Corporate leverage ratio adjustment under cash flow-based debt covenants

Alexander P. Becker, Ivan F. Julio, Irena Vodenska, and Liyuan Wang

Metropolitan College, Boston University, Boston, MA 02215, USA

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Author Note

Correspondence should be addressed to Alexander P. Becker (apbecker@bu.edu).

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Abstract

Debt covenants attempt to solve the agency problem between shareholders and bondholders, but it is unclear how they impact a firm's speed of adjustment towards its target capital structure. While covenants constrain firms in their ability to change their leverage, they may serve as a strong incentive to actively manage the capital structure. Recent research suggests that the presence of covenants slows down firms in their adjustment. However, in the absence of an appropriate measure of covenant slack, these findings are based on simple covenant counts or the probability of violation one period ahead. We therefore introduce a new measure for covenant tightness. Our non-parametric method makes different covenant types comparable and relates a firm's slack to that of other firms and other time periods. Our findings challenge existing research by showing covenants are not simply an additional financial cost slowing down firms, but instead may also serve as a disciplining device for underleveraged firms.

Keywords: Cash flow-based lending, capital structure, debt covenants, speed of adjustment

JEL Classification: E22, G21, G30, G32, G34

Introduction

There are two well-documented facts in the study of the capital structure of the firm and corporate debt in general. Empirical evidence and practitioner surveys suggest the existence of target level of leverage, and that deviations from that target are gradually removed over time. A famous survey by Graham and Harvey (2001) shows that indeed, 81% of firms consider a target debt ratio or range when making their capital structure decisions. Graham (2022) discusses the motives of corporate managers and the importance of finance flexibility in practice. According to Myers (1984), the observed variation in debt ratios can be explained by the presence of large adjustment costs. He advocated for a model that incorporates dynamics into the traditional static model, allowing for imperfect and, in some cases, infrequent adjustment over time. Since then, a large body of empirical literature focuses on estimating the speed of adjustment (SOA) using dynamic partial adjustment models.[1]

A second fact is that debt is a major source of external capital for corporations worldwide, with bank loans as often the preferred form of external funding. Moreover, for U.S. nonfinancial firms, most of debt by value is based primarily on cash flows from firms' operations instead of physical collateral.[2] Houston and James (1996) estimate that public bond issuance amounts to only 17% of the outstanding debt and that most firms rely exclusively on intermediated debt. Bradley and Roberts (2015) provide a sense of the relative importance of the private corporate debt market by reporting that the amount of private corporate debt issued overwhelms the amount of public debt issued, ranging from two to three times the amount on an annual basis. Recent work by Lian and Ma (2021) document the central role of firms' cash flows for corporate borrowing in the United States. They find that only 20% of corporate debt is based on specific physical assets (asset-based lending), while the remaining 80% is instead based on the

[1] Some prominent studies are Rajan and Zingales (1995), Hovakimian et al. (2001, 2004), Fama and French (2002), Leary and Roberts (2005), Flannery and Rangan (2006), Kayhan and Titman (2007), Lemmon et al. (2008), Frank and Goyal (2009), Huang and Ritter (2009), Flannery and Hankins (2013), and Elsas and Florysiak (2015).

[2] Commercial mortgages, equipment loans, and loans against working capital are standard examples of lending against discrete assets, while a substantial portion of business loans and most corporate bonds in the US are backed by the cash flow value of the firm as a whole (Lian & Ma, 2021).

value of cash flows from firms' continuing operations (cash flow-based lending.) The prevalence of cash flow-based lending implies that binding financial covenants are put in place to monitor compliance on a quarterly basis. Near 60% of large nonfinancial firms have earnings-based covenants explicitly written in their debt contracts.[3]

In this paper, we investigate how the prevalence of cash-flow based lending and cash flow-based covenants on private debt contracts affect the firm speed of adjustment toward its target leverage ratio. Not surprisingly, these financial covenants influence the changes in the capital structure of the firm, given that these borrowing constraints are relevant not just for the decision of issuing new debt but also for maintaining existing debt. Our work is embedded in a rapidly growing literature that study the impact of the agency costs and corporate governance on capital structure choices in the presence of restrictive debt covenants. We quantify the impact of creditor governance on the speed of capital structure adjustment by introducing a novel measure to estimate the tightness of covenants, used as a proxy for debtholder governance quality.[4]

Flannery and Rangan (2006) have identified firm-specific characteristics that predict a target debt ratio and shown that firms each year close part of the gap between their current debt ratio and this target. This incompleteness of adjustment reflects the costs that firms incur when they change their capital structure. Byoun (2008) expands upon these findings and identifies differences in the adjustment speed: firms that ought to deleverage and have a financial surplus and firms that ought to lever up and have a financial deficit (requiring them to take on debt) move towards their target faster than their counterparts, suggesting that firms facing higher adjustment cost are slower. Adjustment costs are directly related to the severity of conflicts between managers and shareholders, on one hand, but also between managers and

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[3] Lian and Ma (2021) constructed a data set on U.S. nonfinancial corporate debt that integrates several data sources and hand-collected data. Thus, their analysis includes all forms of debt such as bank loans and corporate bonds.

[4] With some notable exceptions (See Chang et al., 2014 and Devos et al., 2017), little attention has centered on the effect of corporate governance quality on the adjustment speed of firms' capital structure.

debtholders, on the other hand. Researchers have proposed various explanations for adjustment costs that rely on the influence of self-interested managers.

A priori, it is unclear in this context which role debt covenants play. Introduced to mitigate the agency problem between bondholders on the one side and shareholders and management on the other, their presence may either present an additional adjustment cost or an incentive to move towards the target more quickly. Upon inception, covenants attempt to reduce the asymmetry between borrower and lender, allowing the latter to infer the intentions of the borrower, as laid out by Armstrong et al. (2019). Since 80% of US corporate borrowing is cash-flow based and only 20% is asset-backed (Lian & Ma, 2021), covenants are prevalent in many debt contracts and play an important role well beyond the inception of the loan. If, during the lifetime of debt contract, borrowers violate a covenant, lenders have the right to accelerate the loan. In this sense, Dichev and Skinner (2002) argue that covenants work effectively like an early warning system. While such violations are often waived, lenders have the upper hand in potentially costly renegotiations — the lender always has the option of forcing the firm into bankruptcy, an especially painful outcome for the firm's shareholders. Therefore, management has strong incentives to adjust the firm's capital structure to avoid the distress that covenant violations may cause.

However, it is difficult to measure how effectively a covenant constrains a firm, and, thus, Devos et al. (2017) rely on a covenant dummy and a simple index measure for the largest part of their analysis. They conclude that covenants translate into additional adjustment cost for firms and suggest that levered firms with covenants adjust more slowly towards their target debt ratio than levered firms without covenants. However, these results are potentially driven by the fact that a simple count of the number of covenants is a weak proxy for covenant restrictiveness at the contract. While our baseline adjustment speed for book-debt ratios roughly agrees with findings of Devos et al. (2017), we present evidence paints a more complex picture of the role of covenants. Using the active book-debt ratio, the economic effect of covenants increases to more than 50%, magnitudes larger than findings in the literature. If, however, we use the market-debt ratio, covenant dummy and covenant index become insignificant predictors. We demonstrate that covenants are not only an additional adjustment cost for firms, but that they indeed may serve as a disciplining device that pushes firms towards their target leverage – if set properly.

Our main contribution, though, is the introduction of a new non-parametric measure to estimate the tightness of covenants and its impact on the adjustment speed of firms. We show that firms that are underleveraged tend to be slowed down by covenants with a lot of slack, but speed up if their covenants are getting tighter. Conversely, overleveraged firms tend to be sped up by covenants with a lot of slack, but slow down if their covenants are getting tighter. This effect is robust with respect to the different measures for leverage we consider, across time periods, covenant types and a narrower definition of covenant tightness within industry classifications. It is particularly pronounced among large firms by both market cap or sales or highly profitable firms, which are more likely to have covenants in general.

Our new measure is inspired by Murfin (2012) and Demerjian and Owens (2016). The former develops a parametric measure for the probability of violation. Since the financial ratios prescribed in debt covenants do not follow a process easily described by a single distribution, this measure is not suitable to study the impact of a wide array of covenants on capital structure adjustments. Addressing this shortcoming, Demerjian and Owens (2016) develop a non-parametric measure. They compute the probability of violation by drawing changes to the financial ratio of a firm one period ahead based upon a sample of similar companies. While their measure is useful to compute the probability of violation, we expand upon their idea to consider the tightness of a covenant in a relative sense.

When firms and banks agree on covenants in new debt packages, the financial ratios written into them reflect both the bank and firm's expectations of appropriate values for the firm. Intuition tells us that the firm's managers have a desirable ratio or range of ratios for their firm in mind, plus an acceptable cushion. This acceptable cushion would then be the preferred slack for this specific financial ratio. Our new measure compares a firm's slack to that of other firms that have the same covenant. Logically, firms with small relative slack are closer to the threshold of covenant violation than the management of the median firm. Implicitly, they are also further away from their desired slack. Building upon our intuition that excessive covenant tightness corresponds to a deviation from a long-term goal[5], we put forth a new measure for covenant slack to interpret the impact of covenants in more detail. We draw from the "wisdom of the crowd" of managers who have – at least roughly – an appropriate amount of wiggle room for their covenants in mind.

Relevant Literature

The main objective of this article is to empirically test whether private debt covenants provisions, acting as a proxy for creditor governance, affect the firm (adjustment) speed toward its optimal capital structure. We start with a brief review on the main theories in capital structure, with a special focus on dynamic capital structure theories, and the empirical partial adjustment models that will be used to test our main hypotheses. Finally, we review the recent theoretical and empirical literature on debt covenants with a particular focus on how corporate governance quality, represented by different covenants, can influence the borrower's speed of adjustment toward its target.

Brief Review on the Capital Structure Literature

As Modigliani and Miller (1958) have demonstrated, under idealized conditions, the capital structure is irrelevant to the value of the firm[6]. Since their seminal work, several theories have emerged to identify the determinants of capital structure decisions in our imperfect world. These theories are obtained by relaxing the conditions outlined by Modigliani and Miller, and collectively they account for most of the stylized facts observed in real data.

The *pecking order theory of capital structure* by Myers and Majluf (1984) and Myers (1984) is based on the asymmetry of information between insiders and outsiders of the firm about its value. Managers are revealing information through their choice of financing and, thus, capital structure. As a result, investments opportunities are financed with internal funds (i.e., retained earnings) first, which is cheapest as it does not reveal any information. Then, if these funds are insufficient, the firm relies on debt

[5] Such a deviation can be voluntary, for example due to a planned acquisition.
[6] Stiglitz (1969) provides additional important contributions to this theory. Rubinstein (2003) provides a detail discussion of the history behind the capital structure ideas.

issuance. Equity is issued only as last resort. The model predicts a negative correlation between debt and profitability, a negative stock market response to an equity issue announcement, and a better response to debt than to equity issuance. Empirical evidence on the pecking order theory provides mixed results. Antweiler and Frank (2006) find that there are significant stock price reactions to equity issues and Krasker (1986) shows that the larger the stock issue, the worse the signal and the consequent drop in the share price. On the other hand, Frank and Goyal (2003) find that pecking order mainly applies to large firms, which is contradictory as large firms are expected to be the least affected by information asymmetry given their higher public exposure.[7]

Closely related to the pecking order theory is the *signaling theory of capital structure*, which states that investment is fixed, and capital structure is used to signal private insider information (Ross, 1977). In this model, investors consider larger leverage ratios as a signal of higher quality – the firm signals that it is not concerned about bankruptcy cost. As low-quality firms have higher probability of bankruptcy, managers of these firms do not have incentives to imitate higher quality firms by issuing more debt. For this reason, the model predicts negative market reactions on equity issues announcements, which is the same as positive reaction on leverage-increasing transactions. Leland and Pyle (1977), Heinkel (1982), Poitevin (1989), and Antweiler and Frank (2006), and Baker, Powell, and Veit (2003) all provide evidence that support the signaling theory, while Eckbo (1986), Jain and Kini (1994) and Loughran and Ritter (1997) provide evidence against it.

The trade-off theory of capital structure weighs the tax advantages of debt against the deadweight bankruptcy cost (Kraus and Litzenberger, 1973). Interest payments offer a tax shield and therefore increase the value of the firm. As debt increases, however, the probability of bankruptcy also increases and accordingly do the advantages of using equity. The key prediction of this theory is the existence of an

[7] Shyam-Sunder and Myers (1999) find that profitability and fixed assets are important predictors of leverage ratios. Bharath et al. (2008) show that the pecking order is more likely to hold when the information asymmetry is large. On the other hand, Brennan and Kraus (1987), Noe (1988), and Constantinides and Grundy (1989) find that firms do not necessarily have a preference between issuing debt or equity. Chirinko and Singha (2000) and Leary and Roberts (2010) also find evidence against this theory.

optimal leverage ratio. Myers (1984) explains that firms set a target leverage ratio, and then due to the presence of large adjustment costs gradually eliminate deviations from the target. As before, empirical evidence shows mixed results. Fama and French (2002) and Kyhan and Titman (2007) find evidence in support. Leary and Roberts (2005) show that deviations from the target may be gradually removed over time. The model also predicts a positive relationship between profitability and leverage. However, Titman and Wessels (1988), Rajan and Zingales (1995), and Frank and Goyal (2007) find that this relationship is negative.

