# Debt Covenants and Capital Structure: Evidence from an Exogenous Shock to Debt Capacity

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**Abstract**

This paper empirically examines how debt covenants impact the capital structure choices of firms, by utilizing an exogenous accounting based shock to the distance to covenant violation. We find that, on average, the shock to debt capacity had a positive impact on the debt choices of all treated firms, but the response was strongest by firms that were close to violating or in violation of the affected covenants, and that were otherwise financially unconstrained. Our findings suggest that debt covenants are a key component of the capital structure trade-off that influences debt choices well before they are triggered. We proceed to examine how the additional debt affected firms' corporate financial behavior and find that it did not result in an increase in investments or cash holdings, but rather was associated with lower profitability and a lower likelihood to enter default or bankruptcy. Some firms even maintained or increased their dividend payouts.

JEL classification: G01, G30, G31, G33, M21, M41

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# 1 Introduction

The existing literature on capital structure that studies the costs and benefits of leverage largely focuses on tax and bankruptcy considerations, information asymmetry, market timing, and credit supply (see Stein (2003) and Graham and Leary (2011) for detailed surveys).[1] A burgeoning new empirical literature studies how debt contracts address conflicts between debt-holders and equity-holders (à la Tirole (2006), Jensen and Meckling (1976)) through the use of covenants. These covenants are ubiquitous in public and private financial contracts and private equity (see Bradley and Roberts (2003), and Kaplan and Stromberg (2003)). They generally pledge control rights to creditors in the event of a covenant violation. Prior work shows empirically that covenant violations occur frequently, and that firms alter their corporate financial policies following a covenant violation (see e.g., Chava and Roberts (2008), Dichev and Skinner (2002), Nini, Smith, and Sufi (2009, 2012), Roberts and Sufi (2009a, 2009b)).

While the literature studies the effects of covenant violations, it does not study how covenants affect the firm's capital structure prior to violation (see Graham and Leary (2011)). In other words, while the literature studies the effects of agency conflicts on financing and corporate financial policies, it does not study how the need to *pledge* control rights affects leverage choices prior to an actual transfer of control. Hence, it is not clear whether debt covenants per se explain some of the cross-sectional variation in leverage. The challenge in testing and quantifying this empirically is that an exogenous shock to the distance to

[1] Trade-off theories highlight a number of benefits to debt, such as Jensen's (1986) free cash flow, Myers and Majluf's (1984) low private information sensitivity, and the "Pecking Order", and a number of costs to debt, such as risk shifting, Myers' (1977) debt overhang, inefficient liquidations and bankruptcy costs.

covenant violation is required, but rarely found. This paper studies the impact of debt covenants on capital structure by identifying and exploiting an exogenous shock to covenant slack, which increases debt capacity. We also study how the resulting increase in debt impacts firms' corporate financial behavior, such as investment, cash accumulation, earnings, cash flows and the likelihood of entering bankruptcy.

We exploit the Statement of Financial Accounting Standards No. 160 (SFAS 160) accounting change, which aims to harmonize U.S. accounting standards with international accounting standards. The standard took effect in December 2008 and reclassified minority interest (the minority stake in an acquired subsidiary) as equity on firms' balance sheets.[2] As we explain in Section 2.1., the reclassification of minority interest to equity caused an exogenous increase in the balance sheet equity of firms with minority interest. This increase in equity led to a corresponding increase in covenant slack for debt contracts stipulated in terms of firm equity, thereby increasing the debt capacity of firms with minority interest. For example, firms constrained by a maximum debt-to-equity covenant were given additional capacity to hold debt since the size of their balance sheet equity increased. This increase was generally not accounted for *ex ante* in debt contracts and did not engender renegotiation of contracts *ex post*.

In order to address the impact of debt covenants on capital structure, we sort firms into three treatment groups: (1) the broadest full treatment group of all firms with minority interest and covenants stated in terms of equity ("relevant covenants"); (2) firms in (1) that

[2]Firms with minority interest are firms that acquired the majority but not entirety of other firms, thus creating a minority stake in the acquired subsidiaries that is reflected on their balance sheets. For example, when firm A acquires 80% of firm B, the 20% of firm B not owned by firm A is minority interest which is recorded on firm A's balance sheet.

were close to violating their relevant covenants; and (3) firms in (1) that were in violation of their covenants. Our tested hypothesis is that all firms balance the benefits of debt with the potential costs of covenant violations, leading them to choose a buffer of equity (covenant slack).[3] We expect firms to increase their leverage — **relative to carefully constructed control groups** — when they are endowed with an exogenous increase in covenant slack, unless these firms are constrained by other costs of debt. For example, a firm that is more concerned about the risk of financial distress may not increase its debt even when presented with the opportunity. Therefore, we expect the firms in Group (1) to weakly increase their debt. Firms in Group (2) are more likely to be actively constrained by the financial covenant. Therefore, we expect this group to respond more strongly to the increase in covenant slack. Unlike groups (1) and (2), we do not have a clear prediction for how strongly firms in Group (3) will respond. On the one hand, these firms are in most need of further debt capacity and should respond most strongly. On the other hand, these firms may already be in active discussions and renegotiation with their lenders. Hence, the total effect on them is an empirical question we examine.

Consistent with the hypothesis that covenants affect capital structure, we find that all three groups respond — **relative to a host of carefully constructed and matched control groups** — and that the strength of their response increases as the size of minority interest increases. The strongest response is for Groups (2) and (3), firms that are close to violating their covenants or firms in violation of their covenants. Our results imply that

[3]Firms may avoid violations for a variety of reasons. For example, renegotiation may be costly, and it may be difficult to prove to creditors that the firm is still solvent despite the violation. More broadly, creditors may have different tastes (e.g., for risk) and they may impose such preferences on the firm when given control rights.

constrained firms with minority interest increase their debt (relative to the benchmarks) by approximately 5.5%. This shows that debt covenants constrain firms' leverage throughout the life of the debt contract. The results for Group (1) show that, on average, firms with a "relevant covenant" are actively constrained by it. Our findings survive a host of of controls and firm and period fixed effects, as well as a battery of robustness checks.

The shock we study is akin to a relaxation of a constraint, so the response should be stronger for firms for which this constraint is more binding. Therefore, we also examine how other financial constraints affect how firms respond to an exogenous shock to the slackness of their debt covenants. Specifically, we expect firms that are closer to default to be more likely to have the costs of financial distress as their binding constraint. Our hypothesis suggests that these firms are less likely to increase their leverage in response to the relaxation of the debt covenant constraint. Indeed, we find that financially constrained firms (measured by Whited and Wu (2006) and Moody's EDF and Implied CDS) do not respond strongly to the increase in covenant slack. We also find that treated firms with a credit rating are more likely to increase their leverage. These results confirm the integrated approach firms take as they trade off the costs and benefits of leverage.[4]

We proceed to test the impact of the increased debt on corporate financial behavior. In contrast to findings in earlier research, we find that firms do not use the additional capital to increase investments or to hoard cash, but rather use for the firms ongoing operations. Some firms also use the excess debt capacity to maintain or even increase their dividend payouts. We find that these decisions delay bankruptcy, thus potentially preventing or

[4]However, we do not find that firms with more tax benefits to gain from increasing their leverage respond more strongly (employing the methodology from Graham (2000)).

delaying inefficiencies such as fire sales. However, on average, these firms also increase their losses. As we discuss below, the results illustrate that the implications of financial constraints are not uniform across firms and time. Our results suggest that these specific debt covenants do not restrict firms' investment activity, and that the consequences of relaxing these covenants during the crisis are very different from the boost in investment found in times of calm.

We contribute primarily to the capital structure literature and the financial contracting literature. With respect to the capital structure literature, we use an exogenous natural experiment to show that debt covenants impact leverage decisions not only upon violation of covenants, but also *ex ante*, due to the potential transfer of control rights. We thus add to the determinants of the cross-sectional variation in leverage by focusing on the impact of debt covenants on leverage (compare Bradley, Jarrell, and Kim (1984), Titman and Wessels (1988), Rajan and Zingales (1995), Fama and French (1995), Harris and Raviv (1991), Frank and Goyal (2008), Parsons and Titman (2008), Graham (1996), Mackie-Mason (1990)). Our findings imply that firms consider the costs of inefficient investments, liquidations and bankruptcy that could result from covenant violations. Our empirical analysis shows that additional covenant slack results in higher leverage and lower probability of default, thus providing direct evidence in support of trade-off theories. With respect to the financial contracting literature, we are the first, to the best of our knowledge, to study the impact of covenants on the corporate financial decisions *before* they are violated. Hence, our results showing the effects of an exogenous increase in covenant slack augment the findings on changes in corporate financial policy *post* violation, such as declines in investments,

leverage, payouts, and debt issuances (Chava and Roberts (2008), Nini, Smith, and Sufi (2012), Roberts and Sufi (2009a)).[5]

By examining the impact of an exogenous shock to leverage on firms' corporate financial behavior, we also contribute to the literature on the economic costs of financial frictions. This literature documents that financial frictions are important drivers of corporate financial activity, including investment and dividend policy (Fazzari, Hubbard and Petersen (1988), Rauh (2006), Blanchard et al (1994)), spending on non primary segments (Lamont (1997)), the accumulation of cash and asset sales, and the use of lines of credit (Campello, Graham, and Harvey (2010), Campello et al. (2011)). See Stein (2003) for a survey. The challenge faced by this work is the inherent endogeneity in the determination of both the financial constraints and the subsequent reaction to any change in them. The investment opportunity set is jointly determined with the availability of external financing, debt maturity, and covenants (Billet, King, and Mauer (2005)). As such, financially constrained firms may be constrained precisely because their investment opportunity set is poor. This paper adds to this literature by exploiting a new exogenous shock to firms' available capital, as well as by examining this question in the heart of a financial crisis. Our results show the different economic and financial margins upon which firms adjust their behavior depending on the nature of the shock to capital, their own financial condition, and the broader macroeconomic climate.

Lastly, since SFAS 160 took effect in December 2008, we contribute to the recent line of work studying the impact of the ill consequences of the limited provision of capital to firms

[5] Compare also Beneish and Press (1993, 1995a, 1995b), Chen and Wei (1993), Sweeney (1994), Dichev and Skinner (2002), Roberts and Sufi (2009b), and Nini, Smith, and Sufi (2009).

during the crisis. Prior work documents that severely constrained firms draw down their pre-existing lines of credits (LC) as liquidity insurance (Ivashina and Scharfstein (2010)). In addition, increases in credit lines resulted in increases in investments primarily for cash rich firms (Campello, Giambona, Graham, and Harvey (2011)). Our findings add to this literature by showing that significantly constrained firms do not increase investment or increase cash holdings, but rather pour capital into the ongoing operating activities of the firm to shield themselves from default. These results suggest that banks, which are specialists in lending, curtailed their lending due to poor investment opportunities, and to prevent further losses. The limits on leverage may have been on the demand side of capital rather than due to constraints faced by banks.

The rest of this paper is organized as follows. In section 2 we provide the background for the SFAS rule and explain its incidence on firms. Section 3 discusses the data and sample construction. In Section 4 we detail our methodology. Section 5 discusses the empirical findings and their implications. Finally, Section 6 concludes and discusses future research.

# 2 SFAS 160: Motivation and Implications

In December 2007, the Financial Accounting Standards Board (FASB) issued Statement of Financial Accounting Standards No. 160 (SFAS 160) to modify the treatment of non-controlling/minority interest in a consolidated entity. Under U.S. Generally Accepted Accounting Principles (GAAP), firms are required to consolidate entities which they control. Control is most commonly determined by ownership. In particular, if the parent firm owns

more than 50% of a subsidiary's voting shares, the firm is required to report consolidated financial statements.

Broadly speaking, consolidation means that the parent firm includes the subsidiary's separable assets and liabilities on its balance sheet. The subsidiary's revenues and expenses are consolidated with those of the parent firm. When the parent owns 100% of a subsidiary the firm-parent naturally will fully consolidate the assets, liabilities, revenues and expenses of the subsidiary (excluding intercompany transactions). When the parent owns less than 100% of a subsidiary and consolidation occurs the minority interest is the portion of the subsidiary-equity not owned by the parent.

Prior to SFAS 160, the minority interest was reported in either the liabilities or in the mezzanine section between the liabilities and equity sections. As of December 15th 2008, firms are required to report the minority interest, now termed noncontrolling interest, in the equity section of the balance sheet.[6] The motivation for the rule was a desire to "improve the relevance, comparability, and transparency of the financial information that a reporting entity provides in its consolidated financial statements by establishing accounting and reporting standards for the noncontrolling interest in a subsidiary and for the deconsolidation of a subsidiary" (SFAS 160). The rule was passed as part of an overall move by the FASB and International Accounting Standards Board (IASB) to "harmonize" accounting standards.

In particular, there were two motivations for the change. First, this rule conforms with

[6]To be precise, only nonredeemable noncontrolling minority interest is included as equity. Redeemable noncontrolling minority interest is a liability (since those posessing them have the right, and the firm has the corresponding liability, to convert them), and therefore remain in the liabilities or mezzanine section of the balance sheet. However, since no distinction was made before SFAS 160, we are forced to use the entirety of the minority interest.

