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Creditor Intervention, Investment, and Growth Opportunities*

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Abstract

We show that creditors do not just ensure that inefficient investment is not undertaken, but also do not preclude efficient investment. Examining what happens following a debt covenant violation, a situation through which creditors acquire some control rights over the firm, we find that investment declines when the firm has few growth opportunities but it may increase otherwise. The results are robust to the use of different proxies for growth opportunities. The firm's performance improves but it suffers dividend cuts and increased CEO turnover. The results suggest that creditors consider the benefits of growth opportunities as a source of future cash flows to meet outstanding debt obligations.

JEL classification: G21; G32

Keywords: Creditor control rights; Covenants; Growth opportunities; Investment; Performance; Syndicated loans.

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1 Introduction

The control rights over the investment decisions of a firm typically rest with its shareholders, except when the firm fails on interest or principal debt payments or breaches covenants included in debt contracts. Either of these situations gives creditors the right to accelerate loan payments or terminate loan agreements. In an attempt to prevent such outcomes, creditors gain instead some influence over the firm and acquire some control rights that they can use to reshape its investment policy (e.g., Aghion and Bolton 1992; Dewatripont and Tirole 1994). Most theory and some empirical evidence focus on their role in preventing inefficient investment, and if unsuccessful, in punishing the firm and its manager by, for example, constraining or reducing investment (e.g., Jensen and Meckling 1976; Myers 1977; Smith and Warner 1979; Chava and Roberts 2008; Nini et al. 2012).[1] We contribute to this literature by presenting evidence that creditors' influence on investment decisions can be more complex. It may be in the best interest of creditors to assess the potential of a firm's business and support managers and shareholders in improving the firm instead of simply punishing them. As a result, creditors can play a role in shaping the firm's investment policy that may be constrained or boosted in periods in which they can exert a tighter control over the firm.

Specifically, we examine changes in a firm's investment and performance following a debt covenant violation, a situation through which creditors acquire some control rights over the firm, taking into account the growth opportunities of the firm at the time of violation. On the one hand, growth opportunities are often a source of agency conflicts between the shareholders and creditors of a firm as shareholders' investment decisions may lead to situations in which creditors are unlikely to get their money back (e.g., Jensen and Meckling 1976; Myers 1977). On the other hand, growth opportunities are ultimately a source of future cash flows to meet outstanding debt obligations, and for this reason, are valuable to shareholders and creditors alike. In fact, growth opportunities have been documented empirically as important to determine the bargaining power of a firm to negotiate

[1] Daniels and Ramirez (2011), Lee and Sharpe (2009) and Preece and Mullineaux (1994) find empirical evidence consistent with the monitoring role of banks.

concessions with creditors (Roberts and Sufi 2009a). For all these reasons, creditors may want to assess the growth opportunities of a firm at the time of violation before deciding on their preferred course of action. This seeming leniency may also stem from the fact that if creditors appear to be insisting on actions that favor their interests to the detriment of the firm's long-term business strategy, they may be liable to shareholders for resulting damages.

We find that investment, as measured by capital expenditures, declines following a covenant violation when the firm has few growth opportunities at the time of violation. More precisely, there is a decline in investment of around 0.8% of capital in the quarter following the violation – a decline of 20.5% relative to average investment in non-violating quarters. However, investment can increase by 0.6% of capital in the quarter following the covenant violation when the firm has many growth opportunities at the time of violation – an increase of 13.3% relative to average investment in non-violating quarters. A similar pattern arises when we use mergers and acquisitions as an alternative measure for investment. We also look at how a debt covenant violation relates to changes in operating performance, as measured by the return-on-assets (ROA) of the firm. We find that a covenant violation is associated with an increase in ROA of around 0.4% and 0.6% in the quarter following the violation when the firm has few and many growth opportunities, respectively. The direction of all the effects persists for at least two consecutive quarters after the violation.[2]

This does not mean, however, that creditors do not support stricter actions by managers and/or shareholders regarding other aspects of corporate policies. In this line, we find that dividend payments to shareholders decrease and CEO turnover increases following a covenant violation, regardless of the level of growth opportunities.

The empirical strategy developed in the paper requires two main steps: first, to identify firms that violate covenants; and second, to classify firms according to their growth opportunities. Regarding the first step, we identify technical violations of covenants, or technical default, which correspond to violations of a covenant other than the one requiring the payment of interest or principal

[2] As a robustness test available upon request, we find similar results four quarters after the covenant violation.

and that involve accounting-based measures. This approach goes in line with other studies (e.g., Chava and Roberts 2008; Demiroglu and James 2010). In the second step, we follow standard convention in the literature and construct two measures of growth opportunities based on the market-to-book ratio of the assets and on the level of research and development (R&D) expenditures to sales of a firm (e.g., Adam and Goyal 2008, Billet et al. 2007, Goyal et al. 2002).

This paper is related to the literature on the effects of external financing on investment. The seminal papers by Jensen and Meckling (1976), Myers (1977) and Smith and Warner (1979) show how debt financing has the potential to generate agency conflicts between shareholders and creditors over the investment and financing policies of the firm. These papers also explain how to mitigate such agency conflicts by using debt covenants, for instance. In fact, Chava and Roberts (2008) show empirically that debt covenant violations have a negative impact on corporate investment as creditors use their control rights to exert greater influence over corporate policies. They also use five proxies for agency and information problems between borrowers and lenders to show that the effect on investment is heterogeneous across firms. These proxies measure financial variables of the firm or constitute characteristics of the loan contract that are valued by creditors at the loan starting date. The authors' idea is to measure the ability of creditors to prevent firm misbehavior prior to the violation, which is reflected in the severity of the effect of a covenant violation on investment. Our approach is different in the sense that it is linked to the business activity of the firm - growth opportunities - as measured at the time of violation. In this sense, it allows for an assessment of the reaction of creditors to eventual new circumstances faced by the firm after the loan starting date.

The paper is also related to the literature on the resolution and consequences of technical default. This literature goes back to Beneish and Press (1993, 1995), Chen and Wei (1993) and Sweeney (1994). More recent empirical evidence shows how covenant violations affect future debt contracts: Nini et al. (2009) find that these debt contracts impose stronger restrictions on managers, and Sufi (2007) provides evidence that banks limit revolving lines of credit to violating firms. Closer to our paper are Roberts and Sufi (2009b) and Nini et al. (2012), who look at more immediate

consequences of covenant violations. The former document a decline in the issuance of new debt following a covenant violation, while the latter note that a covenant violation is followed by an increase in CEO turnover, a decrease in capital expenditures, a reduction in the use of debt and in shareholders payouts, among others. Their results suggest that creditors exert influence on the corporate governance of firms even outside bankruptcy and liquidation.

Our contribution to this strand of the literature is to provide additional evidence of the role of creditors in the resolution of technical default by showing that in contrast to what has been documented so far, creditors do not always respond to a covenant violation by demanding stronger restrictions on a firm's behavior. Moreover, we also show that creditors seem to care about the growth opportunities of a firm and use them to assess firms when in breach of debt covenants. In this sense, our analysis is ex-post as opposed to an analysis ex-ante that looks at how growth opportunities affect the structure of debt contracts in terms of choice, number and tightness of covenants included in such contracts (e.g., Kahan and Yermack 1998; Nash et al. 2003; Bradley and Roberts 2004; Goyal 2005; Billett et al. 2007; Chava et al. 2010; Reisel 2010; Demiroglu and James 2010).

Finally, this paper shows that covenant violations can be associated with improvements in performance. This is in line with results by Nini et al. (2009) and Andrade and Kaplan (1998), the latter in the context of LBO transactions. This paper uses the same measure of operating performance as in Nini et al. (2009) but their focus is mainly on the impact on performance from including new capital expenditure restrictions in debt contracts following a covenant violation. Nini et al. (2012) also look at operating and stock price performance following a covenant violation but do not address the role of growth opportunities at the time of violation. This point is important for us because the fact that a firm experiences an improvement in performance following a covenant violation after controlling for growth opportunities implies that creditors understand the firm's business conditions.

The remainder of the paper is organized as follows. Section 2 develops the hypotheses, Section 3 discusses the data and the details about the sample construction, Section 4 presents the econometric methodology and the results, and Section 5 concludes. All tables are relegated to the Appendix.

2 Creditor Control Rights and Growth Opportunities: Hypotheses Development

Following a covenant violation, creditors acquire some control rights over the firm and may demand concessions or impose constraints on the violating firm that affect investment. For example, creditors may incorporate explicit restrictions on capital expenditures (e.g., Beneish and Press 1993; Nini et al. 2009), or they may increase interest rates or reduce the amount that the firm is allowed to borrow (e.g., Beneish and Press 1993; Chen and Wei 1993). As a result, Chava and Roberts (2008) and Demiroglu and James (2010) show that without controlling for the growth opportunities of a firm, covenant violations have a direct and negative impact on investment.

