Convertible Debt on Firms' Response to Rule Change

We now develop additional tests of the covenant channel based on which firms will have the highest incentives to risk-shift following the rule change. Green (1984) shows that convertible debt reduces the incentives of equity-holders to engage in risk-shifting because convertible debt holders benefit from risky investment through their option/equity exposure. Therefore, we examine whether firms with more convertible debt in their capital structure respond less to the rule change. Specifically, we create a variable *Convert*, which is the ratio of convertible debt to total debt at the time of the rule change, and we test whether firms with more convertible debt respond less to the rule-change.[27] 25.4% of firms in our sample have convertible debt that accounts for 19.6% of these firms' total debt. The results are displayed in Table 9, which shows that treated firms issue less debt, and invest less if they have convertible debt at the time of the rule change. For example, in Column (1) a one percentage point increase in convertible debt, results in treated firms increasing their debt by 1.5% less following the rule change. These results are consistent with convertible debt reducing firms' incentives to increase their risk at the expense of debtholders and would be difficult to explain with an information-based channel of rating influence.

Overall, we argue that our results are consistent with the hypothesis that the rule

[26] We obtain subordinated debt from the annual Compustat file as it is not reported in the quarterly file.

[27] The convertible debt field is only available in the Compustat annual file; hence, we take the last ratio of convertible debt to total debt prior to the rule change. We find similar results if we use convertible debt over assets rather than convertible debt over total debt.

change relaxed covenants, as firms increase their investment as their liabilities become riskier, and this response is stronger the greater their incentives to risk-shift. Gilje (2016) finds evidence that financial covenants are used ex-ante to prevent risk-shifting. Our results are consistent with Gilje (2016) in that once rating-based triggers are relaxed, firms with risk shifting incentives increase their risky investment at the expense of existing debtholders.

To see if firms are indeed risk-shifting following the rule change, we could test whether total firm value decreases. Unfortunately, we only have market prices and maturities for a small subset of the firms' liabilities. In order to truly test if firm value decreases we would need to know the change in value of all of the firms' liabilities, including derivative, leases, pensions, junior debt, etc.[28] Although we have strong evidence of a transfer from debtholders to equityholders, we cannot definitively claim the overall value of the firms decreased. In addition, given that we have one event, it could be the case that ex-ante covenants were put in place to prevent risk-shifting, but ex-post they are too tight and a relaxation increases firm value.

We could also test the contracting channel by looking at the presence of rating triggers directly. Unfortunately, there is a vast underreporting of rating triggers. While Moody's Investor Service (2002) found that 87.5% of US corporate issuers have ratings triggers with an average of over four triggers per company, only 22.5% of the triggers were disclosed in SEC filings[29]. Furthermore, firms may have an incentive to hide rating triggers exactly when they are more important, which could bias an analysis that only looks at disclosed triggers.[30] Consistent with the observed underreporting, using DealScan and FISD, we found three treated firms that disclosed performance-based rating triggers in their loan contracts and zero with bond rating triggers. There also exist rating triggers in bank loans that induce puts or force firms to post more collateral from rating downgrades which do not appear in DealScan (Moody's Investor Service, 2002). In addition, there

[28] In particular, the treated firm' preferred stock likely changed value substantially given their perpetual nature.

[29] In the Online Appendix, we include excerpts from treated firms filings that explicitly reference contractual ties to credit ratings.

[30] For instance Enron had many rating triggers that market participants were not aware of that hastened its demise. See Enron's Collapse: Credit Ratings; Enron Spurs Debt Agencies To Consider Some Changes

may be many other forms of triggers outside bank and bond triggers. For instance a large number of triggers are found in lease agreements, commercial agreements and derivative contracts (Moody's Investor Service, 2002). Even knowing that a trigger exists may not be sufficient for our analysis because we do not know the terms of the trigger (e.g. below what rating firms must post more collateral and how much collateral they must post). We believe our work further highlights the importance of disclosing the existence and terms of rating triggers as they appear to have material effects on firms behavior.