International Financial Reporting Standards (IFRS), which include minority interest in firm equity. Second, the rule creates uniformity in the way firms report minority interest. As noted, firms previously reported minority interest in either the liabilities or a mezzanine section of the balance sheet. The exposure draft for this rule was issued in 2005. The draft and the implementation were not motivated by the financial crisis; the timing of the implementation in late 2008 was coincidental.

The effect of this change can easily be illustrated using the balance sheet of the AES Corporation in Figures 1 and 2, and in the Appendix. In 2008, the AES Corporation reported a minority interest of $3,418M, a total stockholders' equity of $3,669M, and $18,091M of total debt, resulting in a debt-to-equity ratio of 4.93. Its minority interest of $3,418M (of which $3,358M were noncontrolling interests relevant to the accounting change) were in a mezzanine section of the balance sheet and not included in the equity tally. After the accounting change took effect at the end of 2008, the restated 2008 balance sheet had a total equity of $7,027M (the sum of the $3,358M minority interest and the $3,669M of shareholder's equity), reducing the debt-to-equity ratio to 2.57. While AES is an extreme example, it illustrates the potential additional slack some firms stood to gain in their debt covenants solely as a result of this accounting change.[7]

The timeline for the enactment of SFAS 160 can be seen in Figure 3, which also documents the stock market reaction found in Frankel, Lee, and McLaughlin (2010). The potential impact of this change on leverage ratios did not go unnoticed in the accounting literature both before the rule was passed and in the time subsequent to its enactment. Urbancic

[7] AES also made a minor adjustment to the 2008 reported debt amount that was unrelated to SFAS 160. They amended the total debt number to $17,690M, which led to a lower ratio of 2.52.

(2008) examines the balance sheets of the 50 largest U.S. corporations that reported minority interest for 2007, and finds the lowest change in the debt-to-equity ratio to be 4.1%. For most of these firms, the change was larger than 10%. Mulford and Quinn (2008) examine the anticipated implications of the changes in FASB Statements 160 and 141(R) on 876 public firms reporting minority interests, and find measurable changes to some debt ratios, emphasizing that for some industries and firms theses changes could be significant.[8] See also Leone (2008) and Detriech (2010). In addition, the FASB exposure draft noted that some banks had concerns as well. For example, "Wells Fargo and ACLI questioned the usefulness of the proposed classification of equity. They expressed concern about the impact that classifying noncontrolling interests in consolidated equity will have on key financial and performance ratios" (FASB Exposure Draft, Comment Letter Summary).[9]

## 2.1 Was the Accounting Rule "Accounted" For?

Covenants generally do not automatically readjust in response to mandatory accounting rule changes. This decision impacts the interest rate on the loan (see Beatty, Ramesh, and Weber (2002)). Covenants generally use "rolling GAAP" as opposed to "frozen GAAP" (Leftwich (1983), Gopalakrishnan and Parkash (1995), and Christensen, Lee, and Walker (2009), for

[8] In particular, Mulford and Quinn (2008) document that "(1) shareholders' equity will increase by 2%, though 10% of the companies will see increases of over 25%; (2) income from continuing operations will increase by 3%, though 12% of the companies will see increases of over 25%; (3) liabilities to shareholders' equity will decline by 2%, though 10% of the companies will see declines of over 20%; and (4) times interest earned will increase by 1%, though 9% of the companies will see increases of over 10%."

[9] See http://www.fasb.org/project/FASB_Noncontrolling_Interests_CL_Summary.pdf for a summary of the comment letters associated with the SFAS 160 exposure draft. These concerns were likely related to the "power" the rules afford the borrowers.

U.K. evidence).[10] Under "rolling GAAP", the covenants reflect the accounting rules as they are at the time, as opposed to the way they were at the time the contract was signed. Similarly, Frankel et al. (2010) state that "...frozen-GAAP agreements are uncommon because of potentially significant costs associated with converting financial statements to those that would exist under prior GAAP (arrangements) and keeping two sets of books".[11] They find that in the pre-SFAS 160 periods only 46 out of 450 examined credit agreements (10.2%) use a definition of net worth that would not be affected by the accounting change. In the contracts examined in the post-SFAS 160 period, this number was even lower – 30 out of 384 (7.8%). Deviations from "rolling GAAP" need to be explicitly included. This suggests that the vast majority of contracts were affected. Furthermore, although renegotiations of debt contracts are not uncommon, they do not always occur even when covenants are violated. Campello et al. (2011) find, regarding credit lines, that for more that one-third of their sample firms a violation did not lead to any renegotiation. In our case, it is even less likely this change would trigger a renegotiation that would neutralize the positive shock to borrowers. This is because the direction of the change benefits borrowers. Thus, while some sophisticated lenders may have noticed the changes, they would have to renegotiate existing contracts to the detriment of their borrowers. This may be possible, for example, when there are repeat relationships involved. However, on average, whether renegotiations take place or not, the borrowers exposed to treatment will improve their standing. Furthermore, if some renegotiations occur or if some firms choose not to respond to the shock out of fear

[10] Practitioners acknowledge this as well. See for example, Steven Marks, Managing Director & Head of U.S. REITs, Fitch Ratings, AICPA – CPA Letter Daily, October 26, 2011.

[11] Mandatory accounting changes can also impose additional contracting costs because they increase the costs of the investigation and resolution of unintentional violations (Leftwich (1983), Watts and Zimmerman (1990), Beatty et al. (2002)).

of a detrimental impact on their borrowing relationships, this will weaken the magnitude of the average empirical response. Thus, the findings in this paper can be seen as somewhat weaker than the full response by firms to a relaxation of the slack in their debt covenants.[12]

The impact of other mandatory accounting changes on firm value and behavior, under the assumption that the debt covenants did not adjust to incorporate the changes, has been documented before. For example, Lys (1984) documents a negative stock price reaction related to SFAS 19 (full cost accounting for oil and gas exploration), and Espahbodi, Espahbodi, and Tehranian (1995) document a positive stock price reaction to SFAS 109 (recognition of deferred tax assets). More recently, the Frankel et al. (2010) study above documents abnormal returns surrounding the release of SFAS 160 and further finds these returns to be increasing with the level of minority interest.[13]

Finally, despite the discussions surrounding the rule it was only in February 2011 that Capital IQ (a leading provider of financial data and analytics) send out a letter to its members cautioning that calculations should be reviewed and that the Compustat variables relating to noncontrolling minority interest and equity were updated to account for this change.

[12] It would be interesting to examine whether the response was different for firms that had longer relationships with their lenders. However, given the structure of our data, where a unit of observation is a firm quarter, and where we identify constrained firms based on the most restrictive relevant covenants they have, it is difficult to do so. Firms have multiple lenders with differing realtionship histories, which are difficult to aggregate.

[13] However, they did not examine the effect of firms that were constrained by affected covenants.

# 3 Data

## 3.1 Sample Construction

We extract loan and covenant information from the Loan Pricing Corporation (LPC) DealScan database. LPC describes the DealScan database as having trillions of dollars of "large corporate and middle market commercial loans filed with the Securities and Exchange Commission or obtained through other reliable public sources. The size of the deals in the database may vary from $100,000 to as much as $13 billion. In addition to commercial loan information, LPC gathers an increasing number of private placements". Data are mostly from publicly held companies required to file with the SEC, as well as private companies with public debt securities traded that are required to file as well. There are also data on deals obtained from LPC's direct research, however, since we are interested in obtaining current accounting information we only use deals that can be matched to Compustat. We look at all loans in effect during our sample period, which is generally 2007-2009.[14]

We examine the impact of SFAS 160 on all loan covenants in DealScan. We focus on the covenants that were affected by SFAS 160 and where the directional effect is clear. These are covenants that include either equity or liabilities, but not total assets. Covenants based on EBITDA and cash flows (e.g., debt-to-EBITDA) might be affected, but such an effect, if any, is not clear. EBITDA and cash flow calculations are not standardized, as private lenders make adjustments to GAAP and customize these financial statement variables in their credit agreement.[15] We are also careful to examine the reliability of the DealScan

[14] We experimented by including 2010 and found similar results.

[15] Cash flow, for instance, is defined in more than a dozen ways (Leftwitch (1983), Dechow and Skinner

coding by manually checking a random sample of credit agreements. [16]

The accounting change mechanically caused the equity section on the balance sheet to increase and the liabilities section to decrease by the amount of nonredeemable noncontrolling interest. Therefore, both the debt to equity and the leverage ratios decline since equity in the denominator increased, while both the net worth and the tangible net worth covenant ratios increase since liabilities decreased while equity increased. As a result, debt-to-tangible-net worth decreases. We focus on these covenants. We generally treat the covenant data similarly to Chava and Roberts (2008).[17] When there are overlapping deals, the relevant covenant is the tightest one. When the covenants adjust dynamically over the life of the loan, we linearly interpolate the covenant thresholds.

We match these data to nonfinancial firms in the Compustat database using the link file created by Chava and Roberts (2008), and compare the covenant requirement as it is in effect at the time. Our unit of observation is a firm-quarter (as opposed to deal or facility), as the

(2002), Chava and Roberts (2008)). As another example, if EBITDA is calculated as operating income plus depreciation and amortization, it will not be affected by SFAS 160. In contrast, if EBITDA is calculated as net income, plus income tax expense, plus net interest expense, plus depreciation and amortization, it might be affected as the definition of net income has changed due to SFAS 160. If the calculations employ net income before income attributed to noncontrolling interest, the ratio can either increase or decrease the EBITDA value since either income or loss may be attributable to noncontrolling interests in any given year. Thus, since we cannot estimate the impact of SFAS 160 in such cases, we exclude these ratios from our treatment groups.

[16] This allowed us to use the leverage ratio. The leverage ratio is defined by DealScan in its glossary as "debt divided by capitalization", where capitalization is equal to total debt plus total equity (or total debt plus net worth). While many firms define the term "Leverage Ratio" differently, DealScan classifies and codes only total debt to total capitalization as "Leverage Ratio" and for example will code the debt to EBITDA ratio as "Max Debt to EBITDA", regardless of the term the company and creditors use in the credit agreement. We verify the definition of "Leverage Ratio" on DealScan in forty randomly selected credit agreements. For examples see the five-year credit agreement for Amerada Hess Corp, dated May 12, 2006 (http://www.sec.gov/Archives/edgar/data/4447/000095012306010116/y23908exv4.txt), AARON Rents Inc credit agreement, dated May
23, 2008 (http://www.sec.gov/Archives/edgar/data/706688/000095014408004514/g13676exv10w1.htm), and Ametek Inc credit agreement, dated September 17, 2001
(http://www.sec.gov/Archives/edgar/data/1037868/000089322001500851/w54582ex10-1.txt) ).

[17] See their appendix for full details.

covenant match is intended to identify a group of firms that receive treatment, thus when more than one of the same covenant type exist, we track the most restrictive one. As shown in Chava and Roberts (2008), the merged sample is similar to the Compustat universe.[18] Table 1, Panel A describes the prevalence of these covenants in our matched sample.

We compare the firms' corresponding accounting variables to the requirements in the aforementioned covenants and use three measures. Affected firms are firms that have covenants that are affected by SFAS 160. A firms is considered "Close" to violation if it is within 30% of the covenant threshold. A firm is a "Violator" if its accounting variables breach the covenant requirement. A firms is "Constrained" if it is Close but NOT in violation of a debt covenant. For example, if the covenant specifies a net worth requirement of 100M. A firm with a net worth below 130M is Close; below 130M and above 100M is Constrained; and below 100M is a Violator. Table 1, Panel B describes the prevalence of these thresholds.[19]

### 3.1.1 Bankruptcy Risk

We identify default risk by employing the Expected Default Frequency (EDF$^{TM}$) produced by Moody's Analytics, which is a widely used predictor of default probability and a credit risk measure. In particular, EDF$^{TM}$ is an objective, forward-looking probability of default metric, which is calculated based on Moody's default database and leverages market data,

[18] There is noise in this comparison since the Dealscan database contains aggregate information on the loans and does not adjust for any special definitions the contract may have. As noted by Li (2010), Dichev and Skinner (2002), and Leftwich (1983), there may be some variance in the manner in which "debt" and "net worth" are defined in the covenants. This adds noise to our analysis. We still include these covenants since much of the discussions on the adverse effects of the accounting change was centered around these covenants and there is no systematic noise introduced. We also use the net worth and tangible net worth covenants used by Chava and Roberts (2008) and Dichev and Skinner (2002).