Another concern that creditors may have is to whether the firm is spending its existing resources inefficiently or in too high-risk investments (e.g., Jensen and Meckling 1976; Myers 1977). In this case, creditors may exert pressure for managers to tackle such situations following a covenant violation, which provides an additional reason for the subsequent decline in investment documented empirically in violating firms. Nevertheless, the fact that a firm is investing efficiently or not may depend directly on the firm's investment opportunity set. Firms with relatively more growth opportunities at the time of violation are expected to have a wider portfolio of profitable projects to choose from, and as a result, are perceived as less likely to misuse creditors' money. For this reason, the adjustment in investment required when a firm has many growth opportunities may differ from that required when a firm has few growth opportunities.

In addition, growth opportunities represent a source of future cash flows. Existing creditors should be particularly concerned with getting their money back and they know that to achieve it the firm should not be cutting back on potentially profitable investment. In fact, Roberts and Sufi (2009a) look at renegotiations of debt contract terms and find that growth opportunities give firms some leeway in these renegotiations precisely because these opportunities are valued by creditors, and hence, can increase the bargaining position of the firm.

Finally, Berlin and Mester (1992) and Gârleanu and Zwiebel (2009) look specifically at debt covenants and show that they might be too severe or set too tightly whenever there is asymmetric

information about the quality of the firm. Having many growth opportunities is a characteristic of the firm that is plausibly related to asymmetric information. But having more or tighter covenants also means that a firm is likely to be regularly monitored by creditors (e.g., Rajan and Winton 1995; Park 2000). If this is the case, a covenant violation is likely to be less of a surprise to creditors and this may dictate that they react in a milder manner when it actually occurs.

From the point of view of creditors, all these aspects should favor a firm that happens to have many growth opportunities when it violates a covenant relative to the case when the violating firm has few growth opportunities. This idea leads us to state our first hypothesis in the following terms:

Hypothesis 1: Investment declines following a covenant violation when the firm has few growth opportunities at the time of violation. However, it declines less (or even increases) when the firm has many growth opportunities at the time of violation.

There is evidence that indicates that most firms that violate a covenant rarely end up in bankruptcy (e.g., Sweeney 1994; Gopalakrishnan and Parkash 1995; Dichev and Skinner 2002). This implies that these firms should return to normal levels of activity and experience improvements in performance at some point after violating a covenant. Moreover, in the seminal papers by Jensen and Meckling (1976) and Myers (1977) the authors suggest that allocating control rights to creditors reduces the potential for shareholders to engage in actions that transfer wealth from creditors to themselves and outside the firm. In fact, empirical evidence by Nini et al. (2012) reveals that firms that violate covenants are more closely monitored by their creditors, with consequences in terms of increased CEO turnover and/or decreased shareholders payouts, among others. They also mention some informal mechanisms of creditors' intervention such as providing advice and requiring better reporting and liquidity management. In addition, Ferreira et al. (2012) show that creditors prefer a more independent board of directors following a covenant violation.

Finally, the inclusion of covenants in debt contracts provides itself a very good monitoring device for creditors as debt covenants allow for the early detection and swift resolution of problems inside a firm (e.g., Rajan and Winton 1995; Park 2000).

Therefore, it is not unreasonable to expect improvements in the performance of a violating firm shortly after a covenant violation, irrespective of the level of growth opportunities.

Hypothesis 2: Firm performance improves following a covenant violation, irrespective of the level of growth opportunities at the time of violation.

3 Data and Sample Construction

3.1 Databases

The databases used in the paper are Compustat for accounting information and Loan Pricing Corporation's (LPC) Dealscan for loan information. We start by using the data on covenant violations from Amir Sufi's website, which we cross-refer with Dealscan to obtain the information on the covenants included in each loan. We focus on dollar denominated bank loans to non-financial U.S. firms during the period from 1996 to 2008. We use quarterly accounting data because most firms report their financial statements to creditors on a quarterly basis to allow for monitoring on the compliance with the covenant requirements. The variables constructed are defined in Table 1.

---- Insert Table 1 about here ----

3.2 Covenants and Covenant Violations

There are many covenants that constrain managerial discretion by fixing minimum or maximum thresholds on different accounting ratios and other variables related to the activity of the firm. The Dealscan database reports information on 15 different covenants.[3]

An advantage of bank loans over other sources of debt financing is that bank loan covenants can be customized to suit the specific needs of the borrowing firm. However, this also means that covenants might not be uniform and standardized across different bank loan contracts. For these

[3] These covenants are: Min Current Ratio; Min Net Worth; Min Tangible Net Worth; Min Fixed Charge Coverage; Min Debt Service Coverage; Min Interest Coverage; Min Cash Interest Coverage; Max Leverage Ratio; Max Debt to Cash-Flow; Max Debt to Tangible Net Worth; Max Debt to Equity; Required Lenders (%); Term Changes (%), Collateral Release (%); Max Investment Basket.

reasons, we follow Chava and Roberts (2008) and focus on covenants involving the current ratio, net worth and tangible net worth that fix a minimum threshold on the corresponding accounting variable. Not only do they appear frequently in loan contracts in general (e.g., Dichev and Skinner 2002) but they are also relatively standardized and unambiguous. Moreover, they have been identified as those that are most likely to lead to technical default (e.g., Beneish and Press 1993; Chen and Wei 1993; Sweeney 1994). Hence, to construct the final sample we focus on those firms that are bound by either a current ratio or a (tangible) net worth covenant at least once during the sample period according to the information provided by Dealscan.

We restrict the sample to loans with information on loan amount, maturity date and spread over the LIBOR (all-in spread drawn), which are matched to firm accounting information using company name and loan origination date. Finally, we exclude all firms for which we do not have information on the variables investment, ROA, market-to-book ratio, and on the accounting measures linked to the covenants of interest to us that are the current ratio, net worth and tangible net worth.

We take each loan in the sample and consider that the firm is bound by the covenant until the loan maturity date. The basic unit of observation in Dealscan is a loan (or facility) and many of these loans are packaged together into deals. Hence, loans within one deal may have different maturity dates but are going to overlap until the maturity date of the loan with the shortest maturity. Different deals can also overlap for some time. In this case we consider the minimum covenant threshold across all active loans at a given quarter as the relevant threshold for each covenant.[4]

It is also possible that a new loan is taken to refinance a previous one. Dealscan provides some information on whether a loan is a refinancing, however, this information is only available for a limited number of loans and it is not always clear which past loan is being refinanced. In order to avoid double counting, we disregard any past loans that are active when a new loan occurs unless it is

[4] This is reasonable given that many loans have cross-default clauses, which often means that if the firm is in technical default in one loan, it is automatically considered as in technical default in all of its outstanding loans.

clear from Dealscan that the new loan is not refinancing a previous loan. As a drawback, we may lose information but at least we are certain that loans that no longer exist are excluded from the analysis.

Given this, we are able to identify at each quarter whether the firm is bound by a covenant and the corresponding threshold. The next step is to compare each covenant threshold with the relevant accounting variable at each quarter. If the accounting variable exceeds the covenant threshold there is no covenant violation; otherwise there is a covenant violation. More formally, the variable "Covenant violation" for firm i at year-quarter t is defined as follows:

$$\text{Covenant violation}_{i,t} = \begin{cases} 1 & k_{i,t} - k^{0}_{i,t} \leq 0 \\ 0 & \text{otherwise} \end{cases} \qquad (1)$$

where $k_{i,t}$ is the observed accounting variable and $k^{0}_{i,t}$ is the relevant covenant threshold. We consider that a firm is in violation if at least one of the aforementioned covenants (current ratio, net worth and tangible net worth) is violated.

One important consideration in the way we define a covenant violation is the issue of waivers granted by creditors. When a firm is not in compliance with a covenant its creditors face a decision either to demand immediate repayment or to waive the violation. Expression (1) provides a way to identify a covenant violation but it does not exclude that such violation may be granted a waiver by creditors, in which case any effect that we find in the analysis below would come from a different channel other than the covenant violation itself. This would be a serious concern if waivers were generally granted free of concessions. Two comments are in order in this case. First, a waiver is generally received in exchange for other concessions. This is noted by Beneish and Press (1993), Chen and Wei (1993), Sweeney (1994) and Nini et al. (2012). For this reason, the latter count waivers as violations. Therefore, we believe that possible distortions from not accounting for waivers in the analysis below are limited. Second, treating waivers that are granted free of concessions as real violations should work against finding any significant results. However, to make sure that we are not biasing our analysis in any significant way, in Section 4.2 we present some results regarding the eventual use of waivers and show that results are consistent with the main conclusions of the paper.