4.5 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 investment. However, the rule change had a broader impact beyond firms with existing preferred stock in their capital structure. The new methodology treats preferred stock more favorably for all speculative-grade firms. Thus, we should expect firms rated speculative-grade by Moody's to be more likely to increase the share of preferred stock in their balance sheets after the rule change. Unfortunately, the new methodology applies to all firms rated speculative by Moody's, limiting the options to choose a natural counterfactual. We thus consider as treated all firms that are rated speculative-grade only by Moody's, and as a control group, firms that are rated speculative-grade by both 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 stock 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.[31]

Table 10 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

[31] We find similar results when we compare firms only rated speculative-grade by Moody's to firms only rated speculative-grade by S&P but have less statistical power.

versus after the Moody's rule change. The sample is restricted to speculative-grade firms in Columns (1) and (2). We find that the use of preferred stock increases after the rule change for Moody's-only junk firms. The coefficient is not only statistically significant, but it is also economically large: Before the rule change, preferred stock accounted for only 0.33% of total capital for speculative-grade firms rated only by Moody's, and the amount of preferred stock relative to capital almost triples after the rule change. As a placebo test, we perform the same analysis on firms rated investment-grade. We would expect no change in the use of preferred stock, given that the new rule did not apply to investment-grade firms. In Columns (3) and (4) we indeed find no change in the use of preferred stock by firms only rated investment-grade by Moody's.

This analysis shows the rule change has a pervasive effect, not only on firms with existing preferred stock, but on all firms rated speculative by Moody's. Thus, the rule change has two main effects: (i) a direct one that exogenously lowered the leverage of speculative firms with preferred stock that were rated by Moody's; and (ii) an indirect effect that increased the advantage of issuing preferred stock to all speculative firms rated by Moody's. One then might worry that firms with no preferred stock at the announcement are not a valid control group in the main analysis because some of them (the ones rated speculative-grade by Moody's) are also indirectly affected by the rule change. However, the effect of the rule change on new issuance of preferred stock equally applies to both treated and control groups. Also, as shown in Table 2, the proportion of firms rated speculative-grade only by Moody's is statistically indistinguishable across our main treated and control groups.

Alternatively, one could argue that the proper treatment group for our entire analysis is all firms that were directly or indirectly affected by the rule change, i.e. all firms rated speculative-grade only by Moody's. However, the current empirical approach allows us to measure the direct and the indirect effect separately, thus showing the heterogeneity of the effect across speculative-rated firms. In fact, the direct effect appears to be much larger than the indirect effect. Therefore, we view the dominant effect as coming from firms with existing preferred stock in their capital structure.

Our evidence of increased preferred stock issuance is consistent with anecdotal evidence suggesting the rule change affected the design of hybrid securities (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 rating agencies. To our knowledge, this is the first paper showing how rating agency methodologies have a causal effect of firms' security design decisions.

4.6 Moody's Rule Change and Credit Ratings

The change in treatment of preferred stock mechanically lowered the leverage as assessed by Moody's of affected firms. This 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 11 show that Moody's ratings did not significantly change after the new methodology, consistent with firms targeting an optimal rating level.

However, 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 11 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 firms rated by S&P appear to respond less, although the statistical significance of a triple-difference test is weak given the small

number of firms only rated by S&P. This result 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 firms' financing and investment decisions.

If firms that are rated by S&P respond less, we would expect that their Moody's ratings would increase more following the rule change. In Column (4) of Table A.3 we estimate the same regressions except we include Moody's rating as the dependent variable. We find some evidence that this is the case as the coefficient on the triple difference estimate is negative, but not quite statistically significant. Although we do not have the statistical power to argue that this is definitively occurring, the direction of the coefficient is consistent with a heterogenous response among treated firms depending on whether they are rated or not rated by S&P.

Although most firms are rated by both S&P and Moody's, many firms also rated by S&P could have had room to increase their leverage without being downgraded, which explains why we see a response even among firms rated by both rating agencies.