[19] Note that these are not exclusive sets, but rather alternative definitions for being constrained. The Close measure, for example, will contain all firms in the Constrained and Violator groups.

industry, volatility, financial statement data, and historical default information in a proprietary financial model (for further discussion see Garlappi, Tao, and Yan (2008)).[20] We also use Moody's EDF Implied 5 year CDS spread, which is the spread on a five-year CDS for a given entity, as calculated by the Moody's KMV valuation model. We define High EDF as a firm that is within the highest tenth percentile of EDFs. For robustness, we also examine the probability of being dropped from Compustat and/or liquidated as a proxy for entering severe financial distress.[21]

## 3.2 Data Description

Table 1 summarizes our DealScan data. Panel A describes the sample of firm quarters with available covenant data. Of our sample, more than 9% of the firm-quarter observations have at least one covenant on DealScan. The number of observations with at least one covenant is 2,936, 2,914, and 2,601 in 2007, 2008, and 2009, respectively. Out of the sample of covenants, the most prevalent covenant is the leverage ratio, which constitutes between 3.7% and 4.1% of the sample. In contrast, the debt-to-equity ratio is much less popular and constitutes less than 0.21% of our sample. The second most prevalent covenant is the net worth covenant, constituting between 3.34% and 3.69% of our sample. The tangible net worth covenant constitutes between 2.3% and 2.54% of our sample. Finally, the debt-to-tangible net worth covenant constitutes between 1.2% and 1.4% of our sample.

[20] "EDF$^{TM}$ measure is constructed from the Vasicek-Kealhofer model (Kealhofer (2003a, 2003b)), which adapts the contingent-claim framework of Black and Scholes (1973) and Merton (1974) to make it suitable for practical analysis."

[21] Compustat includes a status alert variable, and CRSP has delisting codes. We generally prefered the CRSP codes since they record the event time. They are also better populated than Compustat's STALTQ. These measures all include some noise, but none that we see as systematic.

Table 1, Panel B shows that our sample is well populated, meaning that we have a considerable number of constrained firms with minority interest. As mentioned above, we sort our sample into the three groups of financial constraints: violators, firms that are close to violating covenants (including violators), and non-violating firms that are close to violating covenants. The data show that approximately 50% of the sample firms that are close to violating a debt covenant are already in violation.

Table 2 reports the summary statistics of our sample firms. Panel A reports summary statistics for affected firms with minority interest, Panel B reports the summary statistics of affected firms without minority interest, Panel C reports the summary statistics for constrained firms with minority interest, and Panel D reports the summary statistics of constrained firms without minority interest. We separate our sample based on minority interest, as firms with minority interest are potentially different than firms without minority interest. Minority interest arises from acquisitions and firms that engage in acquisitions are potentially different from firms that do not because firms that engage in acquisitions tend to be larger and more mature.

Table 2 shows that the sample of affected and constrained firms with minority interest is not significantly different than the corresponding sample without minority interest. The main difference associated with minority interest is size. Specifically, firms with minority interest are larger on average than firms without minority interest. However, with respect to the primary variable of interest, total debt, constrained firms with and without minority interest are very similar (27% and 25%, respectively). The firms are also very similar in terms of our other variables of interest, such as cash holding, profitability and investments.

# 4 Empirical Method

**Treatment is not allocated randomly. To receive treatment, firms must have two features: minority interest and covenants stated in terms of equity.[22] Given the nature of treatment – a point-in-time change in accounting variables – the ideal control group would trend in exactly the same way as the treatment group would have trended absent treatment. Our goal is thus to construct a control group that would have trended identically. The accounting change provided a discrete windfall of debt capacity since its incidence depends on the size of firms' minority interest, a variable that firms (and especially constrained firms) have little control over. However, both of the treatment features (minority interest and the covenants) select a certain type of firms, and our treatment occurs during the end of 2008 — a volatile economic climate. We control for the changes over time in the two obvious control groups: firms with minority interest and firms with relevant covenants. We are thus controlling for the general effects on firms with minority interest — which are firms that make acquisitions and often more diversified. We are also controlling for firms with similar covenants in their loan contracts. However, our treatment group is firms that have both characteristics (minority interest and relevant covenants). Thus, to account for the possibility that these treatment firms are differentially affected at the**

[22] It is possible that the accounting change will affect firms' borrowing when they have minority interest, even if they do not have exisiting affected covenants. Such would be the case if lenders looked at bottom line equity numbers and did not examine the balance sheet more closely. We view this possibility as less likely and therefore focus on firms that we know were affected.

**specific *time of treatment* we go further in our methodology. The variety of specifications and robustness tests we introduce are aimed at making sure that we account for any difference in the treatment and the control groups at the time of treatment. We thus experiment with a host of specifications, including adding control variables discussed in previous work (see for example Roberts and Sufi (2009a) and Chava and Roberts (2008)), we explore other data samples, we examine differential effects of these groups in other time periods, we look at our outcome variable in levels and in changes, and we used a propensity score matching procedure to construct a control group. Once again, ee recognize that our treatment took place during a volatile economic environment and we want to ensure that the difference in behavior can be strictly attributed to treatment and not the result of different economic opportunities. Our results are corroborated across all of our tests.**

Firms are classified as treated based on their characteristics *at the time of the accounting change*. This ensures that we are comparing firms that have not yet been affected by the treatment. In other words, we hold firms' status as affected or not, and their total minority interest fixed (both based on their status before the accounting change) – our treatment group is constant. We compare the evolution over time of the treatment and control group outcome variables.[23] In all of our analyses we control for firm fixed effects and year-quarter dummies.[24] This takes out the average firm specific characteristics, so that we can focus

[23] We note that an adjustment of minority interest for constrained firms, such as by making acquisitions, is not exceeding likely. However, holding the treatment and control groups fixed provides a cleaner analysis.

[24] We also control for the denominator 1/(total assets).

on the changes over time. We also verify graphically that the difference in treatment and control groups is at the time of treatment and not the result of an existing trend. Variables are generally scaled by assets, following past work, to control for scale.

Our specifications range from double differences to quadruple differences. The simplest specification is that for measuring the effect on the "affected" firms. This is the first group described above: all firms that receive treatment because they have minority interest and affected covenants. We compare the evolution of this treated group to the control group of all other firms in our sample, as well as to a more restricted control group of firms that only have one of the two necessary conditions for treatment: firms with affected covenants but without minority interest. The affected firms with minority interest are firms that receive treatment, but do not necessarily benefit from it. They receive additional slack in their covenant constraint, but are not necessarily anywhere near violating it. For some of these firms, the covenant constraint may be binding. For others, it will most likely be slack.

The majority of our specifications are triple differences. Here, the treated group is the subset of treated firms that are likely to benefit from the treatment: firms that are close to violating a covenant or are already in violation of the covenant. For these firms a weakly broader range of shocks to their equity will cause them to trip the covenants. These regressions will generally take the following form:

$$\begin{aligned} y_{it} &= \alpha_i + \delta_t + \gamma X_{it} + \beta_1 Constrained_{2008} * POST + \beta_2 MIB_{2008} * POST \\ &\quad + \beta_3 MIB_{2008} * Constrained_{2008} * POST + \varepsilon_{it} \end{aligned}$$

where $\alpha_i$ are firm fixed effects, $\delta_t$ are year-quarter fixed effects, $X_{it}$ are controls, $Constrained_{2008}$ is the relevant constraint measure, $POST$ is the period after 2008, and $MIB$ is one the of measures of minority interest (either a dummy for having minority interest at all, or a continuous measure for the amount of minority interest). Given the firm fixed effects, the coefficients measure the change in the outcome variable engendered by an increase in the corresponding explanatory variables, where the focus is on $\beta_3$, the triple interaction term. This measures the change to the treated firms in the post period, and assuming the change is exogenous, this will identify the causal reduced form impact of the increase in debt capacity on the treated group. Thus we are not worried about baseline differences in observables, unless there is something in these differences that would cause the treatment and controls groups to *trend differently at the time of treatment*, after controlling for their individual fixed effects (which represent the average effect of their covariates over time), time fixed effects, and a host of controls. Throughout the analyses we cluster (or block bootstrap when relevant) the standard errors by firm to flexibly control for serial correlation.

The quadruple difference specifications arise when looking within the treated group at firms that are likely facing other financial constraints. Here our tests confirm that firms that are likely to be worried about entering default are less likely to respond to treatment.

As we detail below, robustness exercises include introducing of a host of control variables, testing the treatments groups against a variety of control groups, and comparing the treatment and control group trends across different time periods. In unreported results, we also use a rich propensity score matching **with block bootstrapped standard errors** to mechanically construct a tailored control group and obtain a similar treatment effect.

Finally, our results hold when using changes in leverage or debt issuance as the dependent variable. Our identification argument is therefore based on a large series of specifications and falsification tests and several empirical methodologies all corroborating the same empirical findings.

# 5 Empirical Findings

The difference in difference methodology assumes a structural break in the differential effect on the treated group. To ensure that the difference in the post period is indeed the result of a "jump" following treatment as opposed to a monotonic increase over time, which could also generate statistically significant coefficients, we begin with the pictures in Figures 4 and 5. Figure 4 plots the difference in total debt between affected firms with minority interest compared to affected firms without minority interest. The figure shows that firms that were affected by the new accounting standard increased their leverage (after controlling for firm and period fixed effects).

Figure 5 studies the difference between firms with minority interest that are close to violations (including violators) with minority interest and other firms during the time period. Note that firms generally reduce their leverage following the financial crisis in late 2007. This trend continues in 2008-2009. In contrast, constrained firms with minority interest increased their debt during the treatment period.[25] **While some anticipatory effects are likely present,** the figure clearly indicates a "kink" at the end of 2008, when SFAS 160 was first

[25] Once again after removing the fixed effects.

adopted.

## 5.1 The Impact on Debt

We begin our empirical analysis by examining all affected firms, which are firms with covenants affected by SFAS 160. The results are reported in Table 3. We test whether affected firms with minority interest increase their debt in response to the added slack in their debt contracts.[26] The findings indicate that affected firms increase their long-term debt and total debt. In addition, we limit the sample to firms with affected covenants. Within this restricted group, we test whether the firms with minority interest increase their debt. Consistently, we find that within the group of affected firms, the firms with minority interest increase their long-term debt and total debt. We find similar results when we employ minority interest (Panel A) and when we employ an indicator variable for firms with minority interest (Panel B). The confirmation of our findings within this smaller sample helps alleviate the concern that there may be some unobservables that make firms with covenants different from those without covenants and that these unobservables are causing the effect.

We continue our empirical analysis by zeroing in on firms that are treated and close to violating, but not in actual violation. These constrained firms are likely to benefit from the treatment, but are not already actively saddled by a violation of a covenant. Here too, we test whether constrained firms with minority interest increased their short-term debt, long-term debt, and total debt after the adoption of SFAS 160 in 2008. Table 4 reports

[26] We stress that throughout the paper we are looking at the effect of treatment and therefore all discussions regarding an increase in debt are relative to the control groups and after removing fixed effects. A positive treatment effect would also result from both treatment and control groups decreasing their total debt if the control groups experience a sharper decrease than that of the treatment group.

our results for constrained firms. Panel A reports results when we employ minority interest while Panel B employs an indicator variable for firms with minority interest. For robustness, we include the control variables employed in Roberts and Sufi (2009a).[27] For brevity, we do not report the coefficients on these variables. None of the controls significantly alter our treatment effects.

Consistent with the findings in Table 3, the results indicate that constrained firms increase their leverage when they received an exogenous increase in their covenant slack. Specifically, the findings indicate that constrained firms increase their total debt by increasing their long-term debt. The findings are robust to the inclusion of the covenant control variables employed in Roberts and Sufi (2009a). These control variables significantly reduce our point estimates with respect to short-term debt. When the control variables are included, the coefficient on our interaction term loses significance in the short term debt specification. But, our main findings, that firms increase their total debt, is not significantly affected by the control variables.

The analysis in Table 4 excludes firms in violation. On the one hand, firms in violation of covenants are in most need of further debt capacity and should respond most strongly. On the other hand, these firms may already be in active discussions and renegotiations with

[27]Following Roberts and Sufi (2009), the model includes lagged natural logarithm of total assets, the lagged tangible assets to total assets ratio, the lagged market-to-book ratio, and a lagged "has SP rating" indicator as control variables. In addition, covenant control variables include 11 covenant control variables: the lagged book debt to assets ratio, the lagged net worth to assets ratio, the lagged cash to assets ratio, the lagged and current EBITDA to lagged assets ratio, the lagged and current cash flow to lagged assets ratio, the lagged and current net income to lagged assets ratio, and the lagged and current interest expense to lagged assets ratio. Control variables also include four covenant control interaction variables: the lagged debt to assets ratio interacted with the lagged cash flow to lagged assets ratio, the lagged debt to assets ratio interacted with the lagged EBITDA to lagged assets ratio, the lagged debt to assets ratio interacted with the lagged net worth to assets ratio, and the lagged EBITDA to lagged assets ratio interacted with the lagged interest expense to lagged assets ratio.

their lenders which could limit their response, and therefore we separately examine the total effect on this group empirically.

The results in Table 5 suggest that both firms in violation and firms that were close to violating debt covenants increase their total debt in response to SFAS 160. The increase in total debt for violating firms is due in large part to an increase in short-term debt. This is in contrast to constrained firms, which mainly increase their long-term debt. The size of the coefficient on our interaction term in Panel A (approximately 0.9) implies that the increase in debt is approximately the same size of minority interest. The coefficient on our interaction term in Panel B implies that firms close to violation and having minority interest increase their debt by approximately 6% following the passage of SFAS 160.