Hence, following the process described above, we identify 21573 firm-quarter observations, which correspond to 1862 different firms. There are 1942 firm-quarter observations that correspond to events of violation of at least one of the aforementioned covenants, which constitute 9% of the total number of observations. This represents 350 firms out of a total of 1862 firms, i.e. 18.79% of all firms in our sample. To sum up, covenant violations seem to occur rather frequently and affect a significant number of firms in our sample.[5]

3.3 Summary Statistics and Growth Opportunity Proxies

Table 2 presents summary statistics for a number of key variables related to firm characteristics. The variable that measures default or bankruptcy risk is the (Altman's) Z-score, which is inversely related to the probability of bankruptcy. It is worth noting that the average Z-score in our sample is 6.40. This is well beyond the critical threshold of 1.81, which is considered as the level below which there is a high probability of a firm entering bankruptcy. Hence, the firms in our sample seem to show considerable financial strength. This conclusion is confirmed by the performance figures: ROA has a mean value of 2.37% and the market-to-book ratio has a value of 1.94.[6]

---- Insert Table 2 about here ----

In Table 3, we use the market-to-book asset ratio, defined as the sum of the market value of equity and total debt divided by total assets, to classify a firm according to its growth opportunities. This classification is important because, as explained in Section 2, we need to distinguish between firms that are perceived as able to generate more and less cash-flows in the future. To do so, we use the simplest possible classification method. Following Brailsford and Yeoh (2004), Broussard et al. (2004) or Schlingemann (2004), we compare each firm's market-to-book asset ratio to the median

[5] As a reference point, in Sufi's database that includes violations of all covenants there are 16.56% of covenant violations (3572 observations) that correspond to 644 different firms (34.58% of the total).

[6] These numbers are in line with those from Chava and Roberts (2008) for non-financial firms in the merged CRSP-Compustat database for the period from 1987 to 2005.

computed for the whole sample.[7] The idea is that firms with high market-to-book asset values are likely to have many positive NPV new projects to choose from (relative to their assets in place), and therefore, have the possibility to invest their resources in a variety of new profitable projects, whereas firms with low market-to-book asset values have more limited growth prospects (relative to their assets in place) and are perceived as less likely to be able to invest in positive NPV new projects. Hence, we create a dummy variable that equals 1 when the market-to-book asset ratio of the firm is above the sample median value for the last four consecutive quarters, and equals 0 otherwise. When the dummy equals 1, the firm is classified as having many growth opportunities. Otherwise, the firm is classified as having few growth opportunities. With this restriction, 32.92% of the observations correspond to quarters with "many growth opportunities".[8]

We find that a firm shows significantly better average operating performance (ROA) and measures of market value in quarters of many, instead of few, growth opportunities. Having many growth opportunities is also associated with lower average leverage ratios and larger average Z-score values i.e., lower probabilities of going bankrupt. This concurs with the fact that average loan spreads are lower in quarters with many growth opportunities. Unsurprisingly, a firm is also less likely to violate covenants in these quarters.

---- Insert Table 3 about here ----

[7] The results also hold when we use the median value of the market-to-book ratio for the industrial sector (at a secondary SIC code level) instead of the sample median to classify a firm according to its growth opportunities.

[8] Using a dummy variable allows us to easily recognize when the firm has many growth opportunities over a period of time, more specifically over four consecutive quarters. The reason why we focus on a period instead of a point in time is to make sure that we are in fact picking up growth-firms and excluding firms that happen to be above the median by chance at a given quarter. Moreover, we are excluding the possibility that an unexpected jump in growth opportunities contemporaneous to the covenant violation may drive the effect in the firm's investment policy and other dependent variables. This allows us to be more rigorous in the identification strategy.

Overall, these preliminary results are encouraging in that they provide some support to our hypothesis that the level of growth opportunities is a key characteristic to differentiate between firms whenever there is a covenant violation, and for this reason, it should matter to creditors. Moreover, the results highlight the importance of controlling for these characteristics in a multivariate analysis to make sure that we exclude other possible interpretations of our results. A more complete econometric analysis is developed in Section 4.

As explained above, our proxy for growth opportunities is based on the market-to-book asset ratio of the firm. Adam and Goyal (2008) look at different proxies for growth opportunities and conclude that the market-to-book asset ratio is the best proxy as it shows the highest correlation with the firm's actual investment opportunities. For this reason we use it as our main proxy. Nevertheless, looking at the summary statistics presented above, one could argue that firms with high market-to-book asset ratios are simply those firms with lower expected costs of financial distress due to low default risk.[9] Alternatively, they could be firms that are expected to maintain current high earnings in the future or even firms with high market valuations because they are considered as valuable additions to the portfolios of diversified investors. To ensure that we are not just identifying low default risk or high valuation firms instead of high growth firms, we also run alternative regressions using the level of R&D expenses over sales as a proxy for growth opportunities since firms generally engage in research and development to generate future investments.[10] Moreover, this proxy is accounting-based instead of market-based and therefore excludes investor's expectations about costs of financial distress and diversification considerations. Similarly to the procedure with the market-to-book asset

[9] Vassalou and Xing (2004) find that default risk is related to the market-to-book value of the firm. Nevertheless, our descriptive statistics in Tables 2 and 3 show that average Z-scores are quite high suggesting that default risk may not be an immediate concern.

[10] Another proxy for growth opportunities that generates similar conclusions is the past sales growth rate of the firm. Either R&D expenses, past sales growth rate or both are used by Adam and Goyal 2008, Billet et al. 2007, Durnev and Kim (2005), Goyal et al. 2002, Johnson (2003), Rountree et al. (2008), among others.

ratio, the firm is classified as having many growth opportunities when the R&D-to-sales expenses, or R&D intensity, is above the sample median value for the last four consecutive quarters. It is classified as having few growth opportunities otherwise.

4 Methodology and Empirical Results

4.1 Univariate Analysis

Table 4 provides additional results focusing on investment and performance variables. Panel A reports correlations between the variables Investment, ROA, Market-to-book ratio and Covenant violation. Covenant violation is negatively (and significantly) related to Investment, ROA and to the Market-to-book ratio. This is in line with the results from Panel B, which presents a test of mean differences for the variables Investment, ΔInvestment (defined as the difference in Investment between two consecutive quarters), ROA, and Market-to-book ratio, between two subsamples. These subsamples are stratified according to whether the firm is in violation of a covenant or not. The numbers show that when a firm violates a covenant it presents worse performance variables in terms of ROA and Market-to-book ratio. Average Investment is lower in violating than in non-violating quarters. This result also holds for ΔInvestment, which is significantly different between violating and non-violating quarters but negative only in violating quarters. This suggests that average investment is non-decreasing in non-violating quarters but that it may decrease following a covenant violation.

Panel C presents a test of mean differences for the variables in Panel B, taking the violating and non-violating samples stratified according to whether the firm is classified as having many or few growth opportunities, as defined in section 3.3. Among the firms with many growth opportunities, violating firms invest more than non-violating firms with an average investment of 5.1% against 4.5% of capital. This relationship also holds for the variable ΔInvestment, by comparing 0.2% against 0.1% respectively. This is a surprising result that qualifies the results from Chava and Roberts (2008) or Demiroglu and James (2010). However, in the case of firms with few growth opportunities the results are the opposite and consistent with those from the previous two papers. For this group of firms, violating firms invest on average 2.9% of capital whereas non-violating firms invest on average 3.9%

of capital. The difference is significant and such pattern persists for the variable ΔInvestment. We find that a covenant violation entails a larger decrease in investment, - 0.8% compared to 0.1% for a non-violating firm. These preliminary results provide some support to Hypothesis 1.

Regarding the variables that measure performance, the results from Panels B and C are fairly consistent. A violating firm always shows worse performance than a non-violating firm in terms of average ROA. The results for the average Market-to-book ratio are in line with these ones. These results merit further investigation because, as argued in the previous section, covenant violations do not necessarily lead to bankruptcy and it is likely that creditors act to improve the performance of the firm following such violations. In the next section, we conduct a multivariate analysis on the relationship between covenant violation and the variables that measure investment and performance.

---- Insert Table 4 about here ----

4.2 Multivariate Analysis: Implications for Investment

The aim of this section is to uncover the impact of a covenant violation, a situation through which creditors acquire some control rights over the firm, on investment depending on firm characteristics. We estimate the following empirical model:

$$\text{Investment}_{it+1} = \beta_0 + \beta_1 \text{Covenant violation}_{it} + \beta_2 \text{Covenant violation} \times \text{Growth opportunities}_{it} + \beta_3 \text{Growth opportunities}_{it} + \beta_4 \, X_{it} + \eta_i + \nu_t + \varepsilon_{i,t+1} \quad (2)$$

where the variable Investment_{it+1} is explained in terms of two dummy variables: $\text{Covenant violation}_{it}$ and $\text{Growth opportunities}_{it}$, which identify a firm that violates a covenant and a firm with many (few) growth opportunities, respectively, as explained in section 3.3. Moreover, the model includes the interaction term between the two dummies, $\text{Covenant violation}_{it} \times \text{Growth opportunities}_{it}$, and a set of control variables X_{it}. In this set of control variables we include the usual proxies for size (log of total assets), performance (ROA, Cash-flow), financial structure (Leverage ratio), liquidity (measured by cash) and default risk (Z-score). The empirical model in the expression is a firm- and year-quarter fixed effects estimation, given by η_i and ν_t respectively, with standard errors clustered at firm level. The random error term is denoted as ε_{it+1} and it is assumed to be potentially heteroskedastic.