The market timing theory proposed by Baker and Wurgler (2002) states that a firm's observed capital structure reflects its cumulative ability to "time the market". As share prices fluctuate around their true value, managers tend to wait before issuing shares until market conditions get better (higher firm's market-to-book ratios). This implies that managers exploit the information asymmetries to benefit current shareholders. Supporting empirical evidence on the importance of share price over equity issues decisions is provided by Chang et al. (2006), who show that firms with higher public exposure (lower information asymmetries) have lower incentives to time the market. However, Alti (2004), Leary and Roberts (2004a), and Kayhan and Titman (2004) reported evidence that 'market timing' effects have largely dissipated after a couple of years.

Out of all the theories and ideas presented above the only one that explicitly dictates the existence of an optimal capital structure is the trade-off theory. In the event of a shock to capital structure, firms should rebalance their funding choices to gradually move back to target. This idea is very important from an empirical perspective because it implies that the cumulative effect of these shocks should be reflected in the speed of adjustment at which this rebalancing process take place. As we will review in the following section, most of the empirical literature of the dynamics of firms' capital structure is based on the existence of a speed of adjustment toward a target.

Dynamic Capital Structure and Speed of Adjustment toward the Target

The academic discussion, pushed forward by Shyam-Sunder and Myers (1999) and Fama and French (2002), regarding which theory, trade-off or pecking order, best describes capital structure adjustments is still unresolved. In an effort to settle the dispute, Kayhan and Titman (2007) claim that pecking order explains short-term movements and long-term target is explained by the trade-off theory. In a pecking order world, firms show no preference about their funding sources, and the leverage ratio reflects the firms' historical profitability and investment opportunities. Market imperfections, like information asymmetries, impose managers to choose from their financing sources in a specific order to counteract their negative effects. The trade-off theory, on the other hand, says that market imperfections cause the value of the firm to be a function of its capital structure. Therefore, there are incentives for managers to actively offset deviations from the target to maximize the firm's value. The speed with which firms reverse deviations from their target debt ratios depends on the costs of adjusting leverage (Flannery and Rangan, 2006).

Consequently, there is a consensus that the first step to test for capital structure is to estimate the effect of capital adjustment costs. The idea is that finding low empirical estimates of the speed of adjustment (SOA) would contradict the trade-off theory, in favor of the alternatives, which do not predict adjustment behavior back to target. Moreover, if firms' SOA is not different from zero, claiming that a target leverage ratio exists would be difficult (Leary and Roberts, 2005).

Following Myers (1984)'s observation that actual variation in debt ratios can be explained by the presence of large adjustment costs, a vast large body of empirical literature has focused on estimating SOA using dynamic partial adjustment models. Common factors that affect firms' rebalancing decisions toward target found in the literature include size (Jalilvand & Harri, 1984), dividend policy (Fama & French, 2002), tax shields (Shivdasani & Stefanescu, 2010), labor (Matsa, 2010), cash flows (Faulkender et al., 2012), corporate governance (Morellec et al., 2012; Liao et al., 2015), among others. A target leverage, conditional on some (or all) of these firm specific factors, is usually used as a proxy for the unobserved optimal leverage ratio. Then, estimating the SOA involves establishing whether this conditional target leverage is relevant for capital structure adjustments.

Agency Theory of Covenants

Debt is one of the most widely used financial contracts for financing firms worldwide, with bank loans as often the preferred form of external financing for firms in US and in many countries.[8] Drucker and Puri (2009) report that syndicated loans arranged by leading commercial banks lent industrial firms $13.2 trillion between 1993 and 2003, while the joint public issuance of debt and equity was near $12.5 trillion. Moreover, for U.S. nonfinancial firms, 80% of debt by value is based primarily on cash flows from firms' operations and only 20% is asset-backed (Lian & Ma, 2018). These loans in most cases include a variety of covenants that affect borrowers' behavior and demand compliance with respect to financial performance and capital structure.

Debt covenants are a standard feature of current debt contracts and are an essential part of debt enforcement mechanisms. In one conventional mechanism, lenders loan against the liquidation value of discrete assets, thus the focus is on assessing liquidation values of the pledged assets. In another mechanism, creditors lend against the value of the firm as an operating business. In the latter case, lenders' payoffs are tied to the value created by the business, so covenants play a key role in allocating control rights and enforcing monitoring, consistent with empirical evidence in previous studies (Chava & Roberts, 2008; Roberts & Sufi, 2009; Nini et al., 2012). Thus, covenants are designed to protect creditors against wealth transferring activities. In the event of a covenant violation, the control rights of the firm are transferred to creditors, who can enforce additional restrictions on the firms' dividend, investment, and financing policies, or ultimately demand early debt repayment.

The agency theory of covenants developed by Jensen and Meckling (1976), Myers (1977) and Smith and Warner (1979) provides a foundation for the existence of covenants in debt contracts. At the epicenter of this theory is the conflict of interest between shareholders (or managers acting on behalf of shareholders) and debtholders, which compels managers to undertake actions that could have a negative

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[8] The reliance on external debt highlights the importance of credit markets. Robb and Robinson (2012) document the significance of bank financing for startups. Jang (2020) documents that small firms backed by private equity primarily borrow cash flow-based debt. A recent report from the International Monetary Fund shows that bank loans are the dominant source of external capital for firms in Asia, Africa, Latin America, and Eastern Europe (See Oura et al., 2013).

impact on the value of the firm's outstanding debt together with the total value of the firm. Thus, opportunistic shareholders (or managers) can hurt debtholder interests by paying out large dividend, by diluting claims from subsequent issuance of debt of higher priority, by shifting toward projects that benefit shareholders but raise the default risk, by underinvesting in positive net present value projects that could benefit the creditors, and by making acquisitions that increase leverage and affect debt seniority (Warga & Welch, 1993). Debt covenants can mitigate these conflicts and reduce the associated agency costs by restricting the behavior of managers to better align their interests with that of debtholders.

Smith and Warner (1979) argued that these covenants impose restrictions and thus are also costly to the firm. Rajan and Winton (1995) explain that covenants increase a bank's incentive to monitor by decreasing its payoff if it fails to do so. Chava and Roberts (2008) revealed numerous actions taken in response to covenant violations. Most lenders change the maturity of the loan, charge additional fees, increase monitoring activities, raise collateral requirements, and sometimes get involved directly in capital budgeting decisions. For this reason, technical defaults might create additional renegotiation costs that varies widely in terms of the actions taken by the creditor. The fact that many firms choose to accept covenants nevertheless is a signal that they must confer some offsetting benefit. This benefit is the reduction in agency costs, which ultimately translates into a lower cost of debt and an expansion in the financial capacity of the firm. Bradley and Roberts (2015) show that interest rates are lower when firms include covenants in their loan agreements, which implies that covenants must be also valuable for the creditor. A recent paper by Kermani and Ma (2020) reveals how creditor monitoring and covenants facilitate borrowing well beyond the firm's asset liquidation values.

Another strand of this literature shows that banks are increasingly selling loans to the secondary market, separating origination from funding. Pennacchi (1988) and Gorton and Pennacchi (1995) explain that a moral hazard problem arises because loan sellers do not have enough skin on the game to engage in costly screening and monitoring. However, Drucker and Puri (2009) show that the secondary loan market increased private debt availability for borrowers due to better access to capital and lower cost of borrowing. They show that loans sold in the secondary market do indeed have additional and tighter covenants than syndicated loans held by the original lenders. Berlin et al. (2020) show that banks continue to monitor, even when the term loan in the same loan package is covenant-lite. This suggests that covenants mitigate agency problems that are relevant to secondary market loan selling as well.

However, the literature does not provide much evidence on how debt covenants affect the capital structure of the borrowing firm before covenant violations occur or the corresponding loan package expires. As our intuition tells us, firms in financial distress are expected to violate covenants, and therefore it is challenging to observe empirically how covenants by themselves affect firms' leverage ratios and borrowing. Ideally, to empirically separate the effects of covenant constraints from financial constraints, one must observe an exogenous shock that changes the firms' distance from covenant violation (before a technical default), without impacting their financial constraints and investment opportunities. Along these lines, Cohen et al. (2019) use a natural experiment around a change to accounting conventions. An increase in covenant slack led firms to increase their leverage, particularly firms that were close to violating covenants. This increase in leverage among covenant-constrained firms was driven by financially healthy firms, suggesting the covenants were restricting leverage. However, the accounting change coincided with the global financial crisis, making it difficult to generalize or translate these findings.

Nevertheless, the finding strongly suggests that simple measures such as a covenant dummy or a covenant index, in which the number of covenants is counted, are insufficient. First, a covenant in one loan provides protection for all other loans in the same year. Second, an index gives equal weight to all covenant categories. In particular, it assumes that the marginal impact of covenants is constant: for example, the restriction of the first covenant is assumed to be the same as the restriction through the second covenant given the first. This in itself may be a problem. Some studies use a simple count of the number of financial covenants attached to a loan as a measure of violation probability and do not attempt to derive a proper measure of covenant slack that could better reflect the probability of violation. For example, Christensen and Nikolaev (2012) develop a theory that relates to the restrictions put on borrowers through performance vs. capital covenants. However, they measure the intensity of covenants through counts rather than through a more sophisticated measure of violation probability.

In a related paper, Devos et al. (2017) argue that firms should be more concerned when firms' covenants are close to being violated, and the speed of adjustment to a target capital ratio should be more (less) affected when capital (performance) covenants are binding. This line of reasoning is based on Christensen and Nikolaev (2012), which argue that capital covenants directly restrict the level of debt in a firm's capital structure, while performance covenants act more as a "trip wire" which facilitates the contingent allocation of control to lenders. At loan initiation, higher slack for maximum threshold covenants allows a firm to adjust the underlying ratio (e.g., maximum leverage ratio) more easily than when there is less slack (i.e., a lower ratio). The interpretation of covenant slack then depends on whether the covenant imposes a minimum or a maximum threshold. In line with Demerjian and Owens (2016), Devos et al. (2017) define the covenant slack as difference of the actual value and the threshold value, scaled by the threshold value. They calculate slacks only for two type of covenants, Max. Debt to EBITDA and Max. Leverage Ratio, restricting themselves to the ratios with the most standardized definitions. They show that capital covenant slack is more positively related to the speed of capital structure adjustment than performance covenant slack, although they disregard the differences in the underlying distributions of the slack. Unlike the capital structure slack, the performance slack is strongly right-skewed and has a significantly larger average

Data & Sample Construction

Firm Fundamentals

We construct our sample from all firms included in the annual CRSP/Compustat Merged industrial database between the years 1971 and 2018[9]. In line with previous research in capital structure literature, we exclude financial firms (SIC codes 6000-6999) and regulated utility companies (SIC codes

[9] We use data from cash flow statements for which formats were specified beginning in 1971 (Byoun, 2008). Accounting standards were further updated starting in 2019 to include operating leases which changes how the book value of assets and liabilities are calculated (Ma, 2021).

4900-4999) whose capital decisions may be the result of the regulatory environment. For example, while a relatively high leverage ratio is normal for financial firms, the same high leverage ratio for nonfinancial firms may be a sign of financial distress. We also omit firms with less than two consecutive years of data given that our regression specifications use dynamic panel data models which include lagged variables. We drop all firm-years with a negative or missing value of total assets and no Fama-French industry classification. Annual observations are defined based on fiscal.[10]

Table 1 defines the variables used in our study and reports their summary statistics. To avoid the influence of extreme observations in our regressions all ratios are winsorized at the 0.5^{th} and 99.5^{th} percentiles. Size, measured as the natural log of total assets, is the only variable not expressed as a ratio, and it is deflated to 1984 dollars with the average consumer price index from the Bureau of Labor Statistics.

We compute the leverage of firms as the market debt ratio, the book-debt ratio and the active book-debt ratio. The market debt ratio is defined as the book value of debt divided by the sum of the book value of debt and the market value of equity. The book debt ratio is defined as the book value of debt divided by the book value of total assets. Lastly, following Faulkender et al. (2011), the active book debt ratio is computed as the book value of debt divided by the sum of the book value of total assets and next year's net income, to account for the passive component of leverage adjustment due to earnings. The average market-debt, book-debt ratio and active book-debt ratio of firms in our sample are 0.245, 0.240 and 0.248, respectively, with medians of 0.174, 0.205 and 0.201, respectively, and standard deviations of 0.244, 0.222 and 0.257, respectively.

We also attempt to capture the passive or mechanic component of leverage adjustment using the firm's cash flows. Following Byoun (2008), we compute the operating and financing surpluses and deficits for firms. A firm has an operating surplus (deficit) if its cash flow from operations exceeds (is

[10] We use data based on the fiscal year, such that the gap between each time period (a year) is exactly 12 months. However, some sample firms change their fiscal year end month; thus, the gap between each period may not always be 12 months. If this is case, use the respective observations as end point and starting point only.

lower than) its capital expenditures and its net investments in working capital. A firm has a financing surplus (deficit) if its cash flow from operations exceeds (is lower than) its capital expenditures, its net investments in working capital and its dividend payments. A firm can be in one of three states: (i) it has an operating and financing surplus, i.e., internally generated cash flows exceed investments and dividend payments; (ii) it has an operating surplus but a financing deficit, i.e., internally generated cash flows exceed investments but are not sufficient for dividend payments; or (iii) it has an operating deficit and, by extension, a financing deficit, i.e., the internally generated cash flows are insufficient for investments already.