Our findings are consistent with our expectations that the response is stronger as the covenant constraint is more likely to be binding. Specifically, for the full group of affected firms with minority interest the coefficient on our interaction term is 0.774. For violators, the coefficient is higher at 0.915. For our group of "close" firms (including violators), the coefficient increases to 0.965. The largest response was among the covenant constrained firms that were not in violation. Their respective coefficient is 1.013. These are the firms that are likely to be worried about the small "buffer" they have before they trip a covenant, but also are not actively constrained by a control right transfer due to a violation.

**The classification into current and long-term depends on the firm operating cycle or year, whichever is shorter. Thus, a debt taken for or due within 13 months would be classified as long-term debt. Consistently, an 11 month debt would be classified as short-term. Also, due to passage of time or refinancing**

**of existing debt, the debt can move between the classifications. Finally, most revolving credit facilities are defined as short-term debt. Therefore, the most important result concerns total debt, which does not include any of these current versus long-term classification issues and only includes interest baring debt.**

In unreported results, we ran additional robustness tests. First, we used the list of covenant violations compiled by Nini, Smith, and Sufi (2009)[28] (hereinafter the NSS sample). They obtained this list by searching 10K and 10Q filings from the EDGAR website, matching them to Compustat, and using a PerlScript (script search engine) to look for words suggestive of a violation in the filings. We considered firms to be constrained when they violated a covenant in the quarters preceding the enactment of the accounting change. The findings are consistent with our reported results insofar as violating firms increased their leverage after the passage of SFAS 160. Second, we employed the change in debt as a dependent variable. Our findings indicate that the increase in leverage is in fact due to an increase in debt. Specifically, constrained firms that were positively affected by SFAS 160 positively "changed" their debt as a response. We also conducted a (stratified and radius) propensity matched sample analysis. Here, we constructed a balanced sample of firms based on their financials and covenant controls prior to the shock, and compared their outcomes to our treatment group. Standard errors were block bootstrapped. Our results are very similar.[29] All tests are economically and statistically significant and imply that constrained firms use the increased slack in debt covenants to increase their leverage. Finally, we ran our analysis during different time periods, and did not find a placebo effect.

[28] For more on the data see the Data Appendix in Nini, Smith and Sufi (2009).
[29] Our treatment coefficient is 0.044 and statistically significant.

### 5.1.1 The Impact of Financial Constraints

The prior tests show that firms that were constrained by debt covenants increase their leverage when their covenants were exogenously relaxed. These findings imply that the covenant constraints were binding. However, covenant constraints may reflect true financial constraints. In such cases, firms should not increase their leverage when the covenant is exogenously relaxed since they are still facing the risk of inefficient liquidation. For our empirical tests, we employ three measures of financial constraints, none of which are based on debt covenants: the Whited and Wu (2006) measure of constraints ($WW_{i,t}$), the Moody's Analytics Expected Default Frequency ($EDF_{i,t}$), and Moody's implied 5 year CDS spread ($ICDS_{i,t}$). Low and High denote the lowest and highest quartile of the respective measure. In these specifications, we focus on the treatment effect for firms at the high and low ends of the financial constraint measures. The results are reported in Table 6. For brevity, we only include the fourth interaction term in the tables although all interaction terms are included in the regression model.

Our findings confirm and complete the central results of the paper. Firms that were not financially constrained did not increase their leverage. For example, firms with high credit default swap spreads reduced their leverage even though their debt covenants were relaxed. Specifically, the treatment effect for firms with high implied $ICDS_{i,t}$ is the sum of the coefficients [0.042+(-0.056)=-0.014], while for firms with low implied $ICDS_{i,t}$ the debt increased by [0.047+0.031=0.078]. These results are echoed in the $EDF$ sample. They hold qualitatively for the $WW$ sample as well, although here we lose some statistical power.

The findings in Table 6 along with the results in Tables 3-5 support the view that in the debt vs. equity trade off firms take an integrated approach to viewing the potential costs of debt.

These findings also add another component to help explain Graham's (2000) under-leverage results, as firms restrict their leverage to avoid both the costs of violating debt covenants and the risks of default and inefficient liquidation.[30]

### 5.1.2 Credit Ratings

Chava and Roberts (2008) suggest the use of credit ratings as an ex ante proxy for the misalignment of incentives and information asymmetry between borrowers and lenders. In particular, the presence of public bond prices for firms with credit ratings and their tendency to be less risky than non-rated firms are expected to reduce both information asymmetry and agency problems between borrowers and lenders (for further discussion see Chava and Roberts (2008)). The evidence in Table 7 indicates that firms with credit ratings and minority interest increase their total debt in the period following the adoption of SFAS 160. Given that these are firms that are not in violation, this could be interpreted as evidence that firms with less agency conflicts and more external transparency balance more carefully the costs and benefits of debt, and, therefore, are more responsive to the increase in covenant slack. However, given the coarseness of this proxy, we view these results as merely suggestive.

[30] In untabulated results we take this inquiry further. We follow the Graham's (2000) methodology and simulate the "kink" and distress costs, and examine whether firms that were close to violating or in violation of covenants were more likely to increase their leverage if their kink, or tax benefit, was higher. Our results do not indicate any additional response by this group.

## 5.2 The Impact on Corporate Financial Decisions

Having explored the manner in which the increase in debt capacity led to an increase in debt, we now examine the manner in which the treated firms use this debt. In what follows, we examine a broad range of corporate financial decisions including investments, cash holdings, financial performance, dividends and share repurchases, and bankruptcies and severe distress.[31]

### 5.2.1 Investments

We examined the change in a host of investment measures. The results for total long-term investments are reported in Table 8, Panel A. In addition to firm fixed effects and year-quarter fixed effects, we use the standard control variables for investment regressions: cash flows and Macro Q (see e.g., Rauh (2006)).[32] Our findings imply that firms do not use the cash for investments. In fact, the coefficient is generally negative.

These results imply that increasing debt capacity exogenously does not increase investments. Financially constrained firms may even reduce investments when their debt capacity increases, as they choose other corporate financial activity. In unreported results, we also do not find any significant effect on employment, or capital expenditures.[33] These results may be specific to our sample as the sample period of 2007-2009 was different from the samples

[31] We examined all different line items on the balance sheets and income statements that would "balance" the increase in debt (e.g., long-term assets, capital expenditures, working capital, inventory), and for brevity report only those items that changed.

[32] Macro Q, an alternative measure of Tobin's Q, is defined as the sum of debt and equity less inventory divided by the start-of-period capital stock. Salinger and Summers (1983), Erickson and Whited (2000), and Chava and Roberts (2008) argue that Macro q has better measurement quality than Tobin's Q.

[33] For brevity we did not tabulate these results.

commonly used in investment regressions. During this period, firms generally reduced their investments and raised their cash holdings. Investments are also not significantly related to cash flows or Tobin's Q, as they were in prior work examining the preceding decade. This implies that in times of crisis, when investment opportunities are slim, our treatment firms were not actively constrained by their debt covenants with regards to their investment behavior. It is also possible that risky investments become less attractive when firms can obtain more financing and they no longer opt to gamble their last dollars on resurrection.

### 5.2.2 Cash Holdings

There are theoretical models and empirical evidence suggesting that firms' cash holdings were rising. Bolton, Chen, and Wang (2011) show theoretically how firms build financial slack by accumulating cash with which they speculate and hedge. Almeida, Campello, and Weisbach (2004) show that constrained firms save more cash from cash flows. Bates, Khale, and Stulz (2009) show that average cash-to-assets for U.S. industrial firms more than doubled from 1980 to 2006, and this trend is especially pronounced for firms with more idiosyncratic cash flow volatility (compare also Campello, Graham, and Harvey (2010), Duchin, Ozbas, Sensoy (2010), and Lin and Paravisini (2010)). Therefore, we test whether our sample firms increase their cash. The results are reported in Table 8, Panel B. Our results imply that constrained firms with minority interest did not increase their cash holdings. In fact, we find the opposite. The coefficient on our interaction term is negative in all models.

### 5.2.3 Financial Performance

In order to test the financial performance for firms with increased debt capacity, we employ three different measures: Income before extraordinary items excluding depreciation, income before extraordinary items and operating cash flows. Note that the net income definitions are not affected by SFAS 160. The results are reported in Table 9. Our findings indicate that firms take on additional debt to finance their ongoing operations, and that they perform poorly, as indicated by their lower profitability. These results are stronger the further away firms are from violation. However, the treatment group's operating cash flows are statistically indistinguishable from those of the control groups.[34] Our profitability results hold for income before interest expense as well, indicating that the decline in profitability is not due to an increase in interest expense.

### 5.2.4 Dividends and Share Repurchases

We test whether constrained firms with minority interest increase their dividends and share repurchases. The results are reported in Table 10. We find a positive effect on dividends for firms that had higher levels of minority interest. These results are significant for the continuous measure of minority interest, but not for the entire treatment sample. We do not find significant results for share repurchases. Our findings are thus marginal and we present them cautiously. They suggest, however, that some firms with large minority interest

[34]The coefficient is significant only when we employ $DMIB_i$. In unreported results, where we employ $MIB_i$ in our interaction term, our findings become statistically insignificant. This result is not surprising as we do not expect the firms' overall performance to be related to the size of minority interest. The size of minority interest depends mainly on the portion of the subsidiary held by the parent, and there is no reason to believe that this ownership is associated with subsequent performance.

increased their dividends relative to the control groups.[35]

### 5.2.5 Bankruptcies and Severe Distress

Here we test whether the increase in the debt capacity reduced the default probability. We utilize the Moody's Analytics' Expected Default Frequency ($\text{EDF}^{TM}$), which reflects the probability of entering default in the next year, and document in Table 11 that the expected default probability is more likely to decline for constrained firms, post 2008, if they have minority interest. The coefficient on $MIB_i \times Constrained_{i,t} \times POST$ is negative and statistically significant for constrained firms for both $\text{EDF}^{TM}$ overall and for the top decile of the $\text{EDF}^{TM}$ distribution. These results suggest that access to additional debt in the short-term helps firms avoid bankruptcy. However, we find similar results when we employ the implied 5-year CDS spread measure, which suggests that firms are able to increase their survival probability over a longer horizon. This may be driven by our findings that the financially unconstrained were the most likely to increase their leverage. **Our results raise the possibility that by relaxing the short term constraints on financing firms lower the probability of default in the short and medium term.** The results

[35] On average, dividends decreased for unconstrained firms, both with and without minority interest.

Note that since most firms in our sample do not distribute dividends (see Table 2), our results are likely driven by the constrained firms that had minority interest and increased dividends post 2008. An extreme example of this phenomenon is HCA Holdings Inc. HCA is a private firm with public debt (it went private in 2006), that declared no dividends in 2008-2009, but in 2010 declared $42.5 of dividends per share ($4.257B). The firm paid the dividends using cash from operating activities ($3.085B for the year) and using net proceeds of $2.533B from their debt issuance and debt repayment activities. In particular, the firm issued $2.912B of long-term debt, paid back $2.268B of long-term debt, and drew $1.889B from the revolving credit facility despite having negative payments of $1.335B on the same credit facility in the previous year. The firm further spent $1.039B on cash flows from investment activities, and its cash holdings increased from $312 million in 2009 to $411 million in 2010. Hence, it is clear that they could not cover the entire dividend and the investment payment from the operating cash flow or from their cash and cash equivalents. Therefore, the firm must have benefitted from its increase in capital obtained through debt.

for violators were not significant, suggesting that once in violation, additional debt capacity no longer reduces default probability.[36]

# 6 Discussion and Conclusion

This paper exploits SFAS 160, an accounting change that went into effect at the end of 2008 and that increased the equity for firms with minority interest on their balance sheets. Our empirical method isolates the effect of the exogenous increase in debt capacity for firms with affected debt covenants. We find that firms with affected covenants increase their leverage when an exogenous shock increases their covenant slack. Moreover, firms that were constrained by these affected covenants, take particular advantage of this shock and increase their debt, whether they violated or were close to violating the covenants. In addition, firms' reactions to the shock show that they consider the impact of other financial constraints and their likelihood of default. These results suggest that debt covenants affect capital structure before they are violated. They suggest that, from the perspective of firms, the covenant-constrained-optimal capital structure levels are not optimal *ex post*. Firms exploit the relaxation of constraints and increase their debt for the purpose of providing more funding for their ongoing operations. From the perspective of firms, the imposition of debt covenants therefore has a cost. These findings add to the understanding of leverage decisions in the cross section and to the implications of financial frictions for corporate financial behavior.

We also explore how firms use the additional funds. The story that emerges from

[36] The results are statistically weaker for the indicator variable $DMIB_i$, once again suggesting that high levels of minority interest were necessary to have an effect.

our analysis of all relevant corporate financial policies and a host of bankruptcy measures differs from prior empirical research. Unlike previous studies, which use different shocks and examine different groups of firms during different economic climates, we do not find that firms increase investments when their debt capacity increases. Firms also do not use the funds to increase their cash reserves, but rather either distribute the funds to the shareholders or pour them into the operations of the firm, often enabling further losses. In doing so, these firms are able to avoid or at least delay bankruptcies.