Motivated by Chava and Roberts (2008) and Demiroglu and James (2010), we also include in the set of controls the variable Default Distance, which is computed as follows for each covenant:

$$\text{Default distance}_{it} = I(\text{Covenant}_{it}) x (\text{Accounting variable}_{it} - \text{Covenant threshold}_{it})$$

where I(.) is an indicator function that is equal to one if the loan includes one of the covenants considered in our study and zero otherwise. The squared value of the default distance is also included in order to account for potential non-linearities.

Specifically, the idea is to compute the distance between the accounting variables current ratio, net worth and tangible net worth and the corresponding thresholds specified by the covenant. Then, we take the relative minimum of these three values to identify which of the three covenants is closest to the covenant threshold. If the firm is required to comply with two (or even only one) out of the three covenants at a given quarter, the default distance is computed using these two covenants (or one covenant). This variable is important because creditors' reaction to a violation is likely to depend on by how much the firm breached a covenant threshold – creditors may be more lenient with firms which have just missed a covenant threshold than with firms which have exceed a covenant threshold by a wide margin. Moreover, it is possible that the firm may alter its investment behavior depending on how far away it is from violating a covenant (e.g. Chava and Roberts 2008; Demiroglu and James 2010; Roberts and Sufi 2009b). For example, the firm may become more conservative as it approaches a covenant threshold with the purpose of avoiding a covenant violation.

Using a firm fixed-effects estimation allows us to address the potential endogeneity problems linked to the firm-specific component of the error term (e.g., managerial abilities), which may be correlated with the variables that characterize the firm's investment policy, as well as to eventual covenant violations. The parameters of interest are β_1 and β_2, which are expected to be negative and positive, respectively, according to Hypothesis 1 developed in section 2.

We also estimate the model considered above taking as a dependent variable investment two quarters after the covenant violation (Investment_{it+2}). The idea is that presumably there is renegotiation between the firm and its creditors following the covenant violation. This renegotiation is

unlikely to take place immediately, in particular if it involves many creditors as with syndicated loans. In this case, we impose an additional condition that a covenant has not been violated at quarter $t+1$. This is done to eliminate confounding effects and conduct an effective evaluation of the marginal effects of a covenant violation at a given quarter on investment two quarters ahead without having to worry about what happened in between. The results are presented in Table 5A. In columns 1 and 3, we advance the dependent variable by one quarter ($Investment_{it+1}$), while in columns 2 and 4 we advance it by two quarters ($Investment_{it+2}$). In columns 1 and 2, growth opportunities are measured using the market-to-book asset ratio, whereas in columns 3 and 4, growth opportunities are measured using R&D intensity.

Column 1 of Table 5A shows that covenant violations are associated with a decline in investment of 0.8% of capital in the quarter following the violation for firms with few growth opportunities. This number represents a decrease of 20.5% relative to an average investment rate of 3.9% in non-violating quarters for firms with few growth opportunities (see Panel C from Table 4).[11] However, we find a positive and significant coefficient of 1.4% on the interaction term, which represents a net increase of 0.6% (1.4%-0.8%) in investment when a firm has many growth opportunities, and reject the hypothesis that the sum of the coefficients of the covenant violation dummy and the interaction term is equal to zero: the null hypothesis that $\beta_1 + \beta_2 = 0$ is rejected with a p-value<0.01. The net increase of 0.6% represents an increase of 13.3% relative to an average investment rate of 4.5% in non-violating quarters for firms with many growth opportunities (see Panel C from Table 4). Such result suggests that in contrast to what happens with few growth opportunities, when a firm has many growth opportunities there is an increase in investment in spite of the violation. These results also hold in column 3 when we use R&D intensity as a proxy for growth opportunities.

[11] Chava and Roberts (2008) also show that there is a decrease of 0.8% of capital, using a different sample and a slightly different model specification as they do not control for the differential effect of growth opportunities in violating firms.

The quantitative results in columns 2 and 4 are quite similar to those in columns 1 and 3. More specifically, there is a decline in investment of 0.6% of capital two quarters after the covenant violation when a firm has few growth opportunities. However, when it has many growth opportunities there is a net increase in investment of 1% (1.6%-0.6%) two quarters following the violation. We reject the hypothesis that the sum of the coefficients of the covenant violation dummy and the interaction term is equal to zero ($\beta_1 + \beta_2 = 0$ is satisfied with a p-value<0.01). This result also holds in column 4, when we use R&D intensity to construct the proxy for growth opportunities.

The results presented above support Hypothesis 1 developed in section 2. They validate the theories that present covenants as a way for creditors to monitor managers, and suggest that creditors do not respond to covenant violations mechanically but rather act to address firm-specific conditions.

---- Insert Table 5A about here ----

An additional test to support this story would be to show that creditors are indeed more likely to forgive a covenant violation to a firm with many growth opportunities than to a firm with few growth opportunities. As explained in Section 3.2, it is difficult to identify which firms were granted creditor forgiveness because even when creditors grant a waiver, such waiver is likely to entail some conditions. We can however focus on a particular aspect related to waivers and look at amendments to loan contracts, i.e. changes in loan terms such as maturity or interest rates, which are recorded in Dealscan. In particular, we construct a dummy variable that is equal to 1 if there is an amendment to the loan contract at a given quarter and 0 otherwise. In Table 5B, we use this variable to estimate the probability of an amendment in the quarter following a covenant violation depending on growth opportunities. As expected, we find that firms with many growth opportunities are less likely to amend a loan contract following a covenant violation than firms with few growth opportunities.

Finally, we investigate further the link between creditors' influence over a firm and changes in investment following a covenant violation. In doing so, we examine whether the strength of a lending relationship, as measured by the number of historical lending relationships between the firm and a current lender during the sample period, affects the results. The idea is that repeated lending

relationships facilitate the gathering of soft and hard information about the firm, which helps mitigate asymmetric information concerns about the value of growth opportunities or about whether a manager has the skill to make them succeed, in the spirit of Diamond (1991), for example. A creditor with a stronger lending relationship may also be more concerned about the potential reputational costs of failing to fully support a firm with strong growth prospects (as in Dahiya et al., 2003). Columns 3 and 4 of Table 5B show that a strong lending relationship matters in particular when a firm has many growth opportunities, with a marginal increase in investment of around 1.4% after a covenant violation relative to a firm with many growth opportunities but without such lending relationship. A firm with few growth opportunities does not seem to benefit from a lending relationship.

Although we do not use data on waivers, these results suggest that creditors take different considerations into account when a firm has many growth opportunities - involving eventually more waivers, captured here by increased investment and less debt contract amendments following a covenant violation – relative to when a firm has few growth opportunities - involving eventually less waivers, captured here by decreased investment and more debt contract amendments following a covenant violation.

---- Insert Table 5B about here ----

4.3 Multivariate Analysis: Implications for Performance

We next investigate whether a covenant violation, and subsequent creditor intervention, has any impact on firm performance differentiating between firms with many and few growth opportunities. To gain insight into this issue, we estimate the same empirical model as in Section 4.2. using a performance-related variable as a dependent variable. This is the empirical model:

$$\begin{aligned}\text{Performance}_{it+1} = \gamma_0 + \gamma_1 \text{Covenant violation}_{it} + \gamma_2 \text{Covenant violation} \times \text{Growth opportunities}_{it} + \\ \gamma_3 \text{Growth opportunities}_{it} + \gamma_4 \, X_{it} + \eta_i + \nu_t + \varepsilon_{i,t+1}\end{aligned} \quad (3)$$

where $\text{Performance}_{it+1}$ is operating performance (ROA). The parameters of interest are γ_1 and γ_2, with γ_1 expected to be positive and $\gamma_1+\gamma_2>0$, according to Hypothesis 2 developed in section 2. We also estimate the model taking as a dependent variable performance two quarters after the covenant

violation ($Performance_{it+2}$) and we impose as in section 4.2 that there is no covenant violation in quarter $t+1$.