Following Flannery and Rangan (2006), we use firm-specific characteristics to estimate the target debt ratios (MDR^* and BDR^*). We use earnings before interest and tax as the proportion of total assets ($EBIT\_TA$) to control for the impacts of profitability on the decision of debt usage. Per market timing theory, firms with a large market-to-book ratio (*MB*) are inclined to issue equity over debt. Fixed assets as a proportion to total assets (FA_TA) measures the share of tangible assets the firm has and that could potentially be used as collateral. It may be easier for a firm to access to the debt market if FA_TA is large. We include the natural logarithm of total assets (*Ln_TA*) to capture firm size effects on the leverage ratio. Empirically, larger firms have more stable earnings and lower cost of debt. Depreciation and amortization expenses, like interest expenses, can be used as a tax shield. Firms with relatively higher depreciation to total assets (*DEP_TA*) may therefore benefit less from the tax benefits of debt. Research and development expenses are included as a proportion of total assets (RD_TA). RD_TA frequently identifies firms in the high-tech industry that prefer to issue equity over debt. We also include a dummy variable for research and development expense (*RD_Dummy*) which equals to zero if the firm did not report research and development expenses. Missing values of *RD_TA* are then replaced by 0. We control for the dividend payout of firms as a proportion of total assets (DIV_TA). We further include the industry median (*Ind_Median*) to control for common capital structure characteristics among the same industry that are captured by the variables above. Finally, we use a variable to indicate whether the firm is constrained by a covenant or not (*Cov_Dummy*) which we explain in more detail in the section below.

Covenants

We extract covenant data from the Loan Pricing Corporation (LPC) DealScan database for all loan packages that can be matched to Compustat. The data contains the borrowing firm, the start and end dates of the loan package and its facilities, the types of covenants, and the relevant financial ratios stipulated by the covenants.[11] Following Greenwald (2019), we start with loan packages that contain one of the following ten covenant types: Min. Interest Coverage, Min. Fixed Charge Coverage, Min. Cash Interest Coverage, Min. Debt Service Coverage, Max. Debt to EBITDA, Max. Senior Debt to EBITDA, Min. Current Ratio, Min. Quick Ratio, Max. Leverage Ratio and Max. Debt to Equity.[12]

We drop all loan facilities that do not have a valid start and end date. Since loan packages and facilities may overlap and potentially supersede each other, we identify if and how a firm is constrained by covenants; that means identifying the most restrictive active covenant at any given time. For each of the ten covenant types above, we build a time series in the following way. If the firm has only one loan package with a covenant, the ratio detailed in that loan package is the binding ratio for its respective covenant. If the DealScan database indicates that the firm has multiple active loan packages concurrently and the covenant is prescribing a minimum (maximum) ratio, we select the highest (lowest) value among the active packages as the binding ratio. We keep entries in which the financial ratio is missing in the financial statements, since the firm is in fact constrained by the respective covenant, but we denote it accordingly. If the firm has any other active loan packages, we fill the missing data points with the prevailing ratio. If the firm's active loan package does not include a certain covenant, we consider the firm to be unconstrained by this covenant. Similarly, if the firm has no active loan package at all, it is unconstrained. As a result, we have ten time series for each firm which describe if and by what ratio the

[11] Notes on data cleaning: we find that individual entries may contain human error, e.g., be too large or too small by a factor of 10. For example, if we observe a company that is to maintain a Debt-to-EBITDA ratio of 2.5 from January 2010 to April 2011 and from October 2011 to December 2014 and a Debt-to-EBITDA ratio of 0.25 from May 2011 to September 2011, we clean the data by setting the ratio to 2.5 for all these months.

[12] Greenwald (2019) also includes Max. Debt to Tangible Net Worth and Max. Senior Leverage covenants. We do not because they are infrequently used (DTNW) or lead to many missing observations when matched with Compustat/CRSP (SLev).

firm is constrained by each covenant. In the next step we combine the DealScan data with the CRSP/Compustat database, using the linking file provided by Chava and Roberts (2008).

Unlike in our analysis of the target leverage ratio, for which we use annual data, a covenant violation may be recorded in any quarter of the firm's fiscal year. Therefore, we create a variable to indicate whether a firm has been in good standing with its covenants throughout a given fiscal year. The variable is initialized to *True*. As soon as a firm's quarterly financial statements indicate that it has violated at least one of the ratios required by its covenant(s), the variable is set to *False*. We exclude this firm's subsequent annual observations from further analysis. Once the respective loan package expires or a new loan package becomes active, whichever happens first, we set the indicator variable to *true* again and resume using the firm's data. Our total sample thus consists of firm-years for firms without covenants and of firm-years for firms with covenants for which we have not recorded a covenant violation in the active loan package and for which we can determine the covenant tightness based on its financial ratios. For the former, we set the variable *Cov_Dummy* to 0 and, for the latter, we set it to 1. We further include a variable *Cov_Index* that captures how many covenants a firm has in a firm-year, normalized by the maximum possible number of covenants, in our case 10.

Table 2 lists the frequencies of covenants in Panel A. Most commonly, lenders and borrowers include Max. Debt to EBITDA, Min. Interest Coverage and Min. Fixed Charge Coverage covenants in their debt contract, amounting to 72.4% of the total number of covenants in loan packages. Compare Figure 1 for a visual representation.

Just one quarter of debt contracts with covenant stipulations has only one such provision; the largest group of firms (44.2%) has two covenants, as Panel B in Table 2 shows. In Panel C we separate covenants into three groups based on their essence, following the definitions in Greenwald (2019). Debt-to-EBITDA (DE) covenants are comprised of Max. Debt to EBITDA and Max. Senior Debt to EBITDA. These covenants link the debt usage of a firm to its earnings power. Interest coverage (IC) covenants include Min. Interest Coverage, Min. Fixed Charge Coverage, Min. Cash Interest Coverage, and Min. Debt Service Coverage. Lastly, leverage (LEV) covenants include Min. Current Ratio, Min. Quick

Ratio, Max. Leverage Ratio and Max. Debt to Equity. With these covenants, lenders impose restrictions on the firm's capital structure. Among these three covenant types, interest coverage (IC) covenants are most frequently used.

Covenant Tightness

We compute the slack of a covenant as the log difference of the observed financial ratio and the financial ratio prescribed by the covenant; we switch the sign accordingly if the covenant requires a minimum financial ratio. Since the distributions of the covenant slack measured as the log-difference are different for each covenant type (and generally not normal, as shown in Figure 2), we introduce a non-parametric measure, the covenant tightness percentile.

For each covenant type, we compute the percentile to which the slack of the covenant corresponds across the entire sample. A large percentile or tightness value corresponds to a firm that has little slack and is closer to the covenant threshold than most firms in most years that also have this covenant. Accordingly, firm-year observations of a low percentile indicate a lot of slack or very little tightness. With this approach, we are attempting to capture the managerial perspective. Instead of asking how much slack is sufficient or how much tightness is too much, we compare the covenant tightness a firm observes compared to the empirical distribution. This approach captures both the relative position to other firms and different points in time. Naturally, the tightness percentile ranges from 0 (no tightness) to 1 (maximum tightness). We set the variable to 0 for firms that are not bound by any covenant. If a firm has multiple covenants, we use the largest value of the tightness percentile for that firm-year.

In our robustness check, we compute the percentile based on Fama-French industry classification and SIC. Instead of comparing the tightness of a covenant across all firms, we compare the tightness to firms of the same industry only.

Methodology & Baseline Results

The dynamic partial adjustment model is considered the workhorse model to estimate SOA because it allows each firm's target leverage to be time-varying. In addition, in line with the dynamic version of the trade-off theory, it not only recognizes that deviations from target are gradually adjusted but also that adjustment costs might prevent full adjustment. Thus, the conventional partial adjustment model of capital structure dynamics is:

$$LEV_{i,t+1} - LEV_{i,t} = \lambda\left(LEV^{*}_{i,t+1} - LEV_{i,t}\right) + \delta_{i,t+1} \quad (1)$$

where $LEV_{i,t+1}$ represents the leverage ratio, $LEV^{*}_{i,t+1}$ the target leverage ratio, and $\delta_{i,t+1}$ is a stochastic error term. In this model, λ is the SOA's coefficient that captures the proportion of deviation from target corrected in each period. Equation 1 is made operational by assuming that the unobservable target leverage $LEV^{*}_{i,t+1}$ can be instrumented as a linear function of observed firm specific characteristics $X_{i,t}$, that have an impact over the choice of financing leverage:

$$LEV^{*}_{i,t+1} = \beta X_{i,t}. \quad (2)$$

Substituting Equation 2 into Equation 1 and rearranging, we obtain the partial adjustment model of Flannery and Rangan (2006)

$$LEV_{i,t+1} = \lambda\, \beta X_{i,t} + (1-\lambda)\, LEV_{i,t} + \tilde{\delta}_{i,t+1}\, . \quad (3)$$

As Flannery and Hankins (2011) suggest, we first estimate Equation 3 using Blundell and Bond's system GMM (Blundell & Bond, 1998) to extract the target leverage ratio. Then we run an ordinary least squares regression on Equation 1 to estimate the speed of adjustment λ with bootstrapped standard errors. For convenience, we the equation as

$$\Delta LEV_t = \lambda\, DEV_t + \varepsilon_{i,t}. \quad (4)$$

where $\Delta LEV_t = LEV_{i,t+1} - LEV_{i,t}$ is the change in leverage ratio from t to $t+1$ and $DEV_t = LEV^{*}_{i,t+1} - LEV_{i,t}$ is the deviation from the target leverage ratio at time t. We do not use fixed effects in our estimate of Equation 4 because firm-fixed effects would imply a constant increase or decrease in leverage across all years for a given firm and time-fixed effects would imply a constant increase or decrease in leverage across all firms for a given year, regardless of their deviation from the target. Neither makes economic sense. Instead, we include dummy variables to capture the financing status of firms to reflect the mechanic component of the leverage adjustment due to excess or lack of cash flows.

Prior research demonstrates that the speed of adjustment is heterogeneous which reflects that firms face different adjustment costs. Byoun (2012) shows that overleveraged firms adjust towards their target more quickly than underleveraged firms. Interpreted from the perspective of an overleveraged firm, this finding suggests that the cost of being above the leverage target outweighs the adjustment cost, prompting management to deleverage more quickly to avoid financial distress. From the perspective of an underleveraged firm, this finding suggests that there is a benefit to being below the leverage target, prompting management to increase leverage more slowly to maintain financial flexibility and debt capacity.

We observe that the estimated speed of adjustment corresponds closely to estimates presented previously in the literature for market-debt, book-debt and active book-debt ratios. Table 3 shows these baseline estimates. We find adjustment speeds of 17.4% to 19.3% for the market-debt ratio in Panels A and B. Distinguishing between under- and overleveraged firms, we find adjustment speeds in the range of 13.5% to 22.2%. We find adjustment speeds of 14.3% to 16.8% for the book-debt ratio in Panels C and D. Distinguishing between under- and overleveraged firms, we find adjustment speeds in the range of 8.6% to 20.7%. Lastly, we find adjustment speeds of 40.8% to 41.7% for the active book-debt ratio in Panels E and F. Distinguishing between under- and overleveraged firms, we find adjustment speeds in the range of -4.2% to 56.5%.

Results

Covenants confer benefits to firms by lowering the cost of debt and expanding their future financial capacity. At the same time, they impose restrictions as well. In this way, covenants may act as a disciplinary device that incentivize firms to keep their capital ratios near an optimal target ratio consistent with a minimum level of agency costs. However, if a covenant is too restrictive based on the firm's performance or business decisions like an acquisition, it may either force the firm to adjust even faster or become an obstacle in prudent capital structure decisions. As our findings in Table 4 show, the impact of covenants, their number and their tightness is inconclusive when measured across all firms. Panels A and B which use the market-debt ratio show that *Cov_Dummy* in column (2) and *Cov_Index* in column (3) are not significant, while *Cov_Tightness* in column (4) is positively related to the speed of adjustment. We further observe that covenants per se slow down a firm, but tight covenants speed up their adjustment, as shown in column (5). However, panels C and D which use the book-debt ratio show that the impact of covenants is negative on the speed of adjustment, regardless of how they are measured. Using the active book-debt ratio, this negative impact is even more pronounced and economically highly meaningful, as shown in panels E and F.

These findings suggest that we need to study the impact of covenants on the speed of adjustment differently. Covenants are not simply a millstone around the neck when it comes to managing the capital structure, for this would assume that in the absence of covenants, managers diligently work towards the target. However, the evidence in the literature and in this paper shows that overleveraged firms adjust significantly more quickly towards the target than underleveraged firms. This observation is true regardless of how we measure the leverage ratio, as column (1) in panels A through F in Table 5 demonstrates. As measured by market-debt ratio, overleveraged firms close on average 20.7% to 21.7% of the gap each year while underleveraged firms close only 14.0% to 14.3%[13]. As measured by book-debt ratio, overleveraged firms close 17.1% to 20.3% of the gap while underleveraged firms close only 8.3% to 13.6%. The difference is most pronounced when we use the active book-debt ratio as our measure for leverage. In this case, overleveraged firms close between 49.0% and 57.2% of the gap per year. Underleveraged firms, however, do not move towards the target at all (-0.3%, statistically insignificant) or even increase the gap (-4.3%).