One could argue that because we see no change in Moody's ratings, the rule change had no real effect on Moody's risk assessments. However, we find ample evidence that suggests otherwise. First, affected firms dramatically changed their balance sheets after the rule change. Second, there were economically meaningful asset prices responses around the announcement of the rule change. Third, firms rated only speculative-grade by Moody's increased the amount of preferred stock in their capital structure to take advantage of the new methodology. Furthermore, the fact ratings did not change is consistent with firms targeting a minimum credit rating.

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 are an important ex-ante contracting tool to mitigate shareholder and debtholder 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. Our evidence suggests that firms target a leverage ratio defined by rating agencies, and not by GAAP. 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 rule change increased shareholder value at the detriment of existing debtholders. Furthermore, firms with convertible debt, which theory predicts are less subject to risk-shifting incentives, respond less to the rule change. Finally, rating agencies causally influence firms' security design problem: we find that preferred stock usage close to tripled after the methodology change. Collectively, our evidence is consistent with the rule change relaxing financial constraints through rating-based covenants. We view our results as the first experiment in the literature that provides tests to distinguish between information and contract-based channels of rating agency influence.

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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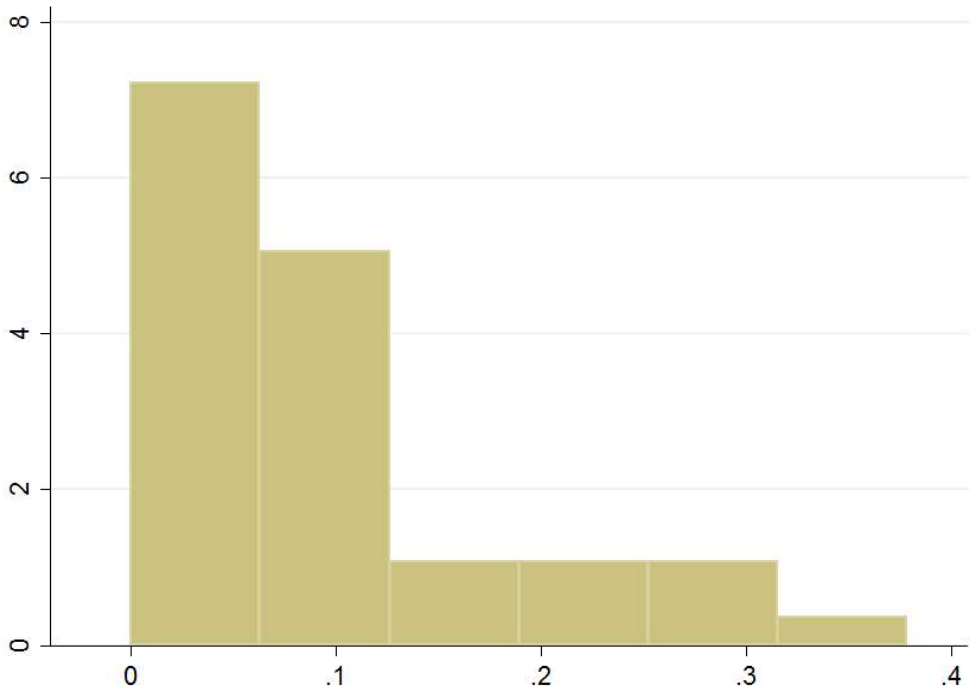


Figure 1: Preferred Stock Histogram

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.