In columns 1 and 3 of Table 6 we advance the dependent variable by one quarter (ROA_{it+1}), while in columns 2 and 4 we advance the dependent variable by two quarters (ROA_{it+2}). According to Column 1, operating performance increases by 0.4% in the quarter following a covenant violation when a firm has few growth opportunities, which corresponds to an increase of 20% relative to an average ROA of around 2% in non-violating quarters (Panel C from Table 4). Moreover, the interaction term has a coefficient that is positive and significant, meaning that a firm with many growth opportunities experiences an even stronger improvement in operating performance. Specifically, when a firm has many growth opportunities the increase in performance associated with the covenant violation is equal to 0.6%, or 15.8% relative to an average ROA of 3.8% in non-violating quarters (Panel C from Table 4). Using R&D intensity as an alternative proxy for growth opportunities yields very similar results that persist for two quarters following the violation. All results provide support to Hypothesis 2.

---- Insert Table 6 about here ----

4.4 Robustness Analysis

In order to test for the robustness of our claims, we provide additional evidence of our theoretical arguments using alternative proxies and specifications.

One particular concern that emerges from our study is whether our results are affected by the fact that a firm might be compelled to subject its investment policy to the control of creditors even before a covenant violation. This happens whenever loan contracts contain covenants on capital expenditures. In particular, one could worry about the fact that firms with growth opportunities are precisely those firms that avoid including such covenants in loan contracts to ensure maximum flexibility in their investment policy. To control for this possibility, in Table 7 we include an additional variable that captures the presence of such covenants (Covenant Capex). We show that covenants on capital expenditures decrease investment but hardly alter the magnitude or significance

of the coefficient of Covenant violation × Growth Opportunities. This result holds regardless of how we measure growth opportunities.

---- Insert Table 7 about here ----

In Table 8, we distinguish between a violation of the current ratio covenant and of the aggregate (tangible) net worth covenant. We find that the reduction in investment measured by the coefficient of the Covenant violation term is not always steeper but is certainly more significant for the latter than for the former. The increase in investment when there are growth opportunities is also weaker in terms of magnitude and significance following a violation of the net worth covenant. These results seem to suggest that the violation of the net worth covenant has more serious implications for potential default and bankruptcy, whereas the violation of the current ratio covenant warns of the possibility of a liquidity problem that may be easier to tackle with the help of creditors.[12]

---- Insert Table 8 about here ----

A further issue that arises from our analysis is whether the market-to-book ratio measures not only growth opportunities but also expectations for costs of financial distress. In this way, a violating firm identified as having few growth opportunities could also be a firm whose high (expected) costs of financial distress push down the market value of its growth opportunities. We already deal with this problem when we introduce R&D intensity as an alternative proxy for growth opportunities and show that it yields results that are quantitatively very similar. An additional test is as follows. If it is true that a low market-to-book ratio captures high costs of financial distress, the effect in our variables of interest should disappear once we focus on firms associated with high costs of financial distress, for example, firms that are more likely to go bankrupt. To show that this is not the case, in specification (2) we include an interaction term of the covenant violation dummy with the Z-score variable that is also interacted with the growth opportunities variable, as proxied by the market-to-book ratio. According to the results presented in Table 9 the coefficient of the interaction term Covenant violation × Z-score is significantly positive, which leads us to conclude that a firm that is more likely to go

[12] We thank a referee for providing this intuition.

bankrupt invests less after a covenant violation. However, there is hardly any change in the coefficients for the variables Covenant violation and Covenant violation× Growth Opportunities relative to the original results, which indicates that the Growth Opportunities variable proxied by the market-to-book ratio is unlikely to be capturing costs of financial distress.

---- Insert Table 9 about here ----

Finally, an additional concern is that if it is true that a firm with many growth opportunities benefits from covenant violations we should see these firms willingly including as many covenants as possible in loan contracts in exchange for a lower cost of debt. The empirical evidence on this issue is mixed.[13] Therefore, a pertinent question is whether there are differential effects of a covenant violation conditional contingent on growth opportunities on other aspects of corporate policies such as mergers and acquisitions, CEO turnover or dividend and capital structure policy. We assess some of these elements in Table 10.

We obtain data on mergers and acquisitions (M&A) -another form of investment- from SDC Platinum, and CEO turnover from EXECUCOMP. Because these data are compiled on a yearly basis, we examine cumulative M&A and turnover during the two and four quarters following a covenant violation.[14] Columns 1 and 2 of Panel A, present the results for (the likelihood of) an M&A. In line with the general result on investment from Table 5A we find that there is a decrease in the probability of engaging in an M&A following a covenant violation. However this result is attenuated when a firm has many growth opportunities. In columns 3 and 4 of Panel A, we conduct the probit estimation of CEO turnover. In line with the qualitative results in Nini et al. (2012), we find that a covenant violation increases the probability of CEO turnover four quarters following the violation, and this

[13] For example, Nash et al. (2003) find that there is a negative relation between the incidence of (some) covenants and growth opportunities, while Bradley and Roberts (2004) find the opposite.

[14] We have also conducted estimations of annual M&A and CEO turnover data using cumulative covenant violations. In this case, the dependent variables are advanced by one year. The results are similar to those presented in Panel A of Table 10.

effect is stronger when the firm has many growth opportunities. In columns 1 and 2 of Panel B, we evaluate the dividend policy of the firm by looking at the payout ratio one and two quarters following a covenant violation. If creditors exert a tighter control over the firm, we should see (as we do) a decrease in such ratio that occurs independently of the level of growth opportunities. Finally, the results from columns 3 and 4 of Panel B show that debt issuance decreases following a covenant violation, which is as shown by Roberts in Sufi (2009b). However, this effect is attenuated when a firm has many growth opportunities, which may be because these firms require extra funds to be able to continue investing following a covenant violation.

---- Insert Table 10 about here ----

Overall, these results provide a more solid ground to our story because they indicate that from the point of view of managers and shareholders, there are still reasons to avoid covenants and covenant violations regardless of the level of growth opportunities. This is due to an increase in the probability of CEO turnover and to dividend payment cuts following a covenant violation.

4.5 Further tests: Causality

The previous analysis does not allow us to address causality between a covenant violation and changes in corporate investment since we cannot fully disentangle the effect of a covenant violation from changes in the firm's investment opportunity set. Therefore, the empirical findings presented above are mainly descriptive.

Chava and Roberts (2010) conduct a regression discontinuity design to show that a covenant violation generates changes in investment but without addressing the issue of growth opportunities.[15] We can, however, follow their approach by estimating the following model:

$$\begin{aligned} Investment_{it+1} = {} & {}_0 I Covenant\ violation_{it} + {}_1 (1 \quad I) Covenant\ violation_{it} \\ & + {}_0 I X_{it} + {}_1 (1 \quad I) X_{it} + {}_i + {}_t + {}_{it+1} \end{aligned} \tag{4}$$

[15] See e.g. Roberts and Whited (2012) for a description of the regression discontinuity methodology.

where I is an indicator function equal to 1 when the firm has few growth opportunities at a given quarter and zero otherwise. Growth opportunities are measured as defined in Section 3.3 and all control variables are the same as before. The parameters of interest are β_0 and β_1, which are expected to be negative and positive, respectively, according to Hypothesis 1 developed in section 2 and the results in section 4.2. This procedure is similar to estimating equation (2) separately for two samples – the sample with many growth opportunities and the sample with low growth opportunities – except that in equation (4) the error terms are not interacted with the indicator function. This is a neater procedure to isolate the effect of a covenant violation.

We report the results in Table 11. They are consistent in terms of magnitude and significance with those results reported in Table 5A. In particular, we find that investment decreases by around 0.8% of capital in the quarter following a covenant violation when a firm has few growth opportunities, while it increases by around 0.8% of capital when a firm has many growth opportunities.[16]

---- Insert Table 11 about here ----

5 Conclusions

In this paper, we present evidence that creditors' effect on investment decisions can be quite complex in the sense that they can help shape the firm's investment policy, even if this means supporting shareholders and managers in their actions. We confirm previous findings that investment declines following a covenant violation but we offer evidence that this result is affected by the firm's

[16] We have also carried out an instrumental variable fixed-effect estimation using as instrument of covenant violation a prediction of this variable in terms of Growth Opportunities, Default Distance, (Default Distance)^2, Size, Leverage, Cash-flow and Z-score. The results, available upon request, show that there are no major differences relative to the results in the paper - the main difference is that the coefficients of the main explanatory variables are slightly less negative or equivalently more positive. This outcome indicates that the (negative) reverse causality from investment to covenant violation is much less important than the causality proposed from covenant violation to investment.

investment opportunity set at the time of violation. Specifically, we use different proxies for growth opportunities to show that investment does not necessarily decrease, and may even increase, following a covenant violation when the violating firm has many growth opportunities at the time of violation. The results suggest that creditors value growth opportunities as a source of future cash flows that enable a firm to repay its outstanding debt.

We also document that firm operating performance improves shortly after a covenant violation, in particular when the firm has many growth opportunities. However, CEO turnover increases and payout ratios decrease regardless of the level of growth opportunities.

Overall, we interpret this evidence as suggesting that creditors' influence on firms that violate covenants seems to depend on firm characteristics at the time of violation. This is consistent with the existing literature that presents covenants and covenant violations as tripwires that enhance the flexibility and efficiency of financial contracting. It is also in line with the empirical literature that documents that covenants can be relaxed and waived by creditors.

