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BANK LINES OF CREDIT AS CONTINGENT LIQUIDITY

A STUDY OF COVENANT VIOLATIONS AND THEIR IMPLICATIONS

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Abstract

We study how the consequences of violations of covenants associated with bank lines of credit to firms vary with the financial health of lenders. Following a violation banks restrict usage of lines of credit by raising spreads, shortening maturities, tightening covenants, or cancelling the line or reducing its size. Even though the frequency of covenant violations is fairly stable during the period 2002-2011, the reaction of banks to violations became significantly more restrictive during the recent crisis. Banks in worse financial health are more likely to restrict access to credit lines following a violation, and violations driven by lender health have capital structure and real implications for firms. This behavior is at the heart of a new *bank liquidity channel*. This channel complements the traditional bank lending channel, which focuses on small financially constrained firms, because credit lines are commonly used by large, high credit quality firms to provide insurance against loss of access to external finance.

Key words: Lines of Credit, Firm Financial Constraints, Bank Financial Health, Covenant Violations
JEL classification: G21, G31, G32, E22, E5.

Non Technical Summary

This paper contributes to our understanding of how distress in the financial sector can lead to spillovers into the real economy, and does so by describing and testing a novel transmission channel based around the role of banks as providers of liquidity to firms through credit lines. Bank lines of credit, also known as loan commitments, credit facilities or revolving credit agreements, are one of the main liquidity management instruments for corporations. A large share of aggregate bank lending to firms arises from credit line drawdowns (around 75% in the U.S. (Demiroglu and James (2011) and 42% in Spain (Jimenez, Lopez and Saurina (2009)). An important feature of bank credit lines is that they contain covenants that allow lenders the discretion to revoke access to further drawdowns in bad states of the world. This opens up the possibility that shocks to bank health transmit to the real economy through the waiver-revocation decision of banks following a covenant violation by one of their borrowers.

We explore empirically the presence of the proposed channel using a combination of datasets including firm and bank balance sheet information, firm-bank linkages, and a self-constructed database of credit line covenant violations and their consequences, covering the majority of U.S. listed firms for the period of 2002-2011. In our sample, around 6% of firms with a line of credit are in violation of a credit line covenant each year, and this frequency did not increase significantly during the recent crisis. Violation frequencies vary significantly across firms, and small unrated firms are around three times more likely to violate a covenant than their large rated counterparts. Less than one in five violations result in a total or partial line cancellations, and instead the most common way for banks to restrict access to credit lines is by tightening the terms of the contract through interest rate increases, covenant tightenings, requirement of assets pledges, and maturity shortenings. Less than one in five violations are fully waived, and most other consequences that are not a full waiver are associated with substantial future decreases in usage and availability.

We show that shocks to bank health transmit to firms in the economy through their waiver-revocation decision. We proxy bank financial health with the lagged change in capital or liquidity as a share of total assets, and concentrate on covenant violation events, to examine whether a bank's reaction to a covenant violation varies with its financial health. Our results show that banks in financial distress are less likely to waive covenant violations, which means that firms that rely on credit lines provided by weak banks may be affected by shocks to bank health. In addition, we show that shocks to bank health matter the most if they coincide with an aggregate shortage of liquidity, such as the recent financial crisis, which makes it difficult for banks and firms to raise financing.

Having shown that bank financial health has an impact on whether a firm retains access to pre-committed credit following a covenant violation, we next study the capital structure implications of the waiver-revocation decision to test the conjecture that firms that have violated

a covenant cannot easily raise external financing. We find that firms that violate a covenant and are not waived suffer a large decrease in drawn credit lines. Many of these firms, however, switch to bond issuance, consistent with our finding that credit line users tend to be large, typically financially unconstrained firms with access to alternative sources of financing. They do not however fully compensate for the lost bank finance, meaning that restriction of access to precommitted credit driven by bank health has important implications for access to external finance. Firms that are waived decrease their usage of bond financing and compensate the loss by drawing down on their lines of credit. This evidence suggests that covenant violation events are associated with an overall increase in the cost of external finance, which only firms that have been waived can avoid suffering. The waiver-revocation decision bears real implications for firms. We find that following a violation, borrowers from financially weaker banks invest less, hire fewer employees and experience lower growth in profitability and sales.

Several aspects distinguish our channel from the standard bank lending channel, although both channels are closely related. The bank lending channel predicts that bank health affects investment and other real variables of credit constrained firms that cannot access other types of financing. However, much of bank lending is done through bank credit lines, and credit lines are more commonly used by large, high credit quality firms, mostly as liquidity insurance, allowing them to access bank financing in states of the world in which their financial performance deteriorates substantially or in which there is severe distress in financial markets. As a result, large, high-credit quality firms may not draw down on credit lines often, but at the same time credit line access can be very important for them in some states of the world. Our channel thus complements the bank lending channel by expanding the set of firms for which bank financial health might be relevant. Another key difference is that precommitted credit is a legal obligation in the absence of covenant violations, and the strength of our channel is thus dependent on the degree of occurrence of violations. The ability of this channel to be a quantitatively relevant amplification mechanism of shocks is yet to be explored. The widespread use of lines of credit, and the large average size of the subset of firms that might suffer from this type of channel, are some of the elements that could lend quantitative relevance to it.