These combined results do not suggest that creditors are hurt by the increase in leverage.[37] Firms remain cognizant of their financial constraints and default probabilities decrease. The results also do not suggest that the covenants were suboptimal *ex ante*. The emerging picture is that this shock allowed firms to increase their leverage when doing so was not detrimental to creditors and to maintain operations at least temporarily.

There are several possible explanations for our different findings regarding the economic response of firms. First, our focus is on a particular group of constrained firms during a severe recession. Investment opportunities were not abundant, especially for constrained firms, and many firms had to struggle for survival. This may rationalize the different behavior of these firms. It is possible that healthier firms would have positively benefitted from more access to capital, and that this access would have also had positive macroeconomic effects. Second, our empirical method is different. Rather than exploring a quasi discontinuity around the covenant violation, we look at a discrete shock. This identification strategy is markedly different and relies on different assumptions.

[37] In unreported results we examine the CDS response to the announcement of SFAS 160; however, the general volatility in the markets during this period makes it hard to isolate a robust effect.

The effect of an intervention in market-based financial constraints is at the heart of the current debates on stimulating the economy. Specifically, many see a link between increased bank lending and increased investments, economic growth and employment, and from there draw the conclusion that bank lending should be encouraged. Others would afford more discretion to the banks and trust their expertise in the field of lending. In this paper we show that the increase in lending caused by an exogenous shock during the heart of the crisis does not have the real effects found in other work, which is consistent with banks not lending more during the crisis due to limited investment opportunities. However, since we cannot rule out all supply side stories including the possibility than banks attached informal limitations on the use of funds, we cannot verify that the lack of investment response was purely demand driven. We therefore leave these important policy implications for future work.

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# Appendix: An Example of The Impact of SFAS 141R and 160

Assume that firm P (the parent firm) acquires 80% of the equity shares of firm S (subsidiary) for $1000. P assesses that the fair value of the noncontrolling interest (the value of the remaining 20% firm S that P has not acquired) is $200. P assesses that the fair value of firm S's identifiable net assets is $900 on the acquisition date (net assets = assets – liabilities). The book value of net assets, which is equal to the book value of equity, is $700.

## Purchase Price Allocation Based on Old GAAP

Under the old accounting rules, goodwill is the difference between the purchase price and the majority share of the fair value of identifiable net assets. The minority interest is the minority share of the subsidiary's identifiable net assets at book value. The minority interest is included in either the Liabilities or Mezzanine section of the balance sheet. Under consolidation, the net identifiable assets of the subsidiary are consolidated based on fair value. The figure below summarizes the consolidation under the old GAAP rules.

**Old Standard:**

Goodwill: 1000 – 900*80% = 280

Minority Interest = 20% *700 = 140 (Mezzanine/Liab.)

Net consolidated assets = 700 +(900 – 700)*80% =860

Cash ↓ (1,000)
Other Assets ↑ 860
Equity =
Mezzanine/Liab. ↑ (140)
Goodwill ↑ 280

## Purchase Price Allocation Based on New GAAP

Under the new accounting rules, goodwill is calculated by summing the purchase price and the fair value of noncontrolling interest and then subtracting the fair value of identifiable net assets. The minority interest (now named "noncontrolling interest") is the fair value of the noncontrolling interest. The noncontrolling interest is now included in the equity section of the balance sheet. Under consolidation, the net identifiable assets of the subsidiary are consolidated based on their full fair value. The figure below summarizes the consolidation under the new GAAP rules.

**New Standard (141R and 160):**

Goodwill: (1000+200) – 900 = 300

Noncontrolling Interest = 200 (Equity)

Net consolidated assets = 900

Cash ↓ (1,000)

Other Assets ↑ 900

Equity ↑ (200)

Goodwill ↑ 300

| | 2008 | 2007 |
|---|---|---|
| **LIABILITIES AND STOCKHOLDERS' EQUITY** | | |
| CURRENT LIABILITIES | | |
| Accounts payable | $ 1,042 | $ 1,067 |
| Accrued interest | 252 | 255 |
| Accrued and other liabilities | 2,660 | 2,626 |
| Non-recourse debt—current portion | 1,074 | 1,142 |
| Recourse debt—current portion | 154 | 223 |
| Current liabilities of discontinued and held for sale businesses | — | 169 |
| Total current liabilities | 5,182 | 5,482 |
| LONG-TERM LIABILITIES | | |
| Non-recourse debt | 11,869 | 11,293 |
| Recourse debt | 4,994 | 5,332 |
| Deferred income taxes—noncurrent | 1,132 | 1,187 |
| Pension and other post-retirement liabilities | 1,017 | 921 |
| Other long-term liabilities | 3,525 | 3,754 |
| Long-term liabilities of discontinued and held for sale businesses | — | 79 |
| Total long-term liabilities | 22,537 | 22,566 |
| MINORITY INTEREST (including discontinued businesses of $—and $—, respectively) | 3,418 | 3,241 |
| Commitments and Contingent Liabilities (see Notes 11 and 12) | | |
| STOCKHOLDERS' EQUITY | | |
| Common stock ($0.01 par value, 1,200,000,000 shares authorized; 673,478,012 issued and 662,786,745 outstanding at December 31, 2008 and 670,339,855 issued and outstanding at December 31, 2007) | 7 | 7 |
| Additional paid-in capital | 6,832 | 6,776 |
| Accumulated deficit | (8) | (1,241) |
| Accumulated other comprehensive loss | (3,018) | (2,378) |
| Treasury stock, at cost (10,691,267 and 0 shares at December 31, 2008 and 2007, respectively) | (144) | — |
| Total stockholders' equity | 3,669 | 3,164 |
| TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY | $34,806 | $34,453 |

Figure 1: Liabilities and Shareholders' Equity for the AES Corporation (2008).

| | 2009 | 2008 |
|---|---|---|
| **LIABILITIES AND EQUITY** | | |
| CURRENT LIABILITIES | | |
| **Accounts payable** | **$ 1,217** | **1,033** |
| Accrued interest | 271 | 244 |
| **Accrued and other liabilities** | **3,017** | **2,640** |
| Non-recourse debt—current | 1,759 | 917 |
| **Recourse debt—current** | **214** | **154** |
| Current liabilities of discontinued and held for sale businesses | 143 | 194 |
| **Total current liabilities** | **6,621** | **5,182** |
| LONG-TERM LIABILITIES | | |
| **Non-recourse debt—noncurrent** | **12,642** | **11,625** |
| Recourse debt—noncurrent | 5,301 | 4,994 |
| **Deferred income taxes—noncurrent** | **1,090** | **1,115** |
| Pension and other post-retirement liabilities | 1,322 | 1,017 |
| **Other long-term liabilities** | **3,208** | **3,357** |
| Long-term liabilities of discontinued and held for sale businesses | 411 | 429 |
| **Total long-term liabilities** | **23,974** | **22,537** |
| Contingencies and Commitments (see Notes 11 and 12) | | |
| **Cumulative preferred stock of subsidiary** | **60** | **60** |
| EQUITY | | |
| **THE AES CORPORATION STOCKHOLDERS' EQUITY** | | |
| Common stock ($0.01 par value, 1,200,000,000 shares authorized; 677,214,493 issued and 667,679,913 outstanding at December 31, 2009 and 673,478,012 issued and 662,786,745 outstanding at December 31, 2008) | 7 | 7 |
| **Additional paid-in capital** | **6,868** | **6,832** |
| Retained earnings (accumulated deficit) | 650 | (8) |
| **Accumulated other comprehensive loss** | **(2,724)** | **(3,018)** |
| Treasury stock, at cost (9,534,580 and 10,691,267 shares at December 31, 2009 and 2008, respectively) | (126) | (144) |
| **Total The AES Corporation stockholders' equity** | **4,675** | **3,669** |
| NONCONTROLLING INTERESTS | 4,205 | 3,358 |
| **Total equity** | **8,880** | **7,027** |
| TOTAL LIABILITIES AND EQUITY | $39,535 | $34,806 |

Figure 2: Liabilities and Shareholders' Equity for the AES Corporation (2009).

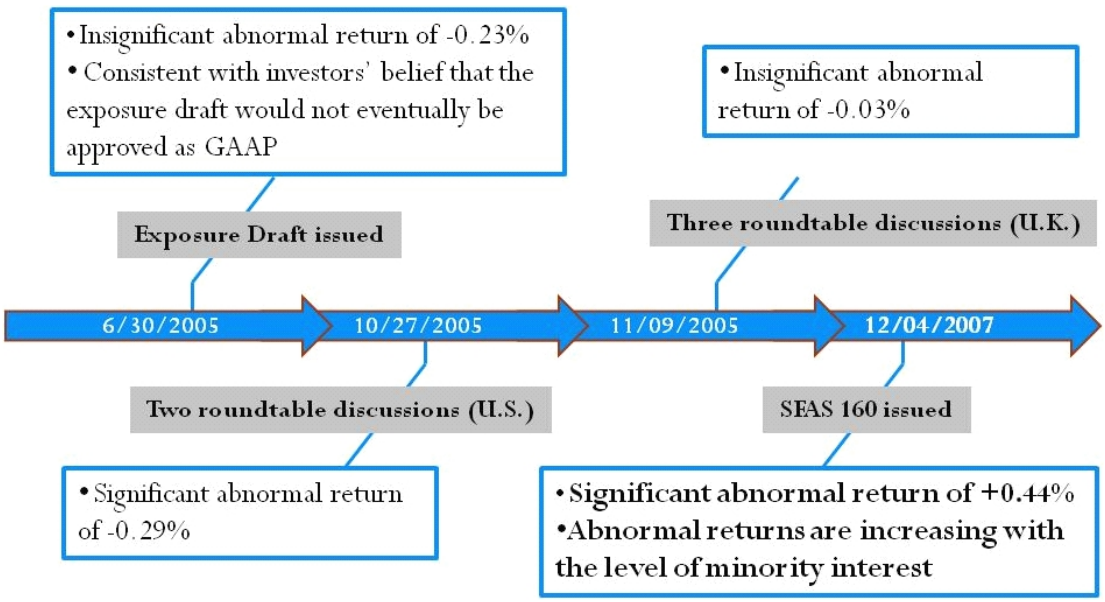


Figure 3: Timeline of SFAS 160 issuance from Frankel, Lee and McLaughlin (2010)

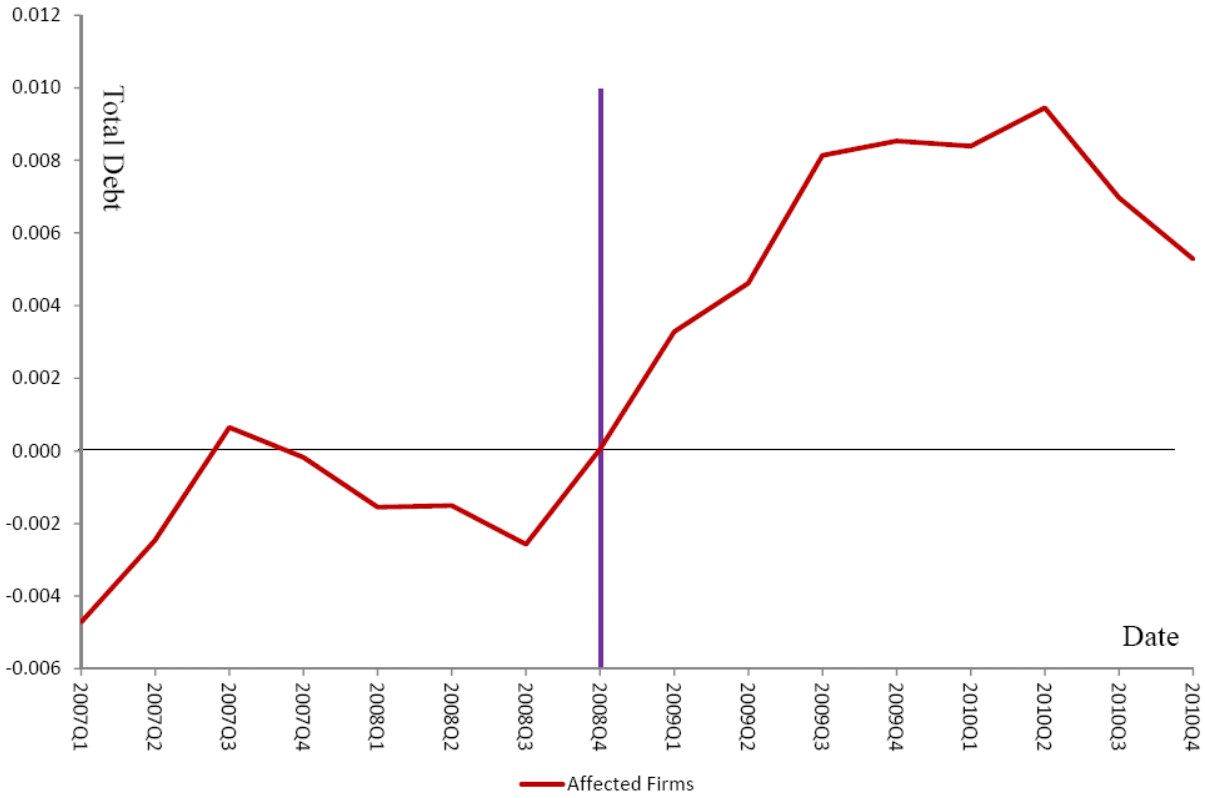


Figure 4: This figure plots the average difference in residuals of a regression of total debt-to-asset ratio on firm and quarter fixed effects. To smooth out some quarterly volatility, we employ a four quarter rolling average. The figure plots the difference between firms that have both covenants affected by SFAS 160 and minority interest at the end of 2008, and those firms that only have covenants that are affected by the new standard. The sample period is 2007 Q1 until 2010 Q4.