The differences in speed of adjustment reflect the asymmetry in the deviation from the target. On the one hand, management of an overleveraged firm ought to have a natural interest in bringing down the debt ratio to avoid financial distress cost and to rebuild debt capacity for future opportunities. On the other hand, management of an underleveraged firm does not face such immediate pressures to increase its

[13] The first percentage value indicates the speed of adjustment if the target is estimated without covenant information, and the second percentage value is the speed of adjustment if the covenant information is included in the target estimation.

debt ratio. Instead, it may choose to remain underleveraged to maintain financial flexibility and debt capacity. It becomes clear that a covenant may have opposite effects for these two kinds of firms.

In columns (2) and (3) in panels A through F in Table 5, we show the regression estimates if we include *Cov_Dummy* and *Cov_Index*, respectively. While the results are inconclusive for the market-debt ratio, we find that overleveraged firms tend to be slowed down by covenants (and a greater number of them) and underleveraged firms tend to be sped up. Using the book-debt ratio as our measure of leverage and estimating a firm's target without covenant information, an overleveraged firm without covenants has a speed of adjustment of roughly 20.5%, while the speed of an underleveraged firm is 12.0%. If the overleveraged firm has at least one covenant, its speed of adjustment drops to 12.1%, while the underleveraged firm remains at 12.0%. Lastly, using the active-book debt ratio, the effect is even more pronounced. An underleveraged, unconstrained firm has an SOA of close to 0%, while its overleveraged counterpart adjusts at 59.7% per year. On the flipside, if the firms have at least one covenant, their speeds of adjustment go to 20.8% and about 3%, respectively.

These findings are even stronger when using our new measure *Cov_Tightness*. Using the market-debt ratio as our measure of leverage and estimating a firm's target without covenant information, an overleveraged (underleveraged) firm without covenants has a speed of adjustment of roughly 22.4% (12.0%). If an underleveraged firm has an extremely tight covenant, its speed of adjustment goes to 20.8%, while the overleveraged firm is not affected by the covenant. Thus, a strongly covenant-constrained underleveraged firm adjusts almost as quickly as an overleveraged firm. Using the book-debt ratio as our measure of leverage and estimating a firm's target without covenant information, an overleveraged firm without covenants has a speed of adjustment of roughly 20.5%, while the speed of an underleveraged firm is 11.5%. If the overleveraged firm has an extremely tight covenant, its speed of adjustment drops to 9.2%, while the underleveraged firm speeds up to 17.4%. Lastly, using the active-book debt ratio, the effect is even more pronounced. An underleveraged, unconstrained firm has an SOA of practically 0%, while its overleveraged counterpart adjusts at 59.6% per year. On the flipside, if the firms are strongly constrained by a covenant, their speeds of adjustment go to 9.9% and 8.8%, respectively.

Interestingly, using *Cov_Dummy* and *Cov_Index* merely reduces the gap in the speed of adjustment between overleveraged and underleveraged firms. Our new variable *Cov_Tightness* suggests a switching point. Beyond a certain degree of restrictiveness, the speed of adjustment of underleveraged firms exceeds that of overleveraged firms. This finding suggests that the impact of covenants is not only different on firms based on their leveraged status, but covenant restrictions affect the firms in different ways. We therefore consider a model that includes both *Cov_Dummy* and *Cov_Tightness* as interaction terms with the leverage deviation to measure their impact on the speed of adjustment.

Returning to the agency theory of covenants, the incentives of managers of over-indebted firms and bond holders are broadly aligned. We hypothesize that the presence of covenants reinforces this alignment and has a small to moderate impact on the speed of adjustment, yielding a small positive coefficient of *Cov_Dummy* for overleveraged firms. However, very restrictive covenants may reduce managers' ability to maneuver and reduce the firm's leverage. We therefore further hypothesize that the coefficient of *Cov_Tightness* is negative and greater in magnitude than the coefficient of *Cov_Dummy* for overleveraged firms.

We expect the opposite results for underleveraged firms. If an underleveraged firm has covenants that are not particularly restrictive, we expect no change in the speed of adjustment. Arguably, the coefficient for *Cov_Dummy* may even be negative since managers can argue that keeping their leverage ratio below what would be the target is well in-line with their debt covenants. However, if the firm's covenants start being tighter, we expect an increase in the speed of adjustment for two reasons. First, the covenant disciplines. Second, when the firm is at a greater risk of covenant violation, the value of its real options diminishes, and so does the value of keeping greater financial flexibility. We therefore would expect a positive coefficient for *Cov_Tightness* that is greater in magnitude than the coefficient of Cov_Dummy. We show the regression estimates for our main model,

$$\Delta LEV_t = \lambda_1\, DEV_t + \lambda_2\, DEV_t \times Cov\_Dummy + \lambda_3\, DEV_t \times Cov\_Tightness \, + \varepsilon_{i,t}, \quad (5)$$

in column (5) in panels A through F in Table 5. We observe that underleveraged firms with a loose covenant adjust slower than underleveraged firms without a covenant, but increase their speed of adjustment with greater covenant tightness. Conversely, overleveraged firms with a loose covenant adjust faster, but reduce their speed of adjustment with greater covenant tightness. For a visual representation, see Figure 3.

Next, we investigate the impact of different covenant types on the speed of adjustment, i.e., debt-to-EBITDA covenants (DE), interest coverage covenants (IC) and leverage covenants (LEV). First, we compute the covenant tightness as the ranked slack value within a covenant type, naming the results *Cov_Tightness_DE*, *Cov_Tightness_IC* and *Cov_Tightness_LEV*. Since one of these categories contains by design the tightest covenant a firm has, one of these values will be the same as the value of the firm's *Cov_Tightness.* We accordingly create the dummies D_{DE}, D_{IC} and D_{LEV} that take the value 1 if the firm's tightest covenant is of the respective type and 0 otherwise. We then estimate two regression models,

$$\Delta LEV_t = \lambda_1\, DEV_t + \lambda_2\, DEV_t \times Cov\_Dummy_t + \lambda_3\, DEV_t \times Cov\_Tightness\_DE_t + \lambda_4\, DEV_t \times Cov\_Tightness\_IC_t + \lambda_5\, DEV_t \times Cov\_Tightness\_LEV_t + \varepsilon_{i,t} \quad (6)$$

and

$$\Delta LEV_t = \lambda_1\, DEV_t + \lambda_2\, DEV_t \times Cov\_Dummy_t + \lambda_3\, DEV_t \times Cov\_Tightness_t \times D_{DE,t} + \lambda_4\, DEV_t \times Cov\_Tightness_t \times D_{IC,t} + \lambda_5\, DEV_t \times Cov\_Tightness_t \times D_{LEV,t} + \varepsilon_{i,t}. \quad (7)$$

In Equation 6, we include the tightness value for each covenant type to study the joint effect. Note that a firm may not have a covenant of all three types at the same time. We report the results of this regression in columns (1) and (2) of Table 6. Our results confirm our earlier findings, independent of covenant type with the exception of leverage-based covenants for overleveraged firms. This result is not surprising since this covenant merely reiterates that the firm has too much debt.

In Equation 7, we include the *Cov_Tightness* value of only the most restrictive debt covenant, using the dummies. Columns (3) and (4) of Table 6 show our estimation. We observe that debt-to-EBITDA covenants have the greatest coefficients, both for overleveraged and underleveraged firms.

Overall, our results confirm the hypothesis that firms with covenants have a higher speed of capital structure adjustment, relative to firms without covenants. We expand upon the findings of Devos et al. (2017) who argue that debt covenants represent an important adjustment cost and slow down the speed of adjustment. Our results paint a rich picture of the interplay between debt covenants and the speed of adjustment. For underleveraged firms, their presence has no meaningful or potentially negative effects, slowing them down from closing the gap to the leverage target. However, if they are sufficiently tight, underleveraged firms adjust expediently and, in some cases, even more quickly than overleveraged firms. Overleveraged firms are moderately sped up in their adjustment by the presence of covenants, but tend to slow down significantly if covenants are too restrictive.

We also offer some methodological improvements. To the best of our knowledge, prior work does not exclude firm-years from loan packages with current or prior violations. It is important to exclude these firm-years, though, because we do not and, in general, cannot know how the violation of the covenant was resolved: Did the lenders accelerate or restructure the loan, did they waive the violation, or did they renegotiate the terms? All these outcomes have different implications for the capital structure and adjustments. If bank and lenders renegotiate terms but the new financial ratios are not reflected in the data set, measure the proper covenant slack is not possible. We therefore restrict our analysis to the firms for which the firm-year have not been contaminated by a prior covenant violation. Removing firm-years accordingly has another important advantage. It is difficult to separate the effects of debt covenants from the effects of the firm's financial constraints on its borrowing, but by removing the years in which firms have an active but violated covenant we exclude the years in which financial constraints due to distress may be particularly apparent. It is possible that the results in Devos et al. (2017) indicate a slow-down in the speed of adjustment due to a firm's financial distress rather than due to the covenants in its debt contracts, in particular since just over half of the firm-years in the sample are of firms not in good standing at that point, meaning that they have violated at least one of their covenants at least once in a preceding quarter.

Robustness

Impact of Firm Size, Sales and Profitability

We test our results for robustness with respect to firm characteristics such as market capitalization, revenue and EBITDA margin. For each fiscal year, we split our sample in to three groups: the top 30%, the bottom 30% and the remaining firms for each of the three measures. We present our results in Table 7. We confirm our findings particularly for large firms, firms with high sales and firms with high profitability. The statistical power is insufficient for small firms, firms with low sales and firms with low profitability since only few of them have debt covenants. For example, while 46.1% of firm-years for firms with high revenue are impacted by covenants, the number is 2.6% for firms with low revenues.

Stability over Time

We use the sample period from 1995 to 2018 to estimate our model and the impact of debt covenants on the speed of adjustment. Prior to 1995, rather little data is available with respect to covenants and their provisions. Nowadays, lenders are less reliant on financial covenants as a tool to monitor firms' financial health in comparison to 20 years ago, as Griffin et al. (2019) point out. For example, from 1997 to 2016, the average number of financial covenants per loan package has decreased by half, while the average covenant slack is twice as big, as measured by the borrower's distance to the covenant threshold at loan origination. The implication of these findings for our model is that the effect of debt covenants on the speed of adjustment should decline as well, but the impact on the speed of adjustment should remain the same. In order to confirm this intuition and the robustness of our model, we re-estimate our findings for three different time periods, 1995-2005, 2006-2009, and 2010-2018. We present our results in Table 8. We find that the signs of the coefficients are robust over time, and as expected in a world of "cov-lite", the magnitude of the coefficient on *Cov_Tightness* has decreased, as seen in panel A.

We also check if debt-to-EBITDA covenants remain the most impactful covenants, and we confirm this finding in panel B. Interestingly, we find that interest coverage covenants appear to have lost their impact on underleveraged firms, potentially due to historically low interest rates.

Industry- and Firmed-Fixed Effects on the Speed of Adjustment

In Table 9, we estimate the speed of adjustment with time-fixed effects and industry-fixed effects, using the Fama-French industry classification codes. We create interaction terms with DEV_t as follows: $\Delta LEV_{i,t} = \lambda_0 DEV_{i,t} + \lambda_1 DEV_{i,t} \times D_1 + \cdots$, where D_1 is a dummy that is 1 in year 1 and 0 otherwise, and $\Delta LEV_{i,t} = \lambda_0 DEV_{i,t} + \lambda_1 DEV_{i,t} \times FF_1 + \cdots$, where FF_1 is a dummy that is 1 if the firm has industry code 1 (Agriculture) and 0 otherwise.

Including time-fixed effects, the difference between over- and underleveraged firms diminishes in their baseline speeds of adjustment. However, we still observe that overleveraged firms adjust more quickly up until the covenants becomes too tight and they slow down, while underleveraged firms adjust slowly until the covenant becomes too tight and they speed up.

Slack Ranking by Industry Codes

One may argue that ranking the slack by covenant across all firms to arrive at *Cov_Tightness* neglects important industry-specific characteristics that impact managers' view on an appropriate amount of slack. Therefore, we also compute the *Cov_Tightness* variable ranking the slack by covenant and by industry. We use both the Fama-French industry classification and SIC codes. In both cases, we confirm our prior findings.

Conclusion

We find strong evidence that firms change their speed of adjustment towards their target leverage ratio if they are bound by covenants. This effect depends on the leverage status of the firm and the restrictiveness of the covenant. To measure this, we have introduced a new measure for covenant tightness, drawing from the "wisdom of the crowd" of managers who have an appropriate slack in mind: we consider a covenant to be tight if the firm's distance to the threshold stipulated in covenant is at a low percentile of the distribution across all firms.

In contrast to the existing literature, we argue that covenants are not simply an additional cost to firms that slow down capital structure adjustment. While this is true for overleveraged firms with very tight covenants that may need more room to maneuver than the covenants allow for, the opposite is the case for overleveraged firms with less restrictive covenants; these firms actually increase their speed of adjustment. In line with a more nuanced impact of covenants, we find that underleveraged firms that are well in line with their covenants actually slow down their adjustment, but can be incentivized to manage their capital structure more prudently with tight covenants.