Total Debt

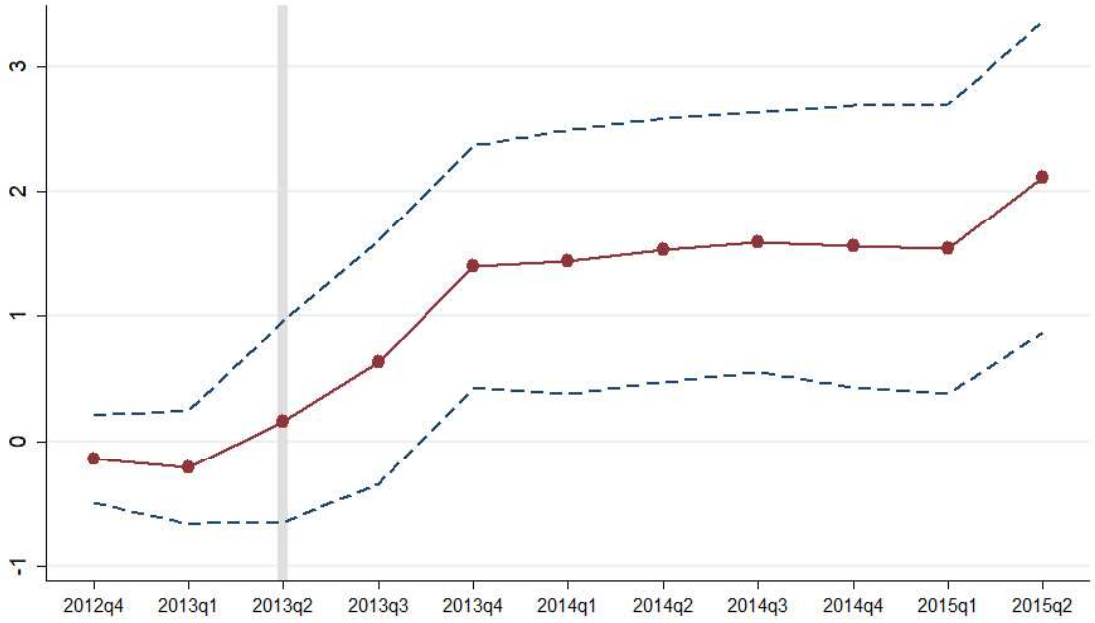


Figure 2: Diff-in-Diff Time Trends of Debt Levels

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. The dependent variable is Total Debt. Standard errors are clustered by firm.