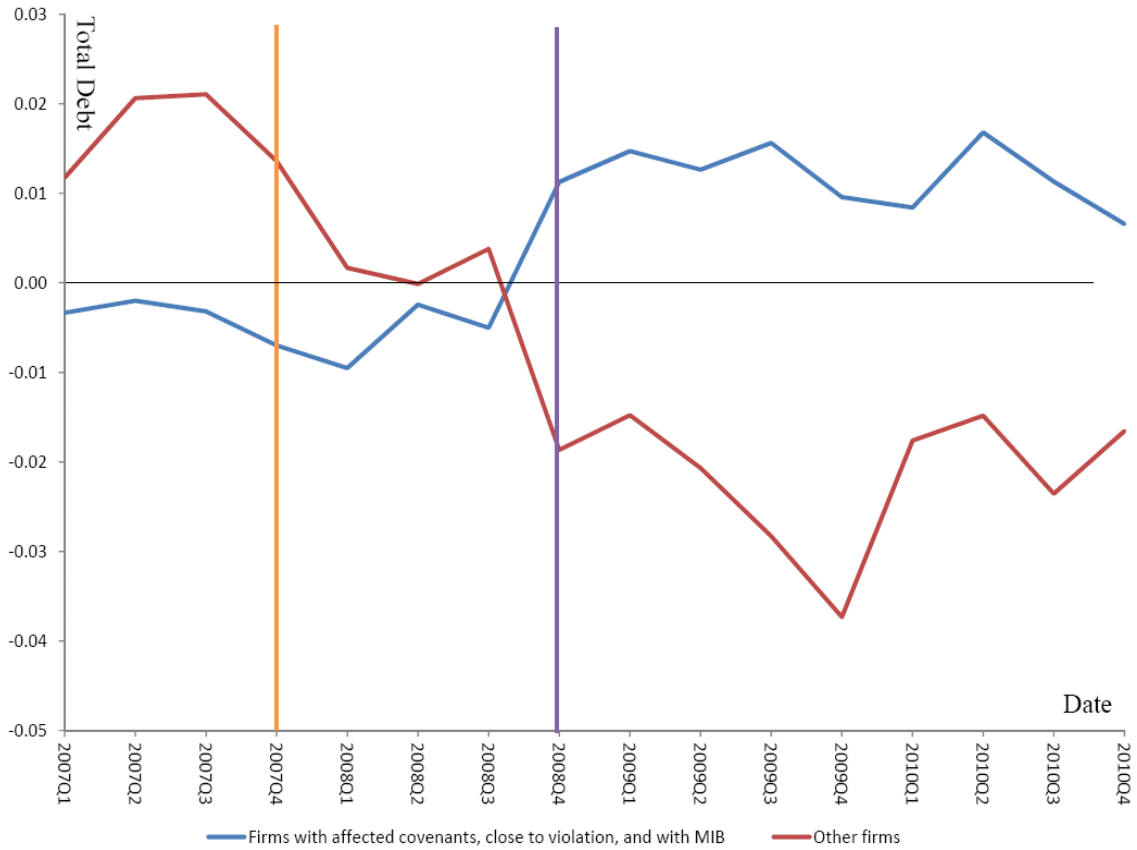


Figure 5: This figure plots the average difference in residuals of a regression of total debt-to-asset ratio on firm and quarter fixed effects. Constrained firms are defined based on $Close_{i,t}$, which is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio. $MIB_i$ denotes minority interest at the end of 2008 scaled by total assets. The sample period is 2007 Q1 until 2010 Q4.

Table 1: Data

This table reports the number of observations used in our analysis. Panel A reports the number of firm-quarter observations with available covenant information in DealScan. Panel B reports the number of firm-quarter observations for firms with minority interest that are also constrained. Affected firms are firms that have covenants that are affected by SFAS 160. $Violate_{i,t}$ is an indicator variable that receives the value of 1 if the firm violated any of its debt covenants. $Close_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio. $Constrained_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio excluding violators. Minority Interest ($MIB_i$) denotes minority interest at the end of 2008 scaled by total assets.

Panel A: Number of Observations with Covenant Data

| Covenant | 2007 | | 2008 | | 2009 | |
|---|---|---|---|---|---|---|
| Has At least One | 2,936 | 9.44% | 2,914 | 9.76% | 2,601 | 9.34% |
| Debt-to-Equity | 62 | 0.20% | 62 | 0.21% | 52 | 0.19% |
| Debt-to Tangible Net Worth | 374 | 1.20% | 418 | 1.40% | 352 | 1.26% |
| Net Worth | 1,147 | 3.69% | 1,083 | 3.63% | 930 | 3.34% |
| Tangible Net Worth | 778 | 2.50% | 759 | 2.54% | 640 | 2.30% |
| Leverage Ratio | 1,151 | 3.70% | 1,182 | 3.96% | 1,141 | 4.10% |
| Total Observations | 31,100 | 100% | 29,871 | 100% | 27,856 | 100% |

Panel B: Number of Constrained Observations with Minority Interest

| | 2007 | 2008 | 2009 |
|---|---|---|---|
| Affected Firms | 713 | 720 | 801 |
| $Close_{i,t}$ | 456 | 450 | 537 |
| $Violate_{i,t}$ | 229 | 226 | 253 |
| $Constrained_{i,t}$ | 227 | 224 | 284 |

Table 2: Summary Statistics

This table reports summary statistics for the variables used in our analysis. The debt measures are scaled by total assets. $Cash_{i,t}$ denotes cash and cash equivalents scaled by total assets. $EBD_{i,t}$ denotes earnings before extraordinary items excluding depreciation and amortization. $Depr_{i,t}$ denotes depreciation and amortization. $Investment_{i,t}$ denotes investment measured as total long-term investments scaled by beginning of period total assets. $DIV_{i,t}$ and $REP_{i,t}$ denote the firm's dividend and share repurchases during the period, scaled by beginning of period assets. $Intangible_{i,t}$ denotes intangible assets scaled by total assets. Retained Earnings, Book Equity, and Minority Interest (non-controlling interest post SFAS 160) are all scaled by total assets. Panel A reports summary statistics for firms with positive minority interest and covenants that are affected by SFAS160. Panel B reports summary statistics for affected firms without minority interest. Panel C reports summary statistics for constrained firms. A firm is defined as constrained if its financials are within 30% of the target financial ratio excluding violators. Panel D reports summary statistics for constrained firms without minority interest.

| | Panel A: Affected Firms with Minority Interest | | | | | | | Panel B: Affected Firms without Minority Interest | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | 5% | 25% | 50% | 75% | 95% | Mean | Std | 5% | 25% | 50% | 75% | 95% | Mean | Std |
| $Assets_{i,t}$ | 245 | 1278 | 3153 | 9688 | 35151 | 8868 | 14688 | 47 | 293 | 1065 | 3493 | 22259 | 4124 | 8248 |
| $Current\ Debt_{i,t}$ | 0 | 0.00 | 0.02 | 0.05 | 0.14 | 0.05 | 0.20 | 0 | 0.00 | 0.01 | 0.05 | 0.18 | 0.05 | 0.15 |
| $Long-Term\ Debt_{i,t}$ | 0.00 | 0.12 | 0.23 | 0.33 | 0.50 | 0.24 | 0.17 | 0 | 0.07 | 0.20 | 0.31 | 0.51 | 0.21 | 0.17 |
| $Total\ Debt_{i,t}$ | 0.02 | 0.16 | 0.27 | 0.38 | 0.54 | 0.29 | 0.28 | 0 | 0.11 | 0.25 | 0.35 | 0.56 | 0.26 | 0.24 |
| $Cash_{i,t}$ | 0.00 | 0.02 | 0.05 | 0.12 | 0.28 | 0.08 | 0.09 | 0.00 | 0.01 | 0.04 | 0.11 | 0.31 | 0.08 | 0.11 |
| $EBD_{i,t}$ | -0.02 | 0.01 | 0.02 | 0.03 | 0.05 | 0.02 | 0.03 | -0.02 | 0.01 | 0.02 | 0.03 | 0.06 | 0.02 | 0.04 |
| $Investment_{i,t}$ | 0 | 0 | 0.01 | 0.05 | 0.15 | 0.04 | 0.06 | 0 | 0 | 0 | 0.01 | 0.11 | 0.02 | 0.07 |
| $DIV_{i,t}$ | 0 | 0 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0 | 0 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 |
| $REP_{i,t}$ | 0 | 0 | 0 | 0.00 | 0.02 | 0.00 | 0.01 | 0 | 0 | 0 | 0.00 | 0.03 | 0.00 | 0.01 |
| $Intangible_{i,t}$ | 0 | 0.06 | 0.22 | 0.48 | 0.97 | 0.32 | 0.31 | 0 | 0.01 | 0.16 | 0.49 | 0.98 | 0.29 | 0.33 |
| $Retained\ Earnings_{i,t}$ | -0.21 | 0.11 | 0.22 | 0.35 | 0.56 | 0.15 | 1.16 | -0.45 | 0.06 | 0.24 | 0.41 | 0.69 | 0.14 | 1.05 |
| $Book\ Equity_{i,t}$ | 0.14 | 0.31 | 0.42 | 0.53 | 0.72 | 0.40 | 0.49 | 0.18 | 0.34 | 0.47 | 0.62 | 0.81 | 0.47 | 0.39 |

| | Panel C: Constrained with Minority Interest | | | | | | | Panel D: Constrained without Minority Interest | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | 5% | 25% | 50% | 75% | 95% | Mean | Std | 5% | 25% | 50% | 75% | 95% | Mean | Std |
| $Assets_{i,t}$ | 239 | 1367 | 3597 | 9134 | 35151 | 8866 | 12490 | 56 | 341 | 1475 | 4434 | 29552 | 5124 | 9416 |
| $Current\ Debt_{i,t}$ | 0.00 | 0.01 | 0.02 | 0.05 | 0.13 | 0.04 | 0.05 | 0 | 0.00 | 0.02 | 0.05 | 0.16 | 0.04 | 0.07 |
| $Long-Term\ Debt_{i,t}$ | 0.02 | 0.17 | 0.24 | 0.31 | 0.40 | 0.23 | 0.11 | 0 | 0.10 | 0.22 | 0.30 | 0.42 | 0.20 | 0.14 |
| $Total\ Debt_{i,t}$ | 0.06 | 0.21 | 0.28 | 0.35 | 0.45 | 0.27 | 0.11 | 0 | 0.15 | 0.27 | 0.34 | 0.47 | 0.25 | 0.14 |
| $Cash_{i,t}$ | 0.00 | 0.01 | 0.03 | 0.09 | 0.24 | 0.07 | 0.08 | 0.00 | 0.01 | 0.03 | 0.08 | 0.30 | 0.07 | 0.11 |
| $EBD_{i,t}$ | -0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.02 | 0.02 | -0.01 | 0.01 | 0.02 | 0.03 | 0.06 | 0.02 | 0.03 |
| $Investment_{i,t}$ | 0 | 0 | 0.00 | 0.03 | 0.11 | 0.03 | 0.05 | 0 | 0 | 0 | 0.01 | 0.09 | 0.02 | 0.05 |
| $DIV_{i,t}$ | 0 | 0 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0 | 0 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 |
| $REP_{i,t}$ | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.01 | 0 | 0 | 0 | 0.00 | 0.02 | 0.00 | 0.01 |
| $Intangible_{i,t}$ | 0.00 | 0.07 | 0.24 | 0.54 | 0.92 | 0.34 | 0.32 | 0 | 0 | 0.11 | 0.40 | 0.92 | 0.25 | 0.31 |
| $Retained\ Earnings_{i,t}$ | -0.02 | 0.11 | 0.21 | 0.35 | 0.60 | 0.23 | 0.25 | -0.29 | 0.08 | 0.20 | 0.37 | 0.64 | 0.18 | 0.59 |
| $Book\ Equity_{i,t}$ | 0.25 | 0.33 | 0.40 | 0.50 | 0.68 | 0.43 | 0.14 | 0.24 | 0.33 | 0.43 | 0.57 | 0.81 | 0.47 | 0.18 |

Table 3: Affected Firms

This table reports OLS coefficient estimates and $t$-statistics in parentheses below. The debt measures are scaled by total assets. $POST$ is an indicator variable that receives the value of 1 for periods after 2008. Affected firms are firms with covenants that are affected by SFAS 160. $MIB_i$ denotes minority interest at the end of 2008 scaled by total assets. $DMIB_i$ is an indicator variable that receives the value of 1 if $MIB_i > 0$. The full sample includes 83403 firm-quarter observations, while the affected sample includes 8410 observations. The regression model includes firm fixed effects as well as year-quarter fixed effects. The standard errors are clustered by firm.