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Table 1: Summary Statistics & Target Leverage Estimation

Samples are taken from the L) merged with Compustat, except utility and financial firms (SIC 4900-4990 & 6000-6999), from 1971 to 2018 based on the firm's fiscal year. Ratio variables are winsorized at 0.5^{th} and 99.5^{th} percentiles. We are using the definition of firm-specific characteristics introduced by Flannery and Rangan (2006) and present summary statistics in Panel A. Book-debt ratio (*BDR*) is total debt (long-term debt [9] + short-term debt [34]) divided by total assets [6]. Active book-debt ratio (BDR_{act}) is total debt (long-term debt [9] + short-term debt [34]) divided by (total assets [6] + next year's net income [172]). Operating income to assets (*EBIT_TA*) is the earnings before tax and interest (Income Before Extraordinary Items [18] + Interest and Related Expense [15] + Income Taxes [16]) divided by total assets [6]. Market-to-book ratio (*MB*) is the book value of the total debt (long-term debt [9] + short-term debt [34]) plus the value of preferred stock [10] and market value of outstanding common stock [199]*[25] divided by total assets [6]). *DEP_TA* is depreciation and amortization [14] divided by total assets [6]. *Ln_TA* is the natural logarithm of total assets, normalized to 1984 dollars (log([6]*1,000,000 / CPI)). Fixed assets to total assets (*FA_TA*) is fixed assets [14] divided by total assets [6]. R&D expenses to total assets (*RD_TA*) is research and development expenses [46] divided by total assets [6]. *RD_Dummy* is a dummy equal to 1 if the firm did not report R&D expenses [46], otherwise equal to 0. *DIV*_TA is cash dividends [127] divided by total assets [6]. *Ind_Median* is the median value of the leverage ratio grouped by year and industry classification code as established by Fama and French (2002). *Cov_Dummy* is equal to 1 if the firm has at least one covenant in the DealScan database in a given fiscal year while (i) it is not in violation of any covenants and (ii) all financial information is available to compute the required covenant ratios; otherwise, it is 0. *Cov_Index* is an index for the number of covenants a firm has at any given time divided by the maximum number of covenants we consider. Like for *Cov_Dummy*, we exclude firms in violation or with insufficient data. We consider fiscal years 1995 to 2018 for covenant data.

ΔMDR and *ΔBDR* are the difference between next and this year's leverage ratios. *DEV* is the difference between the estimated target leverage ratio for the next year and this year leverage ratio. *Op. Surplus & Fin. Surplus* is a dummy variable that is 1 if a firm has an operating surplus and a financing surplus, i.e., sufficient internal cash flow to pay its dividends, and 0 otherwise. *Op. Surplus & Fin. Deficit* is a dummy variable that is 1 if a firm has an operating surplus but a financing deficit, i.e., insufficient internal cash flow to pay its dividends, and 0 otherwise. *Op. Deficit* is a dummy variable that is 1 if the firm has an operating deficit. We follow Byoun (2008) in the definition of surplus and deficit. We estimate the regression model using the *xtdpdsys* command in Stata and present our results in Panel B.

Panel A: Summary statistics.

	N	Mean	Median	SD	Min	Max
MDR	162,705	0.245	0.174	0.244	0.000	0.938
BDR	163,385	0.240	0.205	0.222	0.000	1.227
BDR$_{act}$	144,835	0.248	0.201	0.257	0.000	1.824
EBIT_TA	163,616	-0.011	0.072	0.319	-2.241	0.435
MB	162,572	1.756	1.132	1.941	0.241	15.457
FA_TA	163,677	0.285	0.226	0.228	0.000	0.925
Ln_TA	163,885	18.369	18.276	2.103	6.290	26.246
DEP_TA	163,261	0.047	0.038	0.039	0.000	0.304
RD_TA	163,885	0.053	0.000	0.122	0.000	0.933
RD_Dummy	163,885	0.409	0.000	0.492	0.000	1.000
DIV_TA	161,596	0.010	0.000	0.023	0.000	0.205
Ind_Median (MDR)	163,885	0.196	0.193	0.137	0.000	0.809
Ind_Median (BDR)	163,885	0.199	0.218	0.102	0.000	0.716
Cov_Dummy	68,933	0.190	0.000	0.392	0.000	1.000
Cov_Index	68,933	0.036	0.000	0.082	0.000	0.600
***Δ*MDR**	131,276	0.014	0.001	0.134	-0.938	0.938
MDR*	143,861	0.289	0.276	0.176	-0.522	1.085
DEV (MDR)	143,861	0.049	0.082	0.255	-1.181	1.009
MDR* (w/ Cov_Dummy)	60,808	0.205	0.193	0.131	-0.324	0.731
DEV (MDR, w/ Cov_Dummy)	60,808	0.046	0.077	0.197	-1.071	0.717
***Δ*BDR**	131,927	0.010	-0.002	0.126	-1.227	1.227
BDR*	143,861	0.259	0.249	0.102	-0.230	0.651
DEV (BDR)	143,861	0.026	0.062	0.205	-1.342	0.640
BDR* (w/ Cov_Dummy)	60,808	0.228	0.216	0.126	-0.236	0.748
DEV (BDR, w/ Cov_Dummy)	60,808	0.043	0.081	0.205	-1.451	0.664
***Δ*BDR$_{act}$**	130,428	-0.006	-0.001	0.159	-1.824	1.227
DEV (BDR$_{act}$)	142,129	0.013	0.065	0.251	-1.939	0.640
DEV (BDR$_{act}$, w/ Cov_Dummy)	59,695	0.026	0.082	0.266	-1.918	0.668
Op. Surplus & Fin. Surplus	161,534	0.438	0.000	0.496	0.000	1.000
Op. Surplus & Fin. Deficit	161,534	0.060	0.000	0.238	0.000	1.000
Op. Deficit	161,534	0.502	1.000	0.500	0.000	1.000

Panel B: Regression estimates for the target leverage using Blundell-Bond GMM.

VARIABLES	(1)	(2)	(3)	(4)
	$\mathbf{MDR_{t+1}}$	$\mathbf{MDR_{t+1}^{in}}$	$\mathbf{BDR_{t+1}}$	$\mathbf{BDR_{t+1}^{in}}$
Leverage	0.773***	0.737***	0.781***	0.797***
	(0.003)	(0.006)	(0.004)	(0.006)
EBIT_TA	-0.002	-0.003	-0.005**	-0.013***
	(0.002)	(0.003)	(0.003)	(0.003)
MB	-0.002***	-0.002***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Ln_TA	0.002***	0.001*	0.001	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
DEP_TA	-0.228***	-0.145***	-0.168***	-0.118***
	(0.018)	(0.023)	(0.019)	(0.025)
FA_TA	0.089***	0.098***	0.079***	0.082***
	(0.005)	(0.007)	(0.005)	(0.007)
RD_TA	-0.037***	-0.030***	-0.027***	-0.020**
	(0.006)	(0.007)	(0.007)	(0.008)
RD_DUM	0.011***	-0.005	0.006***	-0.014***
	(0.002)	(0.004)	(0.002)	(0.004)
DIV_TA	0.024***	0.046***	0.019**	0.005
	(0.006)	(0.009)	(0.009)	(0.013)
Ind_Median	-0.093***	-0.111***	-0.029*	-0.028
	(0.017)	(0.019)	(0.017)	(0.018)
Cov_Dummy		0.005**		-0.001
		(0.002)		(0.002)
Constant	0.028***	-0.016	0.018*	-0.069***
	(0.010)	(0.016)	(0.010)	(0.017)
Number of Obs	143,507	60,651	143,693	60,693
Number of Groups	14,073	8,948	14,081	8,956

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 2: Baseline Estimates for the Speed of Adjustment.

Panel A: Using market-debt ratio, target estimated without covenant information.

VARIABLES	(1)	(2)	(3)	(4)
	ΔMDR	**ΔMDR**	**ΔMDR**	**ΔMDR**
DEV	0.183***	0.173***		
	(0.002)	(0.002)		
DEV*$\mathbf{D_{over}}$			0.193***	0.222***

			(0.004)	(0.004)
DEV*D$_{under}$			0.177***	0.130***
			(0.003)	(0.004)
Op. Surplus & Fin. Surplus		-0.021***		-0.012***
		(0.001)		(0.001)
Op. Surplus & Fin. Deficit		-0.012***		-0.003
		(0.002)		(0.002)
Op. Deficit		0.029***		0.037***
		(0.001)		(0.001)
Observations	54,192	53,818	54,192	53,818
Adj. R-squared	0.117	0.156	0.117	0.159

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel B: Using market-debt ratio, target estimated with covenant information.

VARIABLES	(1)	(2)	(3)	(4)
	ΔMDR	**ΔMDR**	**ΔMDR**	**ΔMDR**
DEV	0.193***	0.179***		
	(0.003)	(0.003)		
DEV*D$_{over}$			0.169***	0.213***
			(0.004)	(0.004)
DEV*D$_{under}$			0.216***	0.135***
			(0.004)	(0.005)
Op. Surplus & Fin. Surplus		-0.014***		-0.007***
		(0.001)		(0.001)
Op. Surplus & Fin. Deficit		-0.004		0.003
		(0.003)		(0.003)
Op. Deficit		0.035***		0.041***
		(0.001)		(0.001)
Observations	49,014	48,666	49,014	48,666
Adj. R-squared	0.101	0.144	0.102	0.146

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel C: Using book-debt ratio, target estimated without covenant information.

VARIABLES	(1)	(2)	(3)	(4)
	ΔBDR	**ΔBDR**	**ΔBDR**	**ΔBDR**
DEV	0.173***	0.162***		
	(0.003)	(0.003)		
DEV*D$_{over}$			0.158***	0.194***
			(0.004)	(0.004)
DEV*D$_{under}$			0.188***	0.117***
			(0.004)	(0.006)

Op. Surplus & Fin. Surplus		-0.020***		-0.014***
		(0.001)		(0.001)
Op. Surplus & Fin. Deficit		0.002		0.009***
		(0.003)		(0.003)
Op. Deficit		0.033***		0.040***
		(0.001)		(0.001)
Observations	54,125	53,735	54,125	53,735
Adj. R-squared	0.073	0.116	0.074	0.117

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel D: Using book-debt ratio, target estimated with covenant information.

VARIABLES	(1)	(2)	(3)	(4)
	***Δ*BDR**	***Δ*BDR**	***Δ*BDR**	***Δ*BDR**
DEV	0.160***	0.154***		
	(0.003)	(0.003)		
DEV*D$_{over}$			0.147***	0.201***
			(0.004)	(0.004)
DEV*D$_{under}$			0.176***	0.084***
			(0.004)	(0.006)
Op. Surplus & Fin. Surplus		-0.018***		-0.009***
		(0.001)		(0.001)
Op. Surplus & Fin. Deficit		0.003		0.013***
		(0.003)		(0.003)
Op. Deficit		0.037***		0.046***
		(0.001)		(0.001)
Observations	48,949	48,585	48,949	48,585
Adj. R-squared	0.064	0.111	0.064	0.114

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel E: Using active book-debt ratio, target estimated without covenant information.

VARIABLES	(1)	(2)	(3)	(4)
	***Δ*BDR$_{act}$**	***Δ*BDR$_{act}$**	***Δ*BDR$_{act}$**	***Δ*BDR$_{act}$**
DEV	0.426***	0.428***		
	(0.002)	(0.002)		
DEV*D$_{over}$			0.520***	0.581***
			(0.002)	(0.003)
DEV*D$_{under}$			0.177***	-0.010*
			(0.004)	(0.006)
Op. Surplus & Fin. Surplus		-0.030***		0.023***
		(0.001)		(0.001)
Op. Surplus & Fin. Deficit		-0.009***		0.050***

		(0.003)		(0.003)
Op. Deficit		-0.006***		0.053***
		(0.001)		(0.001)
Observations	53,111	52,783	53,111	52,783
Adj. R-squared	0.416	0.425	0.469	0.489

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel F: Using active book-debt ratio, target estimated with covenant information.

VARIABLES	(1)	(2)	(3)	(4)
	Δ**BDR$_{act}$**	Δ**BDR$_{act}$**	Δ**BDR$_{act}$**	Δ**BDR$_{act}$**
DEV	0.420***	0.422***		
	(0.002)	(0.002)		
DEV*D$_{over}$			0.503***	0.574***
			(0.003)	(0.003)
DEV*D$_{under}$			0.170***	-0.041***
			(0.004)	(0.006)
Op. Surplus & Fin. Surplus		-0.027***		0.028***
		(0.001)		(0.001)
Op. Surplus & Fin. Deficit		-0.010***		0.055***
		(0.003)		(0.003)
Op. Deficit		0.002*		0.060***
		(0.001)		(0.001)
Observations	47,995	47,689	47,995	47,689
Adj. R-squared	0.417	0.422	0.465	0.493

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Covenant Restrictions.

Panel A: Summary of covenant restrictions, containing frequencies of each covenant and relative occurrences in the entire DealScan database with complete data. Panel B: Intensity of covenants per firm-year. Panel C: Intensity of covenants per firm-year, separated into three groups of covenants, interest coverage (IC), debt to earnings (DE) and leverage (Lev). Panel D: Summary statistics of covenant measures in the merged data set for fiscal years 1995 to 2018, excluding firm-years in which we cannot compute the relevant financial ratios from the financial statements of the firm or in which the firm is in violation of a covenant.