$\text{Lev}_{\text{Moody's}}$

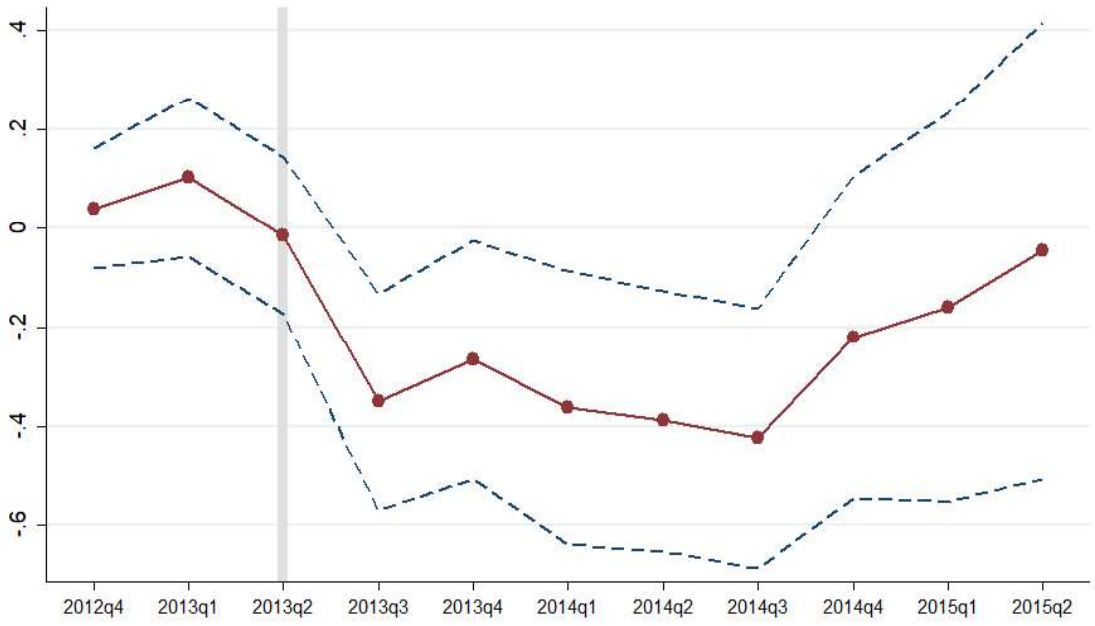
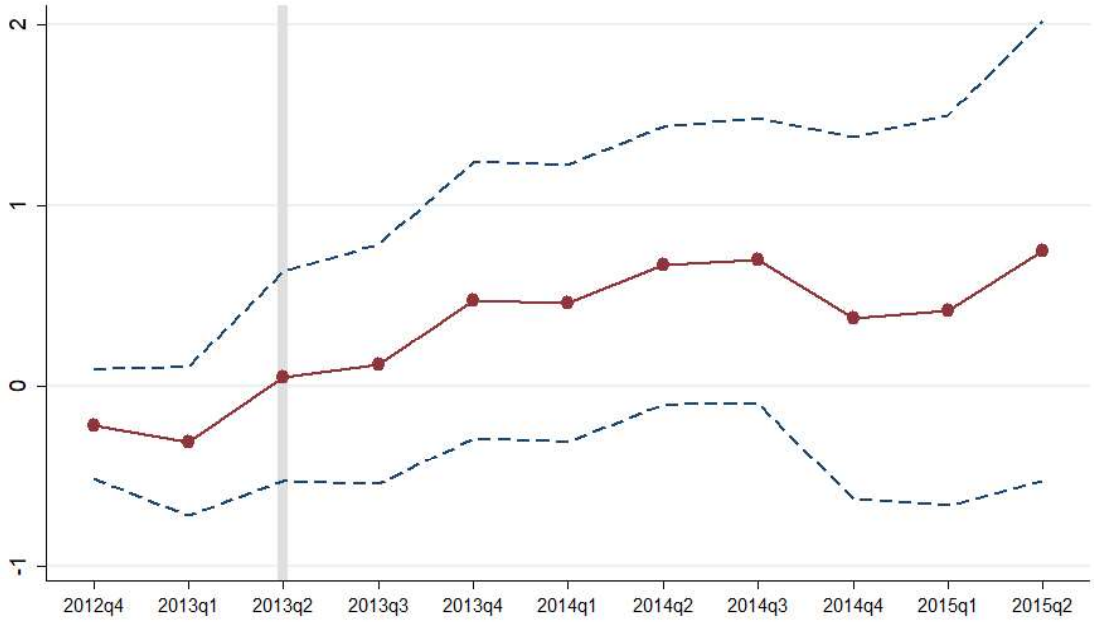


Figure 3: Diff-in-Diff Time Trends of Leverage Ratios

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. The dependent variable is $\text{Lev}_{\text{Moody's}}$. Standard errors are clustered by firm.