Panel A: Continuous Minority Interest

| | Dependent Variable | | | | | |
|---|---|---|---|---|---|---|
| | $Current\ Debt_{i,t}$ | $Long-Term\ Debt_{i,t}$ | $Total\ Debt_{i,t}$ | $Current\ Debt_{i,t}$ | $Long-Term\ Debt_{i,t}$ | $Total\ Debt_{i,t}$ |
| | Full Sample | | | Affected Firms | | |
| $\text{Affected}_{i,t}\times POST$ | -0.042 | 0.001 | -0.051 | | | |
| | (-6.79) | (0.22) | (-6.04) | | | |
| $MIB_i\times POST$ | -0.299 | -0.049 | -0.441 | 0.094 | 0.319 | **0.435** |
| | (-2.56) | (-0.59) | (-2.66) | (0.38) | (2.87) | **(2.04)** |
| $MIB_i\times\text{Affected}_{i,t}\times POST$ | 0.336 | 0.333 | **0.774** | | | |
| | (1.38) | (2.61) | **(3.07)** | | | |
| $Adj-R^2$ | 0.725 | 0.778 | 0.758 | 0.859 | 0.849 | 0.939 |

Panel B: An Indicator Variable for Firms with Minority Interest

| | Dependent Variable | | | | | |
|---|---|---|---|---|---|---|
| | $Current\ Debt_{i,t}$ | $Long-Term\ Debt_{i,t}$ | $Total\ Debt_{i,t}$ | $Current\ Debt_{i,t}$ | $Long-Term\ Debt_{i,t}$ | $Total\ Debt_{i,t}$ |
| | Full Sample | | | Affected Firms | | |
| $\text{Affected}_{i,t}\times POST$ | -0.045 | -0.000 | -0.058 | | | |
| | (-6.36) | (-0.07) | (-5.92) | | | |
| $DMIB_i\times POST$ | -0.030 | -0.001 | -0.046 | 0.000 | 0.010 | **0.012** |
| | (-3.47) | (-0.29) | (-4.03) | (0.06) | (1.56) | **(1.67)** |
| $DMIB_i\times\text{Affected}_{i,t}\times POST$ | 0.029 | 0.010 | **0.055** | | | |
| | (2.99) | (1.39) | **(4.19)** | | | |
| $Adj-R^2$ | 0.725 | 0.778 | 0.758 | 0.859 | 0.849 | 0.939 |

Table 4: Constrained Firms

This table reports OLS coefficient estimates and $t$-statistics in parentheses below. The debt measures are scaled by total assets. $POST$ is an indicator variable that receives the value of 1 for periods after 2008. $Constrained_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio excluding violators. $MIB_i$ denotes minority interest at the end of 2008 scaled by total assets. $DMIB_i$ is an indicator variable that receives the value of 1 if $MIB_i > 0$. Following Roberts and Sufi (2009a), all models include the lagged natural logarithm of total assets, the lagged tangible assets to total assets ratio, the lagged market-to-book ratio, and a lagged "has SP rating" indicator as control variables. In addition, covenant control variables include 11 covenant control variables: the lagged book debt to assets ratio, the lagged net worth to assets ratio, the lagged cash to assets ratio, the lagged and current EBITDA to lagged assets ratio, the lagged and current cash flow to lagged assets ratio, the lagged and current net income to lagged assets ratio, and the lagged and current interest expense to lagged assets ratio. Control variables also include four covenant control interaction variables: the lagged debt to assets ratio interacted with the lagged cash flow to lagged assets ratio, the lagged debt to assets ratio interacted with the lagged EBITDA to lagged assets ratio, the lagged debt to assets ratio interacted with the lagged net worth to assets ratio, and the lagged EBITDA to lagged assets ratio interacted with the lagged interest expense to lagged assets ratio. The sample with no covenant controls includes 66684 firm-quarter observations, while the sample with covenant controls includes 57274 observations. The regression model includes firm fixed effects as well as year-quarter fixed effects. The standard errors are clustered by firm.

Panel A: Continuous Minority Interest

| | Dependent Variable | | | | | |
|---|---|---|---|---|---|---|
| | $Current$ $Debt_{i,t}$ | $Current$ $Debt_{i,t}$ | $Long-Term$ $Debt_{i,t}$ | $Long-Term$ $Debt_{i,t}$ | $Total$ $Debt_{i,t}$ | $Total$ $Debt_{i,t}$ |
| $Constrained_{i,t} \times POST$ | -0.028 | -0.014 | -0.006 | -0.005 | -0.038 | -0.017 |
| | (-3.86) | (-2.61) | (-1.41) | (-1.12) | (-3.80) | (-3.44) |
| $MIB_i \times POST$ | -0.178 | -0.0191 | -0.128 | -0.116 | -0.364 | -0.140 |
| | (-1.03) | (-0.16) | (-1.59) | (-1.48) | (-1.54) | (-1.04) |
| $MIB_i \times Constrained_{i,t} \times POST$ | 0.448 | -0.088 | 0.454 | 0.392 | **1.031** | **0.243** |
| | (1.30) | (-0.46) | (2.53) | (2.29) | **(2.26)** | **(1.55)** |
| Covenant Controls | No | Yes | No | Yes | No | Yes |
| $Adj - R^2$ | 0.761 | 0.829 | 0.786 | 0.798 | 0.793 | 0.875 |

| Panel B: An Indicator Variable for Firms with Minority Interest | | | | | | |
|---|---|---|---|---|---|---|
| | Dependent Variable | | | | | |
| | $Current\ Debt_{i,t}$ | $Current\ Debt_{i,t}$ | $Long-Term\ Debt_{i,t}$ | $Long-Term\ Debt_{i,t}$ | $Total\ Debt_{i,t}$ | $Total\ Debt_{i,t}$ |
| $Constrained_{i,t}\times POST$ | -0.030 | -0.011 | -0.010 | -0.009 | -0.046 | -0.020 |
| | (-3.69) | (-1.94) | (-2.17) | (-1.92) | (-4.12) | (-3.54) |
| $DMIB_i\times POST$ | -0.005 | 0.002 | -0.005 | -0.006 | -0.019 | -0.012 |
| | (-0.49) | (0.29) | (-1.05) | (-1.09) | (-1.63) | (-1.64) |
| $DMIB_i\times Constrained_{i,t}\times POST$ | 0.016 | -0.011 | 0.024 | 0.024 | **0.055** | **0.019** |
| | (1.08) | (-1.05) | (2.27) | (2.20) | **(2.88)** | **(2.11)** |
| Covenant Controls | No | Yes | No | Yes | No | Yes |
| $Adj-R^2$ | 0.761 | 0.829 | 0.786 | 0.798 | 0.793 | 0.875 |

Table 5: Including Firms in Violation

This table reports OLS coefficient estimates and $t$-statistics in parentheses below. The debt measures are scaled by total assets. $POST$ is an indicator variable that receives the value of 1 for periods after 2008. $Violate_{i,t}$ is an indicator variable that receives the value of 1 if the firm violated any of its debt covenants. $Close_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio. $MIB_i$ denotes minority interest at the end of 2008 scaled by total assets. $DMIB_i$ is an indicator variable that receives the value of 1 if $MIB_i > 0$. The sample includes 82800 firm-quarter observations. The regression model includes firm fixed effects as well as year-quarter fixed effects. The standard errors are clustered by firm.

Panel A

| | Dependent Variable | | | | | |
|---|---|---|---|---|---|---|
| | $Current\ Debt_{i,t}$ | $Current\ Debt_{i,t}$ | $Long-Term\ Debt_{i,t}$ | $Long-Term\ Debt_{i,t}$ | $Total\ Debt_{i,t}$ | $Total\ Debt_{i,t}$ |
| $Violate_{i,t}\times POST$ | -0.033 | | 0.011 | | -0.030 | |
| | (-4.01) | | (1.46) | | (-2.96) | |
| $MIB_i\times POST$ | -0.285 | -0.298 | -0.042 | -0.047 | -0.414 | -0.434 |
| | (-2.49) | (-2.57) | (-0.51) | (-0.56) | (-2.56) | (-2.64) |
| $MIB_i\times Violate_{i,t}\times POST$ | 0.508 | | 0.319 | | **0.915** | |
| | (1.29) | | (1.50) | | **(2.57)** | |
| $Close_{i,t}\times POST$ | | -0.040 | | 0.001 | | -0.048 |
| | | (-6.21) | | (0.14) | | (-5.70) |
| $MIB_i\times Close_{i,t}\times POST$ | | 0.488 | | 0.386 | | **0.965** |
| | | (1.65) | | (2.38) | | **(3.40)** |
| $Adj-R^2$ | 0.727 | 0.727 | 0.778 | 0.778 | 0.762 | 0.762 |

| Panel B | | | | | | |
|---|---|---|---|---|---|---|
| | Dependent Variable | | | | | |
| | $Current\ Debt_{i,t}$ | $Current\ Debt_{i,t}$ | $Long-Term\ Debt_{i,t}$ | $Long-Term\ Debt_{i,t}$ | $Total\ Debt_{i,t}$ | $Total\ Debt_{i,t}$ |
| $Violate_{i,t}\times POST$ | -0.036 | | 0.009 | | -0.037 | |
| | (-3.82) | | (1.09) | | (-3.18) | |
| $DMIB_i\times POST$ | -0.028 | -0.029 | -0.000 | -0.001 | -0.042 | -0.044 |
| | (-3.59) | (-3.56) | (-0.10) | (-0.27) | (-4.07) | (-4.11) |
| $DMIB_i\times Violate_{i,t}\times POST$ | 0.031 | | 0.012 | | **0.057** | |
| | (2.25) | | (0.91) | | **(3.13)** | |
| $Close_{i,t}\times POST$ | | -0.043 | | -0.002 | | -0.056 |
| | | (-5.84) | | (-0.37) | | (-5.77) |
| $DMIB_{i,}\times Close_{i,t}\times POST$ | | 0.030 | | 0.017 | | **0.061** |
| | | (2.87) | | (1.90) | | **(4.43)** |
| $Adj-R^2$ | 0.727 | 0.727 | 0.778 | 0.778 | 0.762 | 0.762 |

Table 6: Measures of Financial Constraints

This table reports OLS coefficient estimates and $t$-statistics in parentheses below. Total debt measures are scaled by total assets. $POST$ is an indicator variable that receives the value of 1 for periods after 2008. $WW_{i,t}$ is the Whited and Wu (2006) measure of constraints. $EDF_{i,t}$ is the Moody's Analytics Expected Default Frequency. $ICDS_{i,t}$ denotes Moody's implied 5 year CDS spread. $Low$ and $High$ denote the lowest and highest quartile of the respective measure, respectively. $MIB_i$ denotes minority interest at the end of 2008 scaled by total assets. $DMIB_i$ is an indicator variable that receives the value of 1 if $MIB_i > 0$. The regression model includes firm fixed effects as well as year-quarter fixed effects. The standard errors are clustered by firm.

| Dependent Variable = $Total\ Debt_{i,t}$ | | | | | | |
|---|---|---|---|---|---|---|
| | $X_{i,t} =$ | | | | | |
| | $Low\ WW_{i,t}$ | $High\ WW_{i,t}$ | $Low\ EDF_{i,t}$ | $High\ EDF_{i,t}$ | $Low\ ICDS_{i,t}$ | $High\ ICDS_{i,t}$ |
| $X_{i,t} \times POST$ | -0.030 | 0.060 | -0.062 | 0.124 | -0.067 | 0.130 |
| | (-3.45) | (5.47) | (-5.40) | (6.22) | (-5.82) | (6.52) |
| $DMIB_i \times POST$ | -0.030 | 0.006 | -0.042 | -0.001 | -0.043 | 0.002 |
| | (-2.74) | (0.97) | (-2.82) | (-0.09) | (-2.79) | -0.42 |
| $Constrained_{i,t} \times POST$ | -0.047 | -0.034 | -0.064 | -0.038 | -0.066 | -0.034 |
| | (-5.75) | (-4.41) | (-5.98) | (-4.12) | (-5.98) | (-3.87) |
| $DMIB_i \times X_{i,t} \times POST$ | 0.028 | -0.041 | 0.039 | -0.075 | 0.038 | -0.080 |
| | (2.22) | (-2.40) | (2.15) | (-2.51) | (2.17) | (-2.62) |
| $DMIB_i \times Constrained_{i,t} \times POST$ | **0.033** | **0.033** | **0.047** | **0.042** | **0.047** | **0.042** |
| | **(2.40)** | **(2.83)** | **(2.71)** | **(3.70)** | **(2.64)** | **(3.60)** |
| $DMIB_i \times X_{i,t} \times POST \times Constrained_{i,t}$ | **0.016** | **-0.018** | **0.027** | **-0.042** | **0.031** | **-0.056** |
| | **(0.96)** | **(-0.88)** | **(1.41)** | **(-1.36)** | **(1.67)** | **(-1.83)** |
| $N$ | 83560 | 83560 | 75793 | 75793 | 75793 | 75793 |
| $Adj - R^2$ | 0.761 | 0.762 | 0.740 | 0.741 | 0.740 | 0.741 |