Panel A: Covenant frequency

	Abs. Frequency	**Rel. Frequency**
Max. Debt to EBITDA (DE)	22,449	30.08%
Min. Interest Coverage (IC)	16,454	22.05%
Min. Fixed Charge Coverage (IC)	15,117	20.26%

Max. Leverage Ratio (Lev)	6,686	8.96%
Max. Senior Debt to EBITDA (DE)	4,365	5.85%
Min. Debt Service Coverage (IC)	4,167	5.58%
Min. Current Ratio (Lev)	3,411	4.57%
Min. Quick Ratio (Lev)	1,023	1.37%
Min. Cash Interest Coverage (IC)	598	0.80%
Max. Debt to Equity (Lev)	354	0.47%
Total	74,624	100.00%

Panel B: Covenant intensity.

Number of firm-years with covenant:	**Abs. Frequency**	**Rel. Frequency**
Exactly one covenant	12,431	26.81%
Exactly two covenants	20,485	44.18%
Exactly three covenants	9,399	20.27%
Four or more covenants	4,056	8.75%
Total	46,371	100.00%

Panel C: Covenant intensity by types.

Number of firm-years with covenant:	**Abs. Frequency**	**Rel. Frequency**
DE Types (Maximum 2)		
Exactly one covenant	24,572	84.99%
Exactly two covenants	4,338	15.01%
Total	28,910	100.00%
IC Types (Maximum 4)		
Exactly one covenant	29,476	76.91%
Exactly two covenants	7,899	20.61%
Three or more covenants	951	2.48%
Total	38,326	100.00%
Lev Types (Maximum 4)		
Exactly one covenant	15,270	93.19%
Exactly two covenants	1,081	6.60%
Three or more covenants	35	0.21%
Total	16,386	100.00%

Panel D: Covenant summary statistics

	Cov_Dummy across all firms		Cov_Tightness across all firms		Cov_Tightness if firm has covenants	
	Obs.	**Average**	**Obs.**	**Average**	**Obs.**	**Average**

All Firms		48,666	24.2%	48,666	0.140	11,768	0.581
Market Equity	Small	14,802	5.0%	14,802	0.032	738	0.635
	Big	16,169	43.6%	16,169	0.247	7,049	0.567
Revenue	Low	14,155	2.3%	14,155	0.013	330	0.574
	High	15,934	46.1%	15,934	0.272	7,345	0.590
EBITDA Margin	Low	13,763	2.6%	13,763	0.014	363	0.546
	High	16,160	38.9%	16,160	0.205	6,290	0.527

Table 4: Effect of Covenants on Speed of Adjustment.

We consider the speed of adjustment of firms with debt in at least one of two consecutive fiscal years. Panel A: Using MDR as the leverage ratio. The target is estimated without covenant information. Panel B: Using MDR as the leverage ratio. The target is estimated with the *Cov_Dummy* variable. Panel C: Using BDR as the leverage ratio. The target is estimated with the without covenant information. Panel D: Using BDR as the leverage ratio. The target is estimated with the *Cov_Dummy* variable. Panel E: Using active BDR as the leverage ratio. The target is estimated with the without covenant information. Panel F: Using active BDR as the leverage ratio. The target is estimated with the *Cov_Dummy* variable.

Panel A: MDR, target estimated without covenant information.

VARIABLES	(1) Baseline	(2) Dummy	(3) Index	(4) Tightness	(5) Model
	ΔMDR	**ΔMDR**	**ΔMDR**	**ΔMDR**	**ΔMDR**
DEV	0.176***	0.173***	0.172***	0.168***	0.173***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
DEV*Cov_Dummy		0.000			-0.087***
		(0.005)			(0.010)
DEV*Cov_Index			0.024		
			(0.024)		
DEV*Cov_Tightness				0.040***	0.153***
				(0.008)	(0.015)
Op. Surplus & Fin. Surplus	-0.018***	-0.021***	-0.021***	-0.021***	-0.020***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Op. Surplus & Fin. Deficit	-0.015***	-0.012***	-0.012***	-0.012***	-0.011***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Op. Deficit	0.035***	0.029***	0.029***	0.029***	0.029***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	128,509	53,818	53,818	53,818	53,818
Adj. R-squared	0.172	0.156	0.156	0.156	0.157

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel B: MDR, target estimated with covenant information.

VARIABLES	(1) Baseline	(2) Dummy	(3) Index	(4) Tightness	(5) Model
	ΔMDR	**ΔMDR**	**ΔMDR**	**ΔMDR**	**ΔMDR**
DEV	0.183***	0.181***	0.180***	0.176***	0.181***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
DEV*Cov_Dummy		-0.009			-0.095***
		(0.006)			(0.012)
DEV*Cov_Index			-0.015		
			(0.031)		
DEV*Cov_Tightness				0.026***	0.149***
				(0.010)	(0.019)
Op. Surplus & Fin. Surplus	-0.013***	-0.014***	-0.014***	-0.014***	-0.013***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Op. Surplus & Fin. Deficit	-0.003	-0.004	-0.004	-0.004	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Op. Deficit	0.039***	0.035***	0.035***	0.035***	0.035***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	50,516	48,666	48,666	48,666	48,666
Adj. R-squared	0.152	0.144	0.144	0.144	0.146

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel C: BDR, target estimated without covenant information.

VARIABLES	(1) Baseline	(2) Dummy	(3) Index	(4) Tightness	(5) Model
	ΔBDR	**ΔBDR**	**ΔBDR**	**ΔBDR**	**ΔBDR**
DEV	0.157***	0.169***	0.167***	0.167***	0.169***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
DEV*Cov_Dummy		-0.042***			-0.058***
		(0.007)			(0.014)
DEV*Cov_Index			-0.141***		
			(0.032)		
DEV*Cov_Tightness				-0.049***	0.027
				(0.010)	(0.021)
Op. Surplus & Fin. Surplus	-0.017***	-0.020***	-0.020***	-0.020***	-0.020***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Op. Surplus & Fin. Deficit	-0.005***	0.002	0.002	0.002	0.002
	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)
Op. Deficit	0.036***	0.033***	0.033***	0.033***	0.033***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	128,563	53,735	53,735	53,735	53,735
Adj. R-squared	0.116	0.116	0.116	0.116	0.116

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel D: BDR, target estimated with covenant information.

VARIABLES	(1) Baseline	(2) Dummy	(3) Index	(4) Tightness	(5) Model
	ΔBDR	***ΔBDR***	***ΔBDR***	***ΔBDR***	***ΔBDR***
DEV	0.155***	0.164***	0.161***	0.161***	0.164***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
DEV*Cov_Dummy		-0.050***			-0.071***
		(0.007)			(0.014)
DEV*Cov_Index			-0.190***		
			(0.034)		
DEV*Cov_Tightness				-0.058***	0.036*
				(0.011)	(0.021)
Op. Surplus & Fin. Surplus	-0.018***	-0.018***	-0.018***	-0.019***	-0.018***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Op. Surplus & Fin. Deficit	0.003	0.003	0.003	0.002	0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Op. Deficit	0.039***	0.037***	0.037***	0.037***	0.037***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	50,434	48,585	48,585	48,585	48,585
Adj. R-squared	0.115	0.112	0.111	0.111	0.112

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel E: Active BDR, target estimated without covenant information.

VARIABLES	(1) Baseline	(2) Dummy	(3) Index	(4) Tightness	(5) Model
	ΔBDR	***ΔBDR***	***ΔBDR***	***ΔBDR***	***ΔBDR***
DEV	0.358***	0.457***	0.453***	0.453***	0.457***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
DEV*Cov_Dummy		-0.278***			-0.174***
		(0.007)			(0.015)
DEV*Cov_Index			-1.272***		
			(0.035)		
DEV*Cov_Tightness				-0.407***	-0.178***
				(0.011)	(0.022)
Op. Surplus & Fin. Surplus	-0.019***	-0.028***	-0.028***	-0.031***	-0.029***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Op. Surplus & Fin. Deficit	-0.013***	-0.008***	-0.008***	-0.011***	-0.009***
	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)
Op. Deficit	0.014***	-0.002***	-0.003***	-0.004***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	127,319	52,783	52,783	52,783	52,783

Adj. R-squared	0.343	0.441	0.439	0.440	0.442

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel F: Active BDR, target estimated with covenant information.

VARIABLES	(1) Baseline	(2) Dummy	(3) Index	(4) Tightness	(5) Model
	ΔBDR	***ΔBDR***	***ΔBDR***	***ΔBDR***	***ΔBDR***
DEV	0.419***	0.454***	0.449***	0.448***	0.454***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
DEV*Cov_Dummy		-0.292***			-0.211***
		(0.007)			(0.015)
DEV*Cov_Index			-1.381***		
			(0.036)		
DEV*Cov_Tightness				-0.429***	-0.144***
				(0.011)	(0.023)
Op. Surplus & Fin. Surplus	-0.026***	-0.023***	-0.024***	-0.026***	-0.026***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Op. Surplus & Fin. Deficit	-0.008***	-0.006**	-0.007**	-0.010***	-0.008***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Op. Deficit	0.006***	0.006***	0.006***	0.004***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	49,537	47,689	47,689	47,689	47,689
Adj. R-squared	0.414	0.442	0.439	0.440	0.442

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Over- and Underleveraged Firms.

We estimate the impact of covenants on the speed of adjustment, incorporating the asymmetry between overleveraged and underleveraged firms. A firm is overleveraged (underleveraged) if its current leverage ratio is above (below) its target leverage ratio for the next year. We consider firms with debt in at least one of two consecutive fiscal years. Panel A: Using MDR as the leverage ratio. The target is estimated with the without covenant information, according to specification (1) in Table 1B. Panel B: Using MDR as the leverage ratio. The target is estimated with the *Cov_Dummy* variable, according to specification (2) in Table 1B. “Financial Status” indicates that the dummies for *Op. Surplus & Fin. Surplus*, *Op. Surplus & Fin. Deficit* and *Op. Deficit* are included in the regression.

Panel A: MDR, target estimated without covenant information.

VARIABLES	(1) Baseline	(2) Dummy	(3) Index	(4) Tightness	(5) Model
	ΔMDR	***ΔMDR***	***ΔMDR***	***ΔMDR***	***ΔMDR***
DEV*D_{over}	0.207***	0.222***	0.222***	0.224***	0.221***

	(0.002)	(0.005)	(0.004)	(0.005)	(0.005)
DEV*D_{under}	0.143***	0.127***	0.126***	0.120***	0.128***
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
DEV*D_{over}*Cov_Dummy		0.006			0.211***
		(0.010)			(0.038)
DEV*D_{under}*Cov_Dummy		0.010*			-0.097***
		(0.006)			(0.011)
DEV*D_{over}*Cov_Index			0.033		
			(0.050)		
DEV*D_{under}*Cov_Index			0.077***		
			(0.028)		
DEV*D_{over}*Cov_Tightness				-0.011	-0.259***
				(0.012)	(0.046)
DEV*D_{under}*Cov_Tightness				0.082***	0.216***
				(0.010)	(0.018)
Financial Status	Y	Y	Y	Y	Y
Observations	128,509	53,818	53,818	53,818	53,818
Adj. R-squared	0.173	0.159	0.159	0.160	0.161

Standard errors in parentheses are bootstrapped using 1,000 samples. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Panel B: MDR, target estimated with covenant information.

VARIABLES	(1) Baseline	(2) Dummy	(3) Index	(4) Tightness	(5) Model
	ΔMDR	***ΔMDR***	***ΔMDR***	***ΔMDR***	***ΔMDR***
DEV*D_{over}	0.217***	0.212***	0.212***	0.214***	0.211***
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
DEV*D_{under}	0.140***	0.136***	0.133***	0.124***	0.136***
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
DEV*D_{over}*Cov_Dummy		0.011			0.277***
		(0.011)			(0.043)
DEV*D_{under}*Cov_Dummy		-0.002			-0.119***
		(0.008)			(0.014)
DEV*D_{over}*Cov_Index			0.048		
			(0.054)		
DEV*D_{under}*Cov_Index			0.032		
			(0.038)		
DEV*D_{over}*Cov_Tightness				-0.010	-0.335***
				(0.013)	(0.052)
DEV*D_{under}*Cov_Tightness				0.083***	0.251***
				(0.014)	(0.024)
Financial Status	Y	Y	Y	Y	Y
Observations	50,516	48,666	48,666	48,666	48,666
Adj. R-squared	0.153	0.146	0.146	0.147	0.149

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel C: BDR, target estimated without covenant information.

VARIABLES	(1) Baseline	(2) Dummy	(3) Index	(4) Tightness	(5) Model
	ΔBDR	**ΔBDR**	**ΔBDR**	**ΔBDR**	**ΔBDR**
DEV*D_{over}	0.171***	0.205***	0.203***	0.205***	0.205***
	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
DEV*D_{under}	0.136***	0.120***	0.117***	0.115***	0.120***
	(0.004)	(0.006)	(0.006)	(0.006)	(0.006)
DEV*D_{over}*Cov_Dummy		-0.084***			0.047
		(0.010)			(0.039)
DEV*D_{under}*Cov_Dummy		-0.000			-0.078***
		(0.009)			(0.016)
DEV*D_{over}*Cov_Index			-0.327***		
			(0.048)		
DEV*D_{under}*Cov_Index			0.057		
			(0.044)		
DEV*D_{over}*Cov_Tightness				-0.113***	-0.169***
				(0.013)	(0.049)
DEV*D_{under}*Cov_Tightness				0.059***	0.173***
				(0.017)	(0.028)
Financial Status	Y	Y	Y	Y	Y
Observations	128,563	53,735	53,735	53,735	53,735
Adj. R-squared	0.116	0.118	0.118	0.118	0.119

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel D: BDR, target estimated with covenant information.