Panel A: PP&E



Panel B: Assets

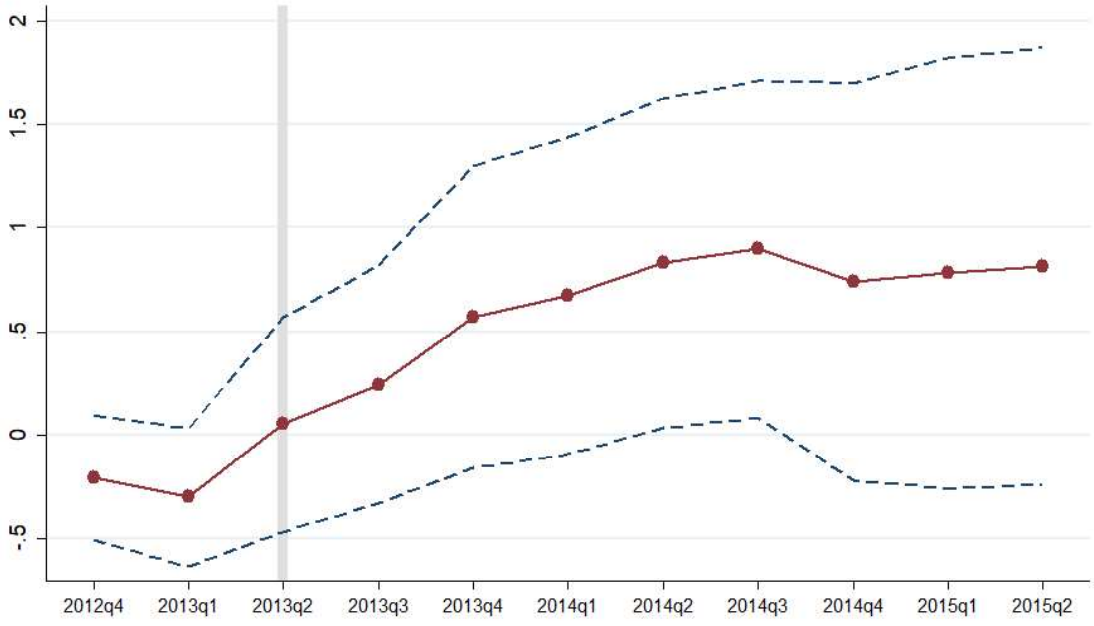


Figure 4: Diff-in-Diff Time-Trends of Assets Levels

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)]	
Long-Term Debt	log long-term debt [log(dlttq)]	
Short-Term Debt	log short-term debt [log(dlcq)]	
Lev_{GAAP}	total debt [dlcq + dlttq]	
	/ (total debt + equity [seqq (teqq if missing seqq)])	Winsorized [0,1]
$\text{Lev}_{\text{Moody's}}$	$= \begin{cases} \frac{\text{total debt +0.5 preferred}}{\text{total debt + equity}} & \text{before July 31st, 2013} \\ \frac{\text{total debt}}{\text{total debt + equity}} & \text{after July 31st, 2013} \end{cases}$	Winsorized [0,1]
$\text{Debt/Assets}_{\text{GAAP}}$	total debt [dlcq + dlttq] / total assets [atq]	Winsorized [0,1]
$\text{Debt/Assets}_{\text{Moody's}}$	$= \begin{cases} \frac{\text{total debt + 0.5 preferred}}{\text{assets}} & \text{before July 31st, 2013} \\ \frac{\text{total debt}}{\text{assets}} & \text{after July 31st, 2013} \end{cases}$	Winsorized [0,1]
Preferred	$\text{preferred}_{t=0}$ / 1000	
Log(Preferred)	log(1+preferred)	
Preferred/Capital	$\text{preferred}_{t=0}$ / (total debt + equity)	Winsorized [0,1]
Market Equity	total shares outstanding [cshoq/1000] × price [prccq]	
Assets	log assets [log(atq)]	
PPE	log ppe [log(ppentq)]	
Capex	log capex [log(1+capxq)]	
Market-to-Book	(market equity + total debt + preferred [pstkq] +	
	deferred taxes [txditcq]) / 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]
Convert	convertible $\text{debt}_{t=0}$ (dcvt) / total $\text{debt}_{t=0}$ (dlc + dltt)	Winsorized [0,1], from annual file
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	
$\Delta CS[-1,1]$	change in 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. Long-term debt, short-term debt, PPE, sales and assets are displayed in billions of dollars in this table (rather than logs as in the regressions). *, **, 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	2.422	0.97	3.895	431	1.929	0.85	3.496	-0.493	164	2.497	0.87	5.721	0.075
Short-Term Debt	44	0.323	0.01	1.501	431	0.146	0.01	0.586	-0.178	164	0.185	0.00	0.647	-0.138
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
Moody's 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	3.384	0.80	7.666	422	2.006	0.76	3.870	-1.378	164	2.951	1.11	6.274	-0.433
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	1.831	0.39	5.932	431	0.944	0.44	1.453	-0.887	164	0.986	0.31	1.813	-0.845
Assets	44	9.645	2.51	25.653	425	4.881	2.48	7.833	-4.764	164	6.076	2.48	12.659	-3.569
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***		0.242***		0.177	
	(3.53)		(3.64)		(0.61)	
Preferred/Capital x Post		1.267***		1.440***		2.859
		(3.30)		(3.19)		(1.10)
Profitability	-0.008	-0.021	-0.749**	-0.794**	-1.550	-1.515
	(-0.03)	(-0.09)	(-2.03)	(-2.08)	(-1.46)	(-1.41)
Tangibility	0.209	0.210	-0.028	-0.032	-0.219	-0.208
	(0.46)	(0.44)	(-0.06)	(-0.06)	(-0.13)	(-0.12)