Table 7: The Impact of Credit Ratings

This table reports OLS coefficient estimates and $t$-statistics in parentheses below. Total debt measures are scaled by total assets. $POST$ is an indicator variable that receives the value of 1 for periods after 2008. $Constrained_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio excluding violators. $HasRatings_{i,t}$ is an indicator variable that receives the value of 1 if the firm is rated by a credit agency. $MIB_i$ denotes minority interest at the end of 2008 scaled by total assets. $DMIB_i$ is an indicator variable that receives the value of 1 if $MIB_i > 0$. The regression model includes firm fixed effects as well as year-quarter fixed effects. The standard errors are clustered by firm.

| | $Total\ Debt_{i,t}$ |
|---|---|
| $HasRatings_{i,t} \times POST$ | -0.059 |
| | (-4.83) |
| $DMIB_i \times POST$ | -0.053 |
| | (-3.74) |
| $Constrained_{i,t} \times POST$ | -0.047 |
| | (-5.70) |
| $DMIB_i \times HasRatings_{i,t} \times POST$ | **0.061** |
| | **(3.72)** |
| $DMIB_i \times Constrained_{i,t} \times POST$ | 0.012 |
| | (0.74) |
| $DMIB_i \times HasRatings_{i,t} \times POST \times Constrained_{i,t}$ | **0.039** |
| | **(2.30)** |
| $N$ | 83403 |
| $Adj - R^2$ | 0.758 |

Table 8: Long-Term Investments and Cash Holdings

This table reports OLS coefficient estimates and $t$-statistics in parentheses below. $POST$ is an indicator variable that receives the value of 1 for periods after 2008. $Violate_{i,t}$ is an indicator variable that receives the value of 1 if the firm violated any of its debt covenants. $Close_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio. $Constrained_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio, excluding violators. $MIB_i$ denotes minority interest at the end of 2008 scaled by total assets. $DMIB_i$ is an indicator variable that receives the value of 1 if $MIB_i > 0$. $Investments_{i,t}$ denotes total long-term investments scaled by beginning of period total assets. $Cash_{i,t}$ denotes cash and cash equivalents scaled by total assets. The regression model, in Panel A, also includes untabulated cash-flows and Macro Q. The sample includes 69340 firm-quarter observations in Panel A and 82683 firm-quarter observations in Panel B. The regression model includes firm fixed effects as well as year-quarter fixed effects. The standard errors are clustered by firm.

| | Panel A: Dependent Variable = $Investments_{i,t}$ | | | | | |
|---|---|---|---|---|---|---|
| | $X_i = DMIB_i$ | | | $X_i = MIB_i$ | | |
| $Violate_{i,t} \times POST$ | 0.002 | | | 0.001 | | |
| | (1.12) | | | (0.55) | | |
| $X_i \times POST$ | 0.002 | 0.003 | 0.011 | 0.095 | 0.095 | -0.053 |
| | (1.25) | (1.35) | (4.28) | (1.77) | (1.77) | (-0.90) |
| $X_i \times Violate_{i,t} \times POST$ | **-0.010** | | | **-0.279** | | |
| | **(-2.12)** | | | **(-1.63)** | | |
| $Close_{i,t} \times POST$ | | 0.000 | | | -0.001 | |
| | | (0.19) | | | (-0.35) | |
| $X_i \times Close_{i,t} \times POST$ | | **-0.009** | | | **-0.229** | |
| | | **(-1.94)** | | | **(-1.68)** | |
| $Constrained_{i,t} \times POST$ | | | 0.020 | | | 0.018 |
| | | | (5.97) | | | (6.02) |
| $X_i \times Constrained_{i,t} \times POST$ | | | **-0.010** | | | **0.155** |
| | | | **(-1.72)** | | | **(1.16)** |
| $Adj - R^2$ | 0.751 | 0.751 | 0.305 | 0.751 | 0.751 | 0.304 |

| | Panel B: Dependent Variable = $Cash_{i,t}$ | | | | | |
|---|---|---|---|---|---|---|
| | $X_i = DMIB_i$ | | | $X_i = MIB_i$ | | |
| $Violate_{i,t} \times POST$ | 0.034 | | | 0.036 | | |
| | (4.68) | | | (5.50) | | |
| $X_i \times POST$ | 0.013 | 0.014 | 0.014 | 0.010 | 0.019 | 0.009 |
| | (4.29) | (4.38) | (4.47) | (0.16) | (0.29) | (0.15) |
| $X_i \times Violate_{i,t} \times POST$ | **-0.007** | | | **-0.397** | | |
| | **(-0.52)** | | | **(-2.44)** | | |
| $Close_{i,t} \times POST$ | | 0.032 | | | 0.030 | |
| | | (7.20) | | | (7.79) | |
| $X_i \times Close_{i,t} \times POST$ | | **-0.014** | | | **-0.332** | |
| | | **(-1.68)** | | | **(-2.27)** | |
| $Constrained_{i,t} \times POST$ | | | 0.028 | | | 0.024 |
| | | | (5.84) | | | (5.79) |
| $X_i \times Constrained_{i,t} \times POST$ | | | **-0.021** | | | **-0.273** |
| | | | **(-2.45)** | | | **(-0.92)** |
| $Adj - R^2$ | 0.830 | 0.830 | 0.829 | 0.830 | 0.830 | 0.829 |

Table 9: Earnings and Cash Flows

This table reports OLS coefficient estimates and $t$-statistics in parentheses below. $POST$ is an indicator variable that receives the value of 1 for periods after 2008. $Violate_{i,t}$ is an indicator variable that receives the value of 1 if the firm violated any of its debt covenants. $Close_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio. $Constrained_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio excluding violators. $MIB_i$ denotes minority interest at the end of 2008 scaled by total assets. $DMIB_i$ is an indicator variable that receives the value of 1 if $MIB_i > 0$. $Earn_{i,t}$ denotes earnings before extraordinary items. $CFO_{i,t}$ denotes the firm's operating cash flows. $EBD_{i,t}$ denotes earnings before extraordinary items excluding depreciation and amortization. The sample includes 80019 firm-quarter observations. The regression model includes firm fixed effects as well as year-quarter fixed effects. The standard errors are clustered by firm.

| | Dependent Variable | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | $EBD_{i,t}$ | | | $Earn_{i,t}$ | | | $CFO_{i,t}$ | | |
| $Violate_{i,t}\times POST$ | 0.010 | | | 0.010 | | | 0.000 | | |
| | (2.39) | | | (2.44) | | | (0.07) | | |
| $DMIB_{i,t}\times POST$ | 0.010 | 0.010 | 0.011 | 0.011 | 0.011 | 0.011 | -0.001 | -0.001 | -0.001 |
| | (2.26) | (2.28) | (2.34) | (2.41) | (2.42) | (2.48) | (-0.53) | (-0.44) | (-0.46) |
| $DMIB_{i,t}\times Violate_{i,t}\times POST$ | **-0.009** | | | **-0.009** | | | **0.001** | | |
| | **(-1.49)** | | | **(-1.57)** | | | **(0.24)** | | |
| $Close_{i,t}\times POST$ | | 0.008 | | | 0.008 | | | 0.002 | |
| | | (2.01) | | | (2.16) | | | (0.86) | |
| $DMIB_{i,t}\times Close_{i,t}\times POST$ | | **-0.010** | | | **-0.011** | | | **-0.001** | |
| | | **(-2.01)** | | | **(-2.11)** | | | **(-0.42)** | |
| $Constrained_{i,t}\times POST$ | | | 0.006 | | | 0.007 | | | 0.003 |
| | | | (1.51) | | | (1.73) | | | (1.25) |
| $DMIB_i\times Constrained_{i,t}\times POST$ | | | **-0.011** | | | **-0.012** | | | **-0.003** |
| | | | **(-2.37)** | | | **(-2.47)** | | | **(-0.89)** |
| $Adj-R^2$ | 0.650 | 0.650 | 0.651 | 0.650 | 0.650 | 0.651 | 0.597 | 0.597 | 0.596 |

Table 10: Dividends and Share Repurchases

This table reports OLS coefficient estimates and $t$-statistics in parentheses below. $POST$ is an indicator variable that receives the value of 1 for periods after 2008. $Violate_{i,t}$ is an indicator variable that receives the value of 1 if the firm violated any of its debt covenants. $Close_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio. $Constrained_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio excluding violators. $MIB_{i,t}$ denotes minority interest at the end of 2008 scaled by total assets. $DIV_{i,t}$ and $REP_{i,t}$ denote the firm's dividend and share repurchases during the period, scaled by beginning of period assets. The sample includes 80019 firm-quarter observations. The regression model includes firm fixed effects as well as year-quarter fixed effects. The standard errors are clustered by firm.

| | Dependent Variable | | | | | |
|---|---|---|---|---|---|---|
| | $DIV_{i,t}$ | | | $REP_{i,t}$ | | |
| $Violate_{i,t} \times POST$ | -0.000 | | | -0.002 | | |
| | (-1.40) | | | (-3.08) | | |
| $MIB_i \times POST$ | -0.004 | -0.004 | -0.003 | -0.000 | -0.000 | 0.008 |
| | (-2.08) | (-2.08) | (-1.90) | (-1.02) | (-0.81) | (4.64) |
| $MIB_i \times Violate_{i,t} \times POST$ | **0.017** | | | **0.001** | | |
| | **(2.30)** | | | **(0.62)** | | |
| $Close_{i,t} \times POST$ | | -0.000 | | | -0.001 | |
| | | (-1.10) | | | (-3.29) | |
| $MIB_i \times Close_{i,t} \times POST$ | | **0.011** | | | **-0.000** | |
| | | **(1.66)** | | | **(-0.12)** | |
| $Constrained_{i,t} \times POST$ | | | -0.000 | | | -0.001 |
| | | | (-0.18) | | | (-1.19) |
| $MIB_i \times Constrained_{i,t} \times POST$ | | | **0.000** | | | **-0.001** |
| | | | **(0.000)** | | | **(-1.07)** |
| $N$ | 78985 | 78985 | 82,354 | 80019 | 80019 | 80427 |
| $Adj - R^2$ | 0.632 | 0.632 | 0.601 | 0.332 | 0.332 | 0.332 |

Table 11: Expected Default Frequency

This table reports OLS coefficient estimates and $t$-statistics in parentheses below. $EDF_{i,t}$ denotes Moody's Analytics expected default frequency. $HighEDF_{i,t}$ denotes the highest decile of EDF. $POST$ is an indicator variable that receives the value of 1 for periods after 2008. $Constrained_{i,t}$ is an indicator variable that receives the value of 1 if the firm's financial ratio is within 30% of the target financial ratio excluding violators. $MIB_i$ denotes minority interest at the end of 2008 scaled by total assets. Following Roberts and Sufi (2009a), the model includes the lagged natural logarithm of total assets, the lagged tangible assets to total assets ratio, the lagged market-to-book ratio, and a lagged "has SP rating" indicator as control variables. In addition, covenant control variables include 11 covenant control variables: the lagged book debt to assets ratio, the lagged net worth to assets ratio, the lagged cash to assets ratio, the lagged and current EBITDA to lagged assets ratio, the lagged and current cash flow to lagged assets ratio, the lagged and current net income to lagged assets ratio, and the lagged and current interest expense to lagged assets ratio. Control variables also include four covenant control interaction variables: the lagged debt to assets ratio interacted with the lagged cash flow to lagged assets ratio, the lagged debt to assets ratio interacted with the lagged EBITDA to lagged assets ratio, the lagged debt to assets ratio interacted with the lagged net worth to assets ratio, and the lagged EBITDA to lagged assets ratio interacted with the lagged interest expense to lagged assets ratio. The regression model includes year-quarter fixed effects. The standard errors are clustered by firm.

| | Dependent Variable | | | |
|---|---|---|---|---|
| | $EDF_{i,t}$ | $EDF_{i,t}$ | $HighEDF_{i,t}$ | $HighEDF_{i,t}$ |
| $Constrained_{i,t} \times POST$ | -0.090 | -0.319 | -0.000 | -0.004 |
| | (-0.33) | (-1.13) | (-0.08) | (-0.49) |
| $MIB_i \times POST$ | 22.98 | 33.18 | 0.561 | 0.787 |
| | (3.67) | (5.20) | (3.51) | (4.04) |
| $MIB_i \times Constrained_{i,t} \times POST$ | **-41.65** | **-34.79** | **-0.923** | **-0.914** |
| | **(-2.43)** | **(-1.73)** | **(-3.70)** | **(-2.54)** |
| Covenant Controls | No | Yes | No | Yes |
| $N$ | 65509 | 40275 | 65509 | 40275 |
| $Adj - R^2$ | 0.061 | 0.276 | 0.026 | 0.134 |