VARIABLES	(1) Baseline	(2) Dummy	(3) Index	(4) Tightness	(5) Model
	ΔBDR	**ΔBDR**	**ΔBDR**	**ΔBDR**	**ΔBDR**
DEV*D_{over}	0.203***	0.210***	0.208***	0.210***	0.209***
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
DEV*D_{under}	0.083***	0.090***	0.086***	0.084***	0.091***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
DEV*D_{over}*Cov_Dummy		-0.073***			0.078**
		(0.011)			(0.039)
DEV*D_{under}*Cov_Dummy		-0.012			-0.072***
		(0.009)			(0.016)
DEV*D_{over}*Cov_Index			-0.307***		
			(0.049)		

DEV*D_{under}*Cov_Index			0.008		
			(0.047)		
DEV*D_{over}*Cov_Tightness				-0.104***	-0.199***
				(0.014)	(0.050)
DEV*D_{under}*Cov_Tightness				0.030*	0.136***
				(0.017)	(0.028)
Financial Status	Y	Y	Y	Y	Y
Observations	50,434	48,585	48,585	48,585	48,585
Adj. R-squared	0.119	0.115	0.115	0.115	0.116

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel E: Active BDR, target estimated without covenant information.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Baseline	Dummy	Index	Tightness	Model
	ΔMDR	***ΔMDR***	***ΔMDR***	***ΔMDR***	***ΔMDR***
DEV*D_{over}	0.490***	0.597***	0.594***	0.596***	0.596***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
DEV*D_{under}	-0.003	0.011*	0.008	0.008	0.012**
	(0.004)	(0.006)	(0.006)	(0.006)	(0.006)
DEV*D_{over}*Cov_Dummy		-0.389***			-0.013
		(0.010)			(0.035)
DEV*D_{under}*Cov_Dummy		0.029***			-0.046***
		(0.009)			(0.016)
DEV*D_{over}*Cov_Index			-1.870***		
			(0.050)		
DEV*D_{under}*Cov_Index			0.191***		
			(0.045)		
DEV*D_{over}*Cov_Tightness				-0.508***	-0.493***
				(0.013)	(0.043)
DEV*D_{under}*Cov_Tightness				0.099***	0.166***
				(0.017)	(0.029)
Financial Status	Y	Y	Y	Y	Y
Observations	127,319	52,783	52,783	52,783	52,783
Adj. R-squared	0.394	0.503	0.503	0.505	0.505

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel F: Active BDR, target estimated with covenant information.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Baseline	Dummy	Index	Tightness	Model
	ΔMDR	***ΔMDR***	***ΔMDR***	***ΔMDR***	***ΔMDR***

DEV*D_{over}	0.572***	0.588***	0.586***	0.587***	0.587***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
DEV*D_{under}	-0.043***	-0.022***	-0.024***	-0.024***	-0.020***
	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)
DEV*D_{over}*Cov_Dummy		-0.365***			0.028
		(0.011)			(0.035)
DEV*D_{under}*Cov_Dummy		0.019**			-0.036**
		(0.009)			(0.016)
DEV*D_{over}*Cov_Index			-1.769***		
			(0.052)		
DEV*D_{under}*Cov_Index			0.144***		
			(0.048)		
DEV*D_{over}*Cov_Tightness				-0.497***	-0.531***
				(0.014)	(0.045)
DEV*D_{under}*Cov_Tightness				0.072***	0.124***
				(0.017)	(0.029)
Financial Status	Y	Y	Y	Y	Y
Observations	49,537	47,689	47,689	47,689	47,689
Adj. R-squared	0.484	0.505	0.505	0.507	0.507

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Impact of Covenant Type.

We estimate the impact of the type of covenant: debt-to earnings (DE), interest coverage ratio (IC) and leverage (Lev). In columns (1) and (2), we include the binding covenant of each category in the regression, i.e., if the firm has a covenant of a given type, then D_{type} is set to 1, and 0 otherwise. In columns (3) and (4), we include only the binding covenant across all categories, i.e., if the covenant of type DE is tighter than the covenant(s) of type IC or Lev, then $D_{DE} = 1$, $D_{IC} = 0$, $D_{Lev} = 0$. If a company does not have a covenant of a given type, then D_{type} is set to 0. As usual, we consider firms with debt in at least one of two consecutive fiscal years. We again use MDR as the leverage ratio. Columns (1) and (3) show results for a target estimate without covenant information and columns (2) and (4) show results for a target estimate with covenant information.

	(1)	(2)	(3)	(4)
VARIABLES	Binding Covenant Overall		Binding Covenant by Type	
	Out-of-target	In-target	Out-of-target	In-target
	ΔMDR	***ΔMDR***	***ΔMDR***	***ΔMDR***
DEV*D_{over}	0.210***	0.201***	0.221***	0.211***
	(0.005)	(0.005)	(0.005)	(0.005)
DEV*D_{under}	0.134***	0.144***	0.128***	0.137***
	(0.004)	(0.006)	(0.004)	(0.006)
DEV*D_{over}*Cov_Dummy	0.127***	0.152***	0.206***	0.271***
	(0.024)	(0.026)	(0.038)	(0.043)
DEV*D_{under}*Cov_Dummy	-0.094***	-0.128***	-0.096***	-0.121***

	(0.009)	(0.012)	(0.011)	(0.014)
DEV*D_{over}*Cov_Tightness*D_{DE}	-0.076***	-0.080***	-0.282***	-0.360***
	(0.025)	(0.027)	(0.049)	(0.055)
DEV*D_{under}*Cov_Tightness*D_{DE}	0.256***	0.335***	0.355***	0.430***
	(0.019)	(0.026)	(0.023)	(0.030)
DEV*D_{over}*Cov_Tightness*D_{IC}	-0.099***	-0.131***	-0.244***	-0.322***
	(0.028)	(0.030)	(0.047)	(0.053)
DEV*D_{under}*Cov_Tightness*D_{IC}	0.057***	0.059**	0.167***	0.182***
	(0.018)	(0.024)	(0.021)	(0.028)
DEV*D_{over}*Cov_Tightness*D_{Lev}	-0.020	-0.006	-0.192***	-0.259***
	(0.036)	(0.037)	(0.061)	(0.065)
DEV*D_{under}*Cov_Tightness*D_{Lev}	0.066***	0.103***	0.140***	0.168***
	(0.019)	(0.025)	(0.023)	(0.030)
Financial Status	Y	Y	Y	Y
Observations	51,697	46,686	53,818	48,666
Adj. R-squared	0.171	0.159	0.163	0.150

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Impact of Firm Characteristics.

We estimate the partial adjustment model for different firm characteristics, again distinguishing between over- and underleveraged firms. We consider firms with debt in at least one of two consecutive fiscal years. We use the target estimated with covenant information in all regressions.

In Panel A, we use the market value of equity as defined by price per share times number of outstanding shares. We separate firms into three groups for each year in a 30/40/30 split. We denote the bottom 30% of firms by market cap as “small” and the top 30% as “big”. In Panel B, we use sales [117]. Again, we separate firms into three groups for each year in a 30/40/30 split. We denote the bottom 30% of firms by sales “low” and the top 30% as “high”. In Panel C, we use the operating margin as defined by operating income before depreciation [13] divided by total assets [6]. We separate firms into three groups for each year in a 30/40/30 split. We denote the bottom 30% of firms by operating margin as “low” and the top 30% as “high”.

Panel A: Market Value of Equity.

	(1)	(2)	(3)	(4)
VARIABLES	Small	Small	Big	Big
	ΔMDR	**ΔMDR**	**ΔMDR**	**ΔMDR**
DEV*D_{over}	0.222***	0.223***	0.271***	0.269***
	(0.008)	(0.008)	(0.007)	(0.008)
DEV*D_{under}	0.191***	0.177***	0.112***	0.090***
	(0.014)	(0.014)	(0.006)	(0.007)
DEV*D_{over}*Cov_Dummy		0.092		0.330***
		(0.106)		(0.050)
DEV*D_{under}*Cov_Dummy		-0.071		-0.046***

		(0.090)		(0.011)
DEV*D_{over}*Cov_Tightness		-0.243*		-0.418***
		(0.129)		(0.061)
DEV*D_{under}*Cov_Tightness		0.523***		0.196***
		(0.151)		(0.019)
Financial Status	Y	Y	Y	Y
Observations	15,210	14,802	16,787	16,169
Adj. R-squared	0.168	0.164	0.211	0.215

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel B: Sales.

VARIABLES	(1) Low	(2) Low	(3) High	(4) High
	ΔMDR	**ΔMDR**	**ΔMDR**	**ΔMDR**
DEV*D_{over}	0.337***	0.332***	0.183***	0.156***
	(0.010)	(0.010)	(0.006)	(0.007)
DEV*D_{under}	0.157***	0.151***	0.116***	0.091***
	(0.012)	(0.012)	(0.007)	(0.008)
DEV*D_{over}*Cov_Dummy		0.520*		0.479***
		(0.285)		(0.050)
DEV*D_{under}*Cov_Dummy		0.106		-0.073***
		(0.085)		(0.014)
DEV*D_{over}*Cov_Tightness		-0.652*		-0.498***
		(0.353)		(0.059)
DEV*D_{under}*Cov_Tightness		-0.075		0.236***
		(0.154)		(0.024)
Financial Status	Y	Y	Y	Y
Observations	14,321	14,155	16,680	15,934
Adj. R-squared	0.154	0.152	0.187	0.185

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel C: Operating Margin.

VARIABLES	(1) Low	(2) Low	(3) High	(4) High
	ΔMDR	**ΔMDR**	**ΔMDR**	**ΔMDR**
DEV*D_{over}	0.263***	0.267***	0.265***	0.284***
	(0.010)	(0.010)	(0.007)	(0.008)
DEV*D_{under}	0.174***	0.165***	0.143***	0.131***
	(0.013)	(0.014)	(0.006)	(0.007)
DEV*D_{over}*Cov_Dummy		-0.141		0.060
		(0.145)		(0.047)

DEV*D_{under}*Cov_Dummy		0.079		-0.053***
		(0.089)		(0.012)
DEV*D_{over}*Cov_Tightness		-0.044		-0.183***
		(0.194)		(0.058)
DEV*D_{under}*Cov_Tightness		0.113		0.186***
		(0.162)		(0.021)
Financial Status	Y	Y	Y	Y
Observations	14,111	13,763	16,570	16,160
Adj. R-squared	0.148	0.146	0.213	0.221

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Stability over Time.

We estimate the partial adjustment model for different time periods. In Panel A, we estimate the baseline model for over- and underleveraged firms and our covenant model, using the leverage target estimated with covenant information. Columns (1) and (2) show the results for the years 1995-2005; columns (3) and (4) show the results for the financial crisis period from 2006 to 2009; columns (5) and (6) show the results for 2010-2018. In Panel B, we the impact of covenant type like in Table 5 for three different time periods. We include only the binding covenant across all categories, i.e., if the covenant of type DE is tighter than the covenant(s) of type IC or Lev, then D_{DE} = 1, D_{IC} = 0, D_{Lev} = 0. If a company does not have a covenant of a given type, then D_{type} is set to 0. We consider firms with debt in at least one of two consecutive fiscal years.

Panel A: Baseline and main model in three different time periods.

VARIABLES	(1) 1995-2005	(2) 1995-2005	(3) 2006-2009	(4) 2006-2009	(5) 2010-2018	(6) 2010-2018
	ΔMDR	***ΔMDR***	***ΔMDR***	***ΔMDR***	***ΔMDR***	***ΔMDR***
DEV*D_{over}	0.218***	0.213***	0.289***	0.287***	0.181***	0.173***
	(0.006)	(0.006)	(0.011)	(0.012)	(0.007)	(0.008)
DEV*D_{under}	0.127***	0.126***	0.189***	0.170***	0.103***	0.115***
	(0.008)	(0.009)	(0.011)	(0.013)	(0.009)	(0.010)
DEV*D_{over}*Cov_Dummy		0.286***		0.315***		0.237***
		(0.065)		(0.085)		(0.075)
DEV*D_{under}*Cov_Dummy		-0.141***		-0.127***		-0.111***
		(0.023)		(0.026)		(0.021)
DEV*D_{over}*Cov_Tightness		-0.330***		-0.425***		-0.286***
		(0.077)		(0.106)		(0.092)
DEV*D_{under}*Cov_Tightness		0.266***		0.351***		0.172***
		(0.038)		(0.048)		(0.040)
Financial Status	Y	Y	Y	Y	Y	Y
Observations	27,541	26,375	7,440	7,110	15,535	15,181
Adj. R-squared	0.137	0.133	0.242	0.240	0.143	0.139

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel B: Impact of different covenant types in three different time periods.