Sales	0.357***	0.364***	0.440***	0.447***	-0.202	-0.222
	(5.82)	(5.98)	(5.57)	(5.68)	(-0.89)	(-0.98)
Market-to-Book	-0.036	-0.041	-0.063	-0.073	-0.301	-0.316
	(-0.19)	(-0.21)	(-0.35)	(-0.39)	(-0.80)	(-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 firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	$\textbf{Lev}_{\textbf{GAAP}}$		$\textbf{Lev}_{\textbf{Moody's}}$	
	(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	0.049	-0.138	-0.025	-0.029	0.132***	0.043	0.081
	(0.48)	(0.85)	(-1.48)	(-0.60)	(-0.69)	(3.03)	(1.04)	(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 the their balance sheets after the rule change compared to matched firms. Coefficient 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		0.081**		0.083**	
	(1.38)		(2.31)		(2.23)	
Preferred/Capital x Post		0.874*		0.473*		0.563*
		(1.83)		(1.74)		(1.81)
Profitability	0.017	0.002	0.332**	0.327**	0.449***	0.442***
	(0.05)	(0.01)	(2.47)	(2.39)	(3.56)	(3.43)
Tangibility	1.678**	1.691**	1.966***	1.967***	-0.410	-0.407
	(2.38)	(2.38)	(4.67)	(4.63)	(-1.24)	(-1.22)
Sales	0.402***	0.403***	0.352***	0.354***	0.339***	0.341***
	(4.69)	(4.70)	(7.38)	(7.48)	(6.71)	(6.78)
Market-to-Book	0.303**	0.296**	-0.144**	-0.146**	-0.139**	-0.143**
	(2.39)	(2.26)	(-2.21)	(-2.22)	(-2.07)	(-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		0.017**		0.028**		0.002	
	(0.53)		(2.04)		(2.60)		(0.10)	
Preferred/Capital		0.209		0.112*		0.211*		0.029
		(1.31)		(1.72)		(1.75)		(0.13)
Profitability	0.115	0.074	0.916***	0.903***	1.437***	1.409***	2.121**	2.116**
	(0.18)	(0.12)	(2.85)	(2.79)	(3.66)	(3.55)	(2.27)	(2.26)
Tangibility	0.024	0.027	-0.002	-0.002	-0.009	-0.010	-0.027	-0.027
	(0.50)	(0.56)	(-0.06)	(-0.08)	(-0.29)	(-0.30)	(-0.43)	(-0.43)
Sales	-0.007	-0.006	0.003	0.004	0.000	0.001	0.012	0.012*
	(-1.08)	(-0.97)	(1.02)	(1.18)	(0.07)	(0.34)	(1.65)	(1.70)
Market-to-Book	-0.011	-0.005	0.022	0.020	0.027	0.023	-0.084	-0.084
	(-0.25)	(-0.11)	(1.16)	(1.03)	(1.16)	(1.00)	(-1.63)	(-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**	
	Δ CS[-30,-2]		**Δ CS[-1,1]**		**Δ CS[-1,3]**		**Δ CS[4,30]**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Preferred Dummy	-19.9		13.5		16.2*		2.3	
	(-1.64)		(1.43)		(1.70)		(0.27)	
Preferred/Capital		-107.9		74.2*		96.4**		-52.2
		(-1.21)		(1.68)		(2.26)		(-1.33)
Profitability	109.0	202.3	-489.4*	-552.3**	-385.4	-456.1**	-8.0	-60.2
	(0.20)	(0.38)	(-1.97)	(-2.36)	(-1.62)	(-2.12)	(-0.03)	(-0.22)
Tangibility	-6.2	-0.8	-28.4	-32.3	-15.2	-19.9	35.3	34.4
	(-0.18)	(-0.02)	(-1.44)	(-1.49)	(-0.82)	(-0.96)	(1.46)	(1.43)
Sales	-6.8	-7.6	3.3	3.9	3.7	4.4	5.4	5.2
	(-1.32)	(-1.51)	(0.90)	(1.03)	(1.15)	(1.30)	(1.27)	(1.25)
Market-to-Book	-5.2	-7.1	14.0	15.1	14.7	16.1	0.7	1.0
	(-0.24)	(-0.34)	(0.94)	(0.97)	(1.02)	(1.11)	(0.04)	(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 Convertible Debt on Response to Rule Change