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Appendix

Table 1: Variable Definitions

Current ratio (CR)	current assets / current liabilities
Net worth (NW)	total assets - total liabilities
Tangible net worth (TNW)	current assets + net plant, property, and equipment + other assets - total liabilities
CR default distance	current ratio - covenant current ratio threshold
NW default distance	net worth - covenant net worth threshold
TNW default distance	tangible net worth - covenant tangible net worth threshold
Default Distance	relative minimum {CR default distance, NW default distance, TNW default distance}
Covenant violation	variable equal to 1 if CR, NW and/or TNW default distance is negative. It is equal to 0 otherwise.
Investment	capital expenditures adjusted for fiscal quarter / lagged net property plan and equipment.
Growth opportunities	variable equal to 1 if the market-to-book ratio (R&D expenses over sales) exceeds the sample median of the market-to-book ratio (R&D expenses over sales) for the last four consecutive quarters (from current quarter to current-3). It is equal to 0 otherwise.
ROA	operating income before depreciation / total assets
Total debt	debt in current liabilities + long term debt
Market-to-book ratio	(market value of equity + total debt) / total assets
Size	log of total assets deflated by the all-urban CPI (year 2000)
Leverage	total debt / total assets
Cash-flow	(income before extraordinary items + depreciation) / lagged net property plan and equipment
(Altman's) Z-score	$3.3 \times A + 0.99 \times B + 0.6 \times C + 1.2 \times D + 1.4 \times E$; where A=EBIT / total assets; B=net sales / total assets; C=market value of equity / total liabilities; D=working capital/total assets; E=retained earnings /total assets.
Liquidity	cash / lagged net property plan and equipment
Covenant Capex	variable equal to 1 if an outstanding loan at a given quarter includes a covenant on capital expenditures. It is equal to 0 otherwise.
Payout ratio	dividends / EBITDA
Debt issuance	(total debt – lagged total debt) / total assets
Spread	total (fees and interests) annual spread paid over LIBOR for each dollar drawn down from the loan (All-in Spread Drawn variable from Dealscan).
Maturity	maturity of a loan in months
Amendment	variable equal to 1 if there is a change in the terms of an outstanding loan contract as reported in Dealscan. It is equal to 0 otherwise.
Lending Relationship	variable equal to 1 if the firm has more than one previous lending relationship with a lead lender in a current lending syndicate. It is equal to 0 otherwise.

Table 2: Summary Statistics of the Variables

The table presents summary statistics – means, standard deviations, minimum and maximum – of loan and firm characteristics variables. The sample is composed of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008 for which we have information on at least one of the following covenants: current ratio, tangible net worth or net worth. Net worth, Tangible net worth and Size are in millions of dollars, Spread is in basis points and Maturity is in months. The variable Size is not in log terms in this table. Variable definitions appear in Table 1.

Variable	Mean	Std. Dev.	Min	Max
Spread	206.399	126.174	1.5	610
Maturity	35.529	20.528	1	276
Covenant violation	0.090	0.286	0	1
Current ratio	3.195	8.964	0.277	25.586
Net worth	610.212	3330.5	0.131	10600
Tangible net worth	211.255	1450	1.001	8650.0
ROA (%)	2.367	5.602	-0.906	11.945
Market-to-book	1.943	1.611	0.262	39.584
Investment	0.040	0.348	0.000	32.933
Size	1757.605	11009	0.208	29197
Cash-flow	0.183	3.261	-4.122	3.195
Leverage	0.517	0.280	0.011	1.289
Z-score	6.404	10.578	0.11	36.65
Liquidity	1.371	17.406	0.003	35.030

Table 3: T-test contingent on Growth opportunities

The table presents a test of mean differences for loan and firm characteristics between two different subsamples. These subsamples are stratified according to whether a firm-quarter observation is classified as having many or few growth opportunities. A firm has many (few) growth opportunities at a given quarter when the market-to-book ratio is above (below) the sample median for the last four consecutive quarters. The sample is composed of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008 for which we have information on at least one of the following covenants: current ratio, tangible net worth or net worth. Net worth, Tangible net worth and Size are in millions of dollars, Spread is in basis points and Maturity is in months. The variable Size is not in log terms in this table. Variable definitions appear in Table 1.

	Many Growth opportunities	Few Growth opportunities	p-value
Spread	185.736	216.540	0.000
Maturity	34.467	36.050	0.000
Covenant violation	0.042	0.114	0.000
Current ratio	3.611	2.991	0.000
Net worth	684	574	0.000
Tangible net worth	224	205	0.000
ROA(%)	3.772	1.678	0.000
Market-to-book	3.173	1.340	0.000
Investment	0.047	0.037	0.000
Size	1443	1912	0.100
Cash-flow	0.278	0.136	0.005
Leverage	0.453	0.548	0.000
Z-score	7.230	5.998	0.000
Liquidity	2.101	1.013	0.000

Table 4: T-test contingent on Covenant Violation and Growth opportunities

Panel A presents correlations between the variables Investment, ROA, Market-to-book ratio and Covenant violation. Panel B presents a test of mean differences for the variables Investment, ΔInvestment (Investment (t+1) – Investment (t)), ROA and Market-to-book ratio between two subsamples (p-values reported). These subsamples are stratified according to whether a firm-quarter observation is identified as being in violation or not. Panel C presents a test of mean differences for the same variables creating two additional subsamples (p-values reported). These subsamples are stratified according to whether a firm-quarter observation is identified as being in violation (or not) and the firm is classified as having many (or few) growth opportunities. A firm has many (few) growth opportunities at a given quarter when the market-to-book ratio is above (below) the sample median for the last four consecutive quarters. The sample is composed of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008 for which we have information on at least one of the following covenants: current ratio, tangible net worth or net worth. Variable definitions appear in Table 1. ***p<0.01, ** p<0.05, * p<0.1.

PANEL A

	Investment	ROA	Market-to-book	Covenant violation
Investment	1			
ROA	0.109***	1		
Market-to-book	0.048**	0.051**	1	
Covenant violation	-0.040*	-0.177***	-0.076***	1

PANEL B

	Violation	No Violation	p-value
Investment	0.036	0.043	0.000
ΔInvestment	-0.005	0.001	0.000
ROA(%)	0.400	3.010	0.000
Market-to-book	1.204	2.177	0.000

PANEL C

	Many growth opportunities		Few growth opportunities	
	Violation	No violation	Violation	No Violation
Investment	0.051	0.045	0.029	0.039
p-value		(0.000)		(0.000)
ΔInvestment	0.002	0.001	-0.008	0.001
p-value		(0.107)		(0.000)
ROA (%)	2.031	3.802	0.050	2.007
p-value		(0.000)		(0.000)
Market-to-book	2.004	3.281	1.050	1.359
p-value		(0.016)		(0.000)

Table 5A: The Effect of Covenant Violations on Investment

The table reports the results of the fixed-effect estimations of Investment (led by one quarter in columns 1 and 3 and by two quarters in columns 2 and 4) on Covenant violation, Growth Opportunities, the interaction term Covenant violation× Growth Opportunities and other control variables. In columns 1 and 2 the proxy for growth opportunities is based on the market-book ratio, while in columns 3 and 4 it is based on R&D intensity. Variable definitions appear in Table 1. This is a sample of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008, which are bound by a covenant on the current ratio or/and on the (tangible) net worth at some point during the sample period. All specifications include time dummies and standard errors are clustered at a firm level.

VARIABLES	Investment (t+1) (M/B)	Investment (t+2) (M/B)	Investment (t+1) (R&D)	Investment (t+2) (R&D)
Covenant violation	-0.008***	-0.006***	-0.009***	-0.009***
	(-4.410)	(-5.540)	(-3.997)	(-3.112)
Covenant violation×Growth Opportunities	0.014**	0.016***	0.016**	0.010**
	(2.216)	(6.803)	(2.092)	(1.961)
Growth Opportunities	0.014***	0.010***	0.003*	0.002
	(6.544)	(7.300)	(1.657)	(1.364)
Default Distance	0.001	0.001	0.001	0.000
	(0.927)	(1.016)	(0.924)	(0.110)
(Default Distance)^2	0.001	0.001	-0.000	-0.000
	(0.775)	(0.828)	(-1.440)	(-0.642)
Size	-0.016*	-0.014**	-0.013	-0.001
	(-1.689)	(-2.492)	(-0.767)	(0.590)
Leverage	-0.948**	-1.256***	-2.889**	-2.717***
	(-2.395)	(-3.421)	(-2.234)	(-2.612)
Cash-flow	0.015***	0.011**	0.008	0.039
	(4.570)	(2.455)	(0.417)	(1.154)
Z-score	0.104	0.077*	0.531	0.173***
	(1.027)	(1.670)	(1.106)	(2.603)
Liquidity	-0.065**	-0.046**	-0.059***	-0.069*
	(-2.325)	(-2.464)	(-2.876)	(1.732)
Intercept	0.019***	0.014***	0.034	0.035*
	(2.718)	(3.952)	(0.708)	(1.722)
Observations	21,573	20,805	21573	20,805
R2 (%)	9.85%	8.19%	14.93%	14.24%
Fitness test (F test)	35.19 (0,000)	27.71 (0.000)	56.53 (0.000)	51.57 (0.000)

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5B: The Effect of Covenant Violations on Investment: Amendments and Relationship Lending

Columns 1 and 2 of this table report the results of probit regressions for the probability of a loan amendment (led by one quarter). Columns 3 and 4 report the results of fixed-effect estimations of Investment (led by one quarter) including lending relationship and other control variables. In columns 1 and 3 the proxy for growth opportunities is based on the market-book ratio, while in columns 2 and 4 it is based on R&D intensity. Variable definitions appear in Table 1. This is a sample of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008, which are bound by a covenant on the current ratio or/and on the (tangible) net worth at some point during the sample period. All specifications include time dummies and standard errors are clustered at a firm level.