VARIABLES	(1) 1995-2005	(2) 2006-2009	(3) 2010-2018
	ΔMDR	**ΔMDR**	**ΔMDR**
DEV*D_{over}	0.213***	0.286***	0.173***
	(0.006)	(0.012)	(0.008)
DEV*D_{under}	0.127***	0.170***	0.116***
	(0.009)	(0.013)	(0.010)
DEV*D_{over}*Cov_Dummy	0.277***	0.310***	0.237***
	(0.065)	(0.085)	(0.075)
DEV*D_{under}*Cov_Dummy	-0.136***	-0.120***	-0.113***
	(0.023)	(0.026)	(0.021)
DEV*D_{over}*Cov_Tightness*D_{DE}	-0.434***	-0.397***	-0.280***
	(0.085)	(0.108)	(0.096)
DEV*D_{under}*Cov_Tightness*D_{DE}	0.551***	0.541***	0.252***
	(0.053)	(0.059)	(0.045)
DEV*D_{over}*Cov_Tightness*D_{IC}	-0.294***	-0.453***	-0.296***
	(0.078)	(0.111)	(0.094)
DEV*D_{under}*Cov_Tightness*D_{IC}	0.173***	0.284***	0.079
	(0.044)	(0.055)	(0.048)
DEV*D_{over}*Cov_Tightness*D_{Lev}	-0.281***	-0.272*	-0.207
	(0.093)	(0.156)	(0.129)
DEV*D_{under}*Cov_Tightness*D_{Lev}	0.207***	0.123*	0.150**
	(0.043)	(0.071)	(0.060)
Financial Status	Y	Y	Y
Observations	26,375	7,110	15,181
Adj. R-squared	0.135	0.244	0.140

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Table 9. Industry- and Time-Fixed Effects in the Speed of Adjustment

We estimate the partial adjustment model with industry-fixed effects and time fixed-effects. We use MDR as the leverage ratio, and the target is estimated with covenant information. Again, we include only firms with debt in at least one of two consecutive fiscal years. Column (1) shows the results of our model like in Table 4B. Column (2) includes time-fixed effects, i.e., $\Delta \text{MDR}_{i,t} = \lambda_0 DEV_{i,t} + \lambda_1 DEV_{i,t} \times D_1 + \cdots$, where D_1 is a dummy that is 1 in year 1 and 0 otherwise. Column (3) includes industry-fixed effects where we use the Fama-French industry classification, i.e., $\Delta \text{MDR}_{i,t} = \lambda_0 DEV_{i,t} + \lambda_1 DEV_{i,t} \times FF_1 + \cdots$, where FF_1 is a dummy that is 1 if the firm has industry code 1 (Agriculture) and 0 otherwise. Column (4) includes both time-fixed effects and industry-fixed effects. We control for financial status in all specifications.

VARIABLES	(1)	(2)	(3)	(4)
	ΔMDR	**ΔMDR**	**ΔMDR**	**ΔMDR**
DEV*D_{over}	0.211***	0.120***	0.173***	0.069**

	(0.005)	(0.026)	(0.024)	(0.035)
DEV*D$_{under}$	0.136***	0.117***	0.100***	0.110***
	(0.006)	(0.014)	(0.016)	(0.020)
DEV*D$_{over}$*Cov_Dummy	0.277***	0.228***	0.270***	0.229***
	(0.043)	(0.042)	(0.043)	(0.042)
DEV*D$_{under}$*Cov_Dummy	-0.119***	-0.118***	-0.126***	-0.126***
	(0.014)	(0.014)	(0.014)	(0.014)
DEV*D$_{over}$*Cov_Tightness	-0.335***	-0.292***	-0.308***	-0.276***
	(0.052)	(0.051)	(0.052)	(0.051)
DEV*D$_{under}$*Cov_Tightness	0.251***	0.246***	0.255***	0.241***
	(0.024)	(0.024)	(0.024)	(0.024)
Year-DEV fixed effects	N	Y	N	Y
Industry-DEV fixed effects	N	N	Y	Y
Financial Status	Y	Y	Y	Y
Observations	48,666	48,666	48,666	48,666
Adj. R-squared	0.149	0.169	0.160	0.179

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Table 10. Slack-Ranking by SIC and FF Industry Codes

We compare different ways to compute the covenant tightness. In Panel A, we do not use covenant information for the target estimation, and in Panel B, we do. In our standard specification, shown in columns (1) and (2) of each panel, we compute the covenant tightness using the ranking of slack across all firms in all industries. In columns (3) and (4), we compute the tightness using the ranking of slack across all firms by industry according to the Fama-French industry classification. There are 42 Fama-French industries in our sample. In columns (5) and (6) we use SIC division instead of the Fama-French industry classification. There are 8 SIC divisions in our sample. We then estimate the partial adjustment model with the different covenant measures, focusing on firms with debt in at least one of two consecutive fiscal years.

Panel A: Alternative covenant tightness computation, target estimated without covenant information.

	Baseline		Fama-French		SIC	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	ΔMDR	**ΔMDR**	**ΔMDR**	**ΔMDR**	**ΔMDR**	**ΔMDR**
DEV*D$_{over}$	0.224***	0.221***	0.224***	0.221***	0.224***	0.221***
	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)
DEV*D$_{under}$	0.120***	0.128***	0.117***	0.128***	0.117***	0.128***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
DEV*D$_{over}$*Cov_Dummy		0.211***		0.093***		0.095***
		(0.038)		(0.024)		(0.023)
DEV*D$_{under}$*Cov_Dummy		-0.097***		-0.108***		-0.108***
		(0.011)		(0.010)		(0.010)
DEV*D$_{over}$*Cov_Tightness	-0.011	-0.259***	-0.015	-0.124***	-0.016	-0.127***
	(0.012)	(0.046)	(0.013)	(0.031)	(0.013)	(0.030)

DEV*D_{under}*Cov_Tightness	0.082***	0.216***	0.105***	0.251***	0.102***	0.248***
	(0.010)	(0.018)	(0.010)	(0.017)	(0.010)	(0.017)
Financial Status	Y	Y	Y	Y	Y	Y
Observations	53,818	53,818	53,818	53,818	53,818	53,818
Adj. R-squared	0.160	0.161	0.160	0.162	0.160	0.162

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Panel B: Alternative covenant tightness computation, target estimated with covenant information.

	Baseline		Fama-French		SIC	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	ΔMDR	**ΔMDR**	**ΔMDR**	**ΔMDR**	**ΔMDR**	**ΔMDR**
DEV*D_{over}	0.214***	0.211***	0.214***	0.211***	0.214***	0.211***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
DEV*D_{under}	0.124***	0.136***	0.120***	0.138***	0.119***	0.137***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
DEV*D_{over}*Cov_Dummy		0.277***		0.101***		0.102***
		(0.043)		(0.025)		(0.025)
DEV*D_{under}*Cov_Dummy		-0.119***		-0.148***		-0.146***
		(0.014)		(0.013)		(0.013)
DEV*D_{over}*Cov_Tightness	-0.010	-0.335***	-0.012	-0.131***	-0.012	-0.132***
	(0.013)	(0.052)	(0.014)	(0.033)	(0.014)	(0.033)
DEV*D_{under}*Cov_Tightness	0.083***	0.251***	0.120***	0.322***	0.123***	0.323***
	(0.014)	(0.024)	(0.014)	(0.022)	(0.014)	(0.022)
Financial Status	Y	Y	Y	Y	Y	Y
Observations	48,666	48,666	48,666	48,666	48,666	48,666
Adj. R-squared	0.147	0.149	0.147	0.150	0.147	0.150

Standard errors in parentheses are bootstrapped using 1,000 samples. *** p<0.01, ** p<0.05, * p<0.1.

Figure 1

Frequency of different covenants in the DealScan database

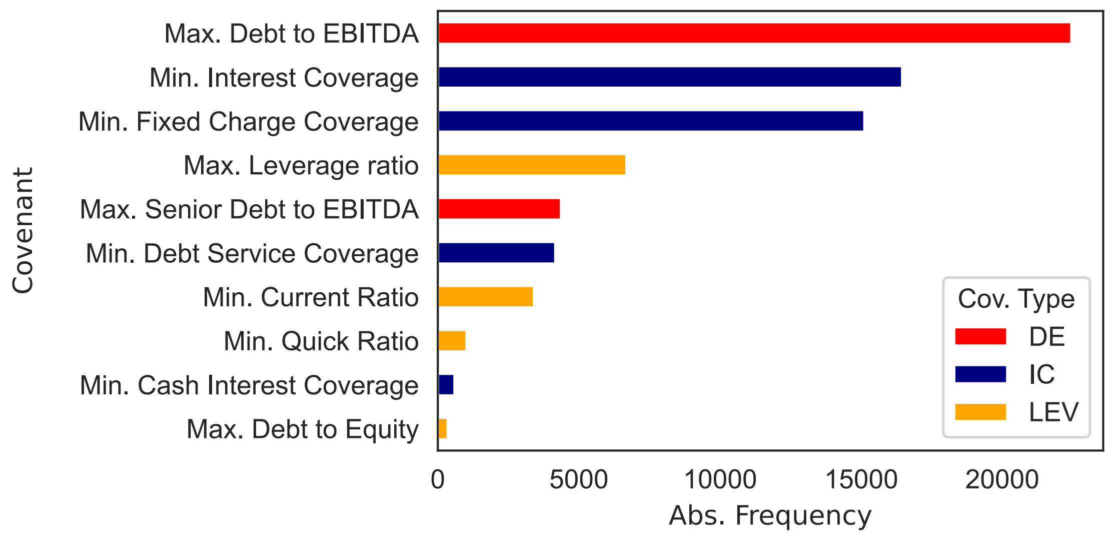


Figure 2

Distribution of covenant slack for different covenants

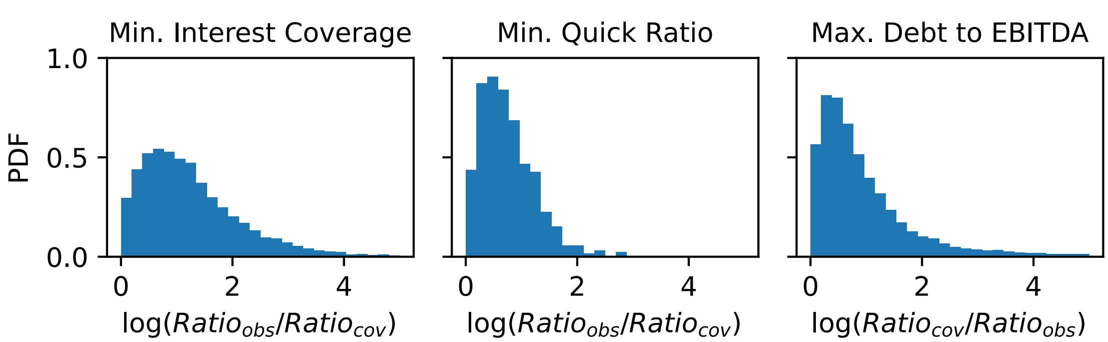
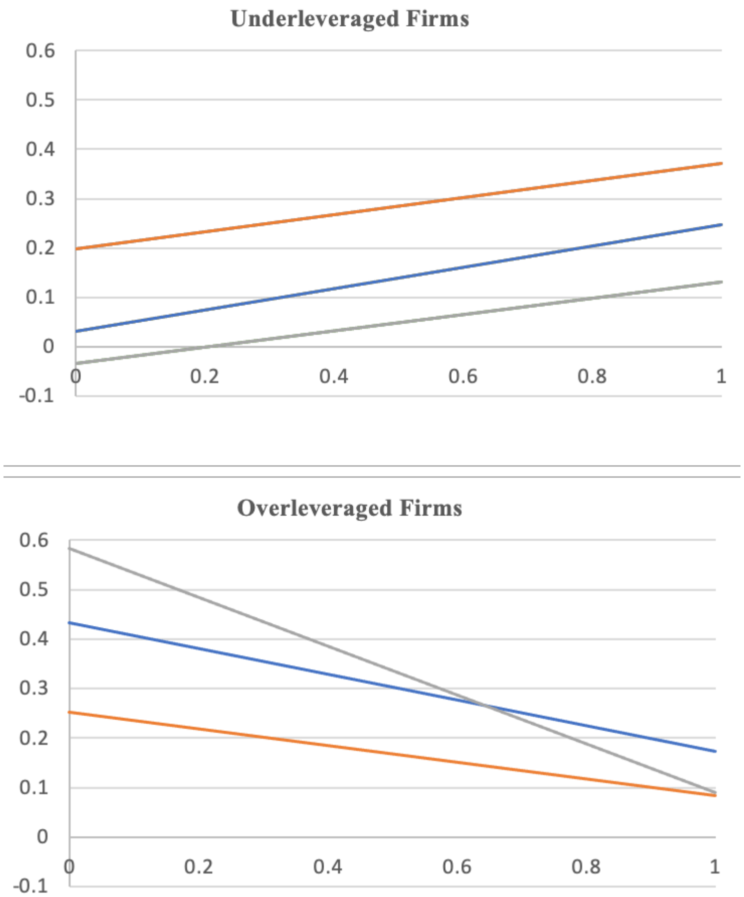


Figure 3

Impact of covenant tightness on the speed of adjustment.



Note: The y-axis is the speed of adjustment, the x-axis is the value of *Cov_Tightness*. Blue: MDR. Orange: BDR. Gray: BDR_{act}.