This table contains results testing whether treated firms' responses to the rule change are affected by the amount of convertible debt they had in their capital structure at the time of the rule change. 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. Convert is the ratio of convertible debt to total debt 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		**Lev_{GAAP}**		**PPE**		**Assets**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Preferred Dummy x Post	0.290***		0.049***		0.111***		0.117***	
	(4.04)		(2.69)		(2.77)		(2.70)	
Preferred Dummy x Convert x Post	-1.460***		-0.397*		-0.657**		-0.734**	
	(-3.27)		(-1.77)		(-2.00)		(-2.50)	
Preferred/Capital x Post		1.445***		0.292**		0.494*		0.579*
		(3.65)		(2.02)		(1.70)		(1.73)
Preferred/Capital x Convert x Post		-9.143*		-3.563**		-1.218		-0.990
		(-1.81)		(-2.44)		(-0.41)		(-0.43)
Convert x Post	0.104	-0.013	-0.001	-0.024	0.049	-0.027	0.055	-0.032
	(0.48)	(-0.06)	(-0.01)	(-0.38)	(0.26)	(-0.16)	(0.37)	(-0.23)
Profitability	-0.022	-0.029	-0.223**	-0.225**	0.326**	0.324**	0.442***	0.439***
	(-0.10)	(-0.12)	(-2.09)	(-2.09)	(2.45)	(2.36)	(3.55)	(3.41)
Tangibility	0.171	0.187	0.360**	0.362**	1.948***	1.967***	-0.430	-0.405
	(0.37)	(0.40)	(2.34)	(2.34)	(4.57)	(4.56)	(-1.29)	(-1.20)
Sales	0.347***	0.359***	-0.014	-0.012	0.347***	0.353***	0.334***	0.340***
	(5.61)	(5.90)	(-0.67)	(-0.59)	(7.18)	(7.43)	(6.52)	(6.74)
Market-to-Book	-0.051	-0.037	-0.073**	-0.070*	-0.151**	-0.145**	-0.147**	-0.141**
	(-0.28)	(-0.19)	(-2.09)	(-1.94)	(-2.30)	(-2.20)	(-2.17)	(-2.08)
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter x Cohort FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm Quarters	2448	2448	2454	2454	2454	2454	2454	2454
R^2	0.139	0.118	0.062	0.058	0.342	0.334	0.309	0.299

Table 10: 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 (P/C) and the log of total preferred (Log(P)). 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 (2). In Columns (3) and (4), the sample is restricted to firms that are rated investment-grade 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.

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

Table 11: 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		-0.219	
	(-0.57)		(-1.56)	
Preferred/Capital x Post		-1.423		-1.000
		(-1.17)		(-1.08)
Profitability	-1.135	-1.125	-2.752***	-2.753***
	(-1.19)	(-1.17)	(-2.83)	(-2.84)
Tangibility	2.271*	2.227	2.145	2.122
	(1.68)	(1.64)	(1.63)	(1.61)
Sales	-0.178	-0.177	-0.776***	-0.782***
	(-0.70)	(-0.70)	(-4.32)	(-4.35)
Market-to-Book	-1.145***	-1.132***	-1.053***	-1.043***
	(-3.39)	(-3.34)	(-3.35)	(-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