VARIABLES	Amendment (t+1) (M/B) Probit	Amendment (t+1) (R&D) Probit	Investment (t+1) (M/B)	Investment (t+1) (R&D)
Covenant violation	0.214***	0.176***	-0.008***	-0.009***
	(7.208)	(2.915)	(-4.105)	(-3.591)
Covenant violation × Growth Opportunities	-0.076***	-0.038**	0.012**	0.012***
	(-3.526)	(-2.062)	(2.196)	(2.645)
Cov. Viol. × Growth Opport. × Lending Relationship			0.014**	0.015**
			(2.313)	(2.150)
Cov. Violation × Lending Relationship			-0.008	0.002
			(-0.942)	(0.381)
Growth Opportunities	-0.045**	-0.122*	0.015***	0.006*
	(-1.943)	(-1.646)	(3.547)	(1.680)
Lending Relationship			0.001	0.007*
			(1.074)	(1.971)
Growth Opportunities × Lending Relationship			0.016	0.016
			(1.059)	(1.363)
Default Distance	-0.024	-0.060	0.001	-0.000
	(-1.058)	(-1.137)	(1.259)	(-0.084)
$(\text{Default Distance})^2$	-0.568*	-0.200	0.000	-0.000
	(-1.804)	(-1.086)	(0.398)	(-0.062)
Size	0.111	0.220*	-0.021*	-0.012
	(0.182)	(1.658)	(-1.661)	(-0.465)
Leverage	1.634***	0.381*	-1.138***	-2.464*
	(4.820)	(1.841)	(-2.888)	(-1.814)
Cash-flow	-0.071	-0.877	0.019***	0.041*
	(-1.240)	(-1.110)	(5.737)	(1.744)
Z-score	0.010	0.054*	0.083	0.417*
	(1.240)	(1.650)	(0.564)	(1.853)
Liquidity	-0.250**	-0.403*	-0.093***	-0.059**
	(-2.071)	(-1.881)	(-6.922)	(-2.333)
Intercept	0.118***	0.129***	0.013*	0.014
	(13.430)	(11.727)	(1.784)	(0.672)
Observations	21,573	21,573	21,573	21,573
R2 (%)	20.28%	27.20%	10.28%	15.20%
Fitness test	76.88 (0.000)	108.86 (0.000)	34.63 (0.000)	52.24 (0.000)

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: The Effect of Covenant Violations on Operating Performance

The table reports the results of the fixed-effect estimations of ROA (led by one quarter in columns 1 and 3 and two quarters in columns 2 and 4) on Covenant violation, Growth Opportunities, the interaction term Covenant violation×Growth Opportunities and other control variables. In columns 1 and 2 the proxy for growth opportunities is based on the market-book ratio, while in columns 3 and 4 it is based on R&D intensity. Variable definitions appear in Table 1. This is a sample of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008, which are bound by a covenant on the current ratio or/and on the (tangible) net worth at some point during the sample period. All specifications include time dummies and standard errors are clustered at a firm level.

VARIABLES	ROA (t+1) (M/B)	ROA (t+2) (M/B)	ROA (t+1) (R&D)	ROA (t+2) (R&D)
Covenant violation	0.004***	0.002**	0.004***	0.002**
	(3.225)	(1.951)	(2.933)	(1.969)
Covenant violation×Growth Opportunities	0.002***	0.002***	0.003***	0.002***
	(3.594)	(3.050)	(3.410)	(7.297)
Growth Opportunities	0.013***	0.005***	0.001	0.002
	(19.065)	(11.172)	(0.022)	(0.514)
Default Distance	0.002	0.001	0.003	0.006
	(1.212)	(0.260)	(1.014)	(1.286)
(Default Distance)^2	0.001	0.001	-0.002	-0.019
	(0.470)	(0.507)	(-0.155)	(-0.748)
Size	-0.009**	-0.010*	-0.009**	-0.020***
	(-2.314)	(-1.654)	(-1.986)	(-3.647)
Leverage	0.148***	0.046**	0.105**	0.158***
	(7.230)	(2.028)	(2.390)	(6.531)
Cash-flow	-0.000	-0.000	-0.061**	-0.029**
	(-0.272)	(-1.282)	(1.969)	(-2.064)
Z-score	0.025*	0.010**	0.033**	0.018**
	(1.718)	(2.323)	(1.991)	(2.487)
Liquidity	0.033***	0.025***	0.027*	0.024*
	(3.425)	(2.922)	(1.694)	(1.863)
Intercept	0.030***	0.022***	0.037	0.019
	(8.406)	(6.369)	(0.967)	(0.527)
Observations (firms)	21,573	20,805	21,573	20,805
R2 (%)	6.02%	5.95%	10.08%	8.26%
Fitness test (F test)	20.63 (0.000)	19.65 (0.000)	39.00 (0.000)	27.97 (0.000)

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 7: Robustness Analysis. Covenant on Capital Expenditures

The table reports the results of the fixed-effect estimations of Investment (led by one quarter in columns 1 and 3 and by two quarters in columns 2 and 4) on Covenant violation, Growth Opportunities, the interaction term Covenant violation × Growth Opportunities and other control variables. In columns 1 and 2 the proxy for growth opportunities is based on the market-book ratio, while in columns 3 and 4 it is based on R&D intensity. Variable definitions appear in Table 1. This is a sample of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008, which are bound by a covenant on the current ratio or/and on the (tangible) net worth at some point during the sample period. All specifications include time dummies and standard errors are clustered at a firm level.

VARIABLES	Investment (t+1) (M/B)	Investment (t+2) (M/B)	Investment (t+1) (R&D)	Investment (t+2) (R&D)
Covenant violation	-0.008***	-0.006***	-0.006***	-0.007***
	(-4.294)	(-5.382)	(-2.618)	(-3.286)
Covenant violation×Growth Opportunities	0.014***	0.012***	0.012**	0.012**
	(6.526)	(7.246)	(1.993)	(2.342)
Growth Opportunities	0.012**	0.016***	0.001	0.002
	(2.183)	(6.775)	(0.498)	(0.545)
Covenant Capex	-0.011***	-0.009***	-0.009***	-0.008***
	(-5.649)	(-5.819)	(-3.580)	(-3.320)
Default Distance	0.001	0.001	-0.001	-0.001
	(1.024)	(1.005)	(-1.328)	(-1.222)
$(\text{Default Distance})^2$	0.001	0.001	-0.000	-0.000
	(0.864)	(0.856)	(-1.082)	(-1.544)
Size	-0.016*	-0.014***	-0.012	-0.008
	(-1.761)	(-2.621)	(-0.980)	(-0.759)
Leverage	-0.916**	-1.229***	-2.997***	-1.975**
	(-2.343)	(-6.284)	(-3.041)	(-2.205)
Cash-flow	0.015***	0.011**	0.037	0.010
	(4.467)	(2.441)	(0.850)	(0.222)
Z-score	0.109	0.080*	0.014	0.118***
	(1.071)	(1.729)	(0.129)	(2.702)
Liquidity	-0.064**	-0.035**	-0.030*	-0.030*
	(-2.255)	(-2.411)	(-1.646)	(-1.736)
Intercept	0.022***	0.017***	0.020	0.017
	(3.243)	(4.710)	(0.147)	(0.978)
Observations	21,573	20,805	21,573	20,805
R2 (%)	10.40%	8.71%	15.97%	14.66%
Fitness test (F test)	36.78 (0.000)	29,15 (0.000)	60.23(0.000)	52.49 (0.000)

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 8: Robustness Analysis. Analysis by covenant type

The table reports the results of the fixed-effect estimations of Investment (led by one period) on Covenant violation, Growth Opportunities, the interaction term Covenant violation× Growth Opportunities and other control variables. We distinguish between a current ratio covenant violation (columns 1 and 3) and a net worth (or tangible net worth) covenant violation (columns 2 and 4). In columns 1 and 2, the proxy for growth opportunities is based on the market-book ratio while in columns 3 and 4 it is based on R&D intensity. Variable definitions appear in Table 1. This is a sample of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008. Specifications include time dummies and standard errors are clustered at a firm level,

VARIABLES	Investment (t+1) (M/B) CR	Investment (t+1) (M/B) NW+TNW	Investment (t+1) (R&D) CR	Investment (t+1) (R&D) NW+TNW
Covenant violation	-0.014*	-0.007***	-0.003	-0.010***
	(-1.691)	(-4.900)	(-0.315)	(-9.851)
Covenant violation×Growth Opportunities	0.043**	0.005	0.025**	0.007*
	(2.397)	(1.079)	(2.566)	(1.741)
Growth Opportunities	0.033***	0.012***	0.002	0.005**
	(4.946)	(4.955)	(0.369)	(2.038)
Default Distance	0.002	0.001	0.002	0.001
	(0.345)	(1.216)	(0.714)	(1.341)
(Default Distance)^2	-0.008	0.001	-0.010	0.001
	(-1.572)	(0.972)	(-1.493)	(1.474)
Size	0.115	-0.023**	-0.013	-0.021***
	(1.489)	(-2.367)	(-0.371)	(-2.769)
Leverage	-0.789	-1.481***	-1.640	-2.902**
	(-1.574)	(-3.014)	(-1.440)	(-1.981)
Cash-flow	0.020***	0.014***	0.029	0.004
	(3.208)	(4.296)	(1.070)	(1.094)
Z-score	0.008	0.167	1.633	0.103
	(0.042)	(1.322)	(1.428)	(0.688)
Liquidity	-0.052***	-0.074***	-0.178**	-0.048**
	(-6.407)	(-2.694)	(-2.124)	(-2.115)
Intercept	0.043**	0.012	0.008	0.042***
	(2.242)	(1.402)	(0.240)	(3.765)
Observations	4427	18352	4427	18352
R2 (%)	8.28	12.00	6.22	10.80
Fitness test (F test)	5.73***	37.27***	4.21***	33.09***

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 9: Robustness Analysis. The Effect of Covenant Violations on Investment. Interaction effects

The table reports the results of the fixed-effect estimations of Investment (led by one quarter in column 1 and by two quarters in column 2) on Covenant violation, Growth Opportunities, the interaction term Covenant violation × Growth Opportunities and other control variables. We include interaction terms with the default risk variable (Covenant violation × Z-score; Covenant violation × Z-score × Growth Opportunities). The proxy for growth opportunities is based on the market-book ratio. Variable definitions appear in Table 1. This is a sample of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008, which are bound by a covenant on the current ratio or/and on the (tangible) net worth at some point during the sample period. All specifications include time dummies and standard errors are clustered at a firm level.

VARIABLES	Investment (t+1) (M/B)	Investment (t+2) (M/B)
Covenant violation	-0.010***	-0.009***
	(-4.565)	(-5.961)
Covenant violation×Growth Opportunities	0.014**	0.015***
	(2.164)	(5.691)
Growth Opportunities	0.014***	0.011***
	(6.693)	(7.616)
Covenant violation × Z-score	0.007***	0.006***
	(2.700)	(2.772)
Cov. Viol.×Z-score × Growth Opportunities	0.000	0.000
	(0.366)	(0.132)
Default Distance	0.001	0.000
	(0.920)	(0.028)
(Default Distance)^2	-0.001	-0.000
	(-0.596)	(-0.420)
Size	-0.018*	-0.008*
	(-1.749)	(-1.644)
Leverage	-1.177***	-1.084***
	(-2.675)	(-4.991)
Cash-flow	0.017***	0.015**
	(4.422)	(2.153)
Z-score	0.077	0.094*
	(0.597)	(1.722)
Liquidity	-0.069**	-0.074**
	(-2.448)	(-2.327)
Intercept	0.025*	0.026***
	(1.774)	(3.858)
Observations	21,573	20,805
R2 (%)	11.30%	10.51%
Fitness test (F test)	39.73 (0.000)	35.28 (0.000)

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 10: Robustness Analysis. Extensions (Mergers and acquisitions (M&A), CEO turnover, Dividend payout, Debt issuance)

The table reports the results of the estimations of M&A, CEO turnover, Dividend payout ratio and Debt issuance. Panel A presents Probit estimations, while Panel B presents fixed effect estimations. The dependent variables in Panel A are led by two (columns 1 and 3) and four quarters (columns 2 and 4), while in Panel B they are led by one (columns 1 and 3) and two quarters (columns 2 and 4). CEO turnover is extracted from EXECUCOMP, while M&A is extracted from SDC Platinum. Control variables are the same as in Table 6A, except for Debt issuance in which we exclude the explanatory variable Leverage to avoid endogeneity issues. Variable definitions appear in Table 1. This is a sample of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008, which are bound by a covenant on the current ratio or/and on the (tangible) net worth at some point during the sample period. The variable Growth Opportunities is computed based on the market-to-book ratio. All specifications include time dummies and standard errors are clustered at a firm level.

VARIABLES (PANEL A)	M&A (t+2) Probit	M&A (t+4) Probit	CEO turnover (t+2) Probit	CEO turnover (t+4) Probit
Covenant violation	-0.026***	-0.025***	0.037**	0.069**
	(-6.200)	(-6.031)	(2.100)	(2.180)
Covenant violation×Growth Opportunities	0.028***	0.021**	0.035**	0.010*
	(3.650)	(2.870)	(3.880)	(1.741)
Growth Opportunities	0.027***	0.029***	0.002	0.036
	(8.670)	(8.400)	(1.007)	(0.140)
Firm controls	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes
Observations	20805	20037	7503	7226
R2 (%)	10.24%	7.58%	2.69%	2.55%
Fitness test (LR test)	35.31 (0.000)	24.44 (0.000)	3.07 (0.000)	2.83 (0.000)
VARIABLES (PANEL B)	Payout (t+1)	Payout (t+2)	Debt issuance (t+1)	Debt issuance (t+2)
Covenant violation	-0.102***	-0.113**	-0.063***	-0.100**
	(-2.501)	(-2.590)	(-2.790)	(-1.975)
Covenant violation × Growth Opportunities	0.182	0.042	0.083*	0.080*
	(0.570)	(0.251)	(1.720)	(1.720)
Growth Opportunities	0.020	0.096	-0.006**	-0.004*
	(0.180)	(0.133)	(-2.709)	(-1.820)
Firm controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	21,573	20,805	21,573	20,805
R2 (%)	4.50%	3.60%	12.08%	8.82%
Fitness test (F test)	15.18 (0.000)	11.60 (0.000)	44.26 (0.000)	30.04 (0.000)

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 11. Robustness Analysis. The Effect of Covenant Violations on Investment. Interactions

The table reports the results of the fixed-effect estimations of Investment (led by one quarter in columns 1 and 3 and by two quarters in columns 2 and 4) on Covenant violation, Growth Opportunities, the interaction term Covenant violation× Growth Opportunities and other control variables as shown in specification (4) in the main text. Each explanatory variable is interacted with two dummies variables. On the one hand, Few-growth opportunities that is equal to 1 if the proxy for growth opportunities does not exceed the sample median for the last four consecutive quarters and 0 otherwise. On the other hand, High-growth opportunities that is equal to 1 if the proxy for growth opportunities exceeds the sample median for the last four consecutive quarters and 0 otherwise. In columns 1 and 2 the proxy for growth opportunities is based on the market-book ratio, while in columns 3 and 4 it is based on R&D intensity. Variable definitions appear in Table 1. This is a sample of non-financial firms in the intersection of the Compustat, Sufi's and Dealscan databases during the period from 1996 to 2008, which are bound by a covenant on the current ratio or/and on the (tangible) net worth at some point during the sample period. All specifications include time dummies and standard errors are clustered at a firm level.

VARIABLES	Investment (t+1) (M/B)	Investment (t+2) (M/B)	Investment (t+1) (R&D)	Investment (t+2) (R&D)
Covenant violation×Few-growth Opportunities	-0.008***	-0.009***	-0.009***	-0.007***
	(-4.050)	(-4.874)	(-4.056)	(-3.140)
Covenant violation×High-growth Opportunities	0.008**	0.011**	0.009**	0.004**
	(1.982)	(1.980)	(1.998)	(1.910)
Firm controls	Yes	Yes	Yes	Yes
Observations	21,573	20,805	21,573	20,805
R2 (%)	11.59%	8.80%	16.10%	16,01 %
Fitness test (F test)	37.87 (0.000)	26.87 (0.000)	55.43 (0.000)	53.09 (0.000)

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1