1 Introduction

One of the main liquidity management instruments for firms are lines of credit provided by financial intermediaries, also known as loan commitments or revolving credit facilities. The size of lines of credit is large with respect to the assets of the average firm and so are the associated drawdowns.[1] From the perspective of financial intermediaries, the exposure to drawdowns under committed loans is also very large. At the beginning of the recent crisis, U.S. banks had on average roughly the same size of unused loan commitments as they did outstanding loans (Strahan (2012)). A steady increase in aggregate bank lending to businesses in the U.S. well into the recent crisis was largely due to drawdowns on committed loans (Ivashina and Scharfstein (2010), Mian and Santos (2012), and Strahan (2012)).

Banks do not always have to honor their promises of lending under their corporate lines of credit. Lenders have the legal ability to withhold funds if borrowers do not comply with cash flow, interest rate coverage, liquidity, leverage or other covenants that are typically written into the line of credit contracts, or if borrowers violate "borrowing base" requirements that limit borrowings to a certain percentage of collateral, or by invoking a more discretionary material adverse change clause.[2] There is a lack of consensus in the empirical literature about how committed lines of credit are. Some papers support the view that lines of credit offer contingent insurance because firms with poor operating performance are less likely to have access to the precommitted credit (Sufi (2009), Demiroglu and James (2011), James, and Kizilaslan (2009)), while others suggest that lines of credit provide a high degree of liquidity insurance (Barakova and Parthasarathy (2012) and Berrospide, Meisenzahl, and Sullivan (2012)).

The aim of this paper is to provide evidence on the degree of commitment in lines of credit, and relate it to a novel channel through which distress in the financial sector might be transmitted to the real economy via the use of credit lines. We refer to this channel as the *bank liquidity channel*. The standard bank lending channel predicts that bank health affects investment and other real variables of financially constrained firms, whose only source of finance is bank credit. Our findings show that distress in the financial sector can also affect large, high-credit quality firms because of their reliance on credit lines for liquidity insurance. For these firms, access to credit lines is particularly important when their financial performance deteriorates. Liquidity insurance may fall through if access to the credit line is restricted following the violation of a covenant. For banks, it is a discretionary choice whether to waive the covenant, or restrict a firm from accessing the credit line. This raises the question of how reliable lines of credit are as a source of liquidity for firms, and to what extent access to the line, following a violation, depends on the financial health of lenders.

[1] Firms in our sample have on average an amount of undrawn credit under credit line agreements equivalent to 10.6% of assets net of cash holdings. The share of aggregate bank lending to firms that arises from credit line drawdowns ranges from 42% in Spain (Jimenez, Lopez and Saurina (2009)) to around 75% in the U.S. (Demiroglu and James (2011)).

[2] See Chava and Roberts (2008) and Demiroglu and James (2009).

To examine these questions we employ a combination of datasets for the period 2002-2011 on the Compustat sample, including a hand-collected database of consequences of covenant violations, the use of credit lines from Capital IQ, and bank financial health measures obtained from the combination of LPC Dealscan and Call Reports. For the set of firms with a credit line, we can estimate the exposure to each lender, and accordingly assess the average financial health of a firm's lenders.

The empirical strategy is two-fold. First, we concentrate on covenant violations, as these represent the standard motive for why firms lose access to credit lines.[3] Second, we examine whether a bank's reaction to a covenant violation varies with its financial health. We want to assess if the waiver-revocation decision that follows a violation depends on the financial health of lenders. Shocks to bank health should matter the most if they coincide with an aggregate shortage of liquidity which makes it difficult for banks and firms to raise new finance.

We find that each year in excess of 6% of firms with a line of credit violate a credit line covenant. This frequency does not vary significantly across time, including during the crisis. Violation frequencies vary significantly across firms: small unrated firms are around three times more likely to violate a covenant than large rated ones. Less than one in five violations are fully waived, and also less than one in five result in total or partial line cancellations. The rest of the violations bear other consequences, such as interest rate increases, covenant tightenings, assets pledges, and maturity shortenings. We find that most consequences that are not a full waiver or a revocation are associated with substantial future decreases in usage and availability; in other words, the most common way for banks to restrict access to credit lines is not a formal revocation, but rather a tightening of the terms of the contract.

Next, we explore whether bank financial health matters for the outcomes of credit line covenant violations. We find that banks in financial distress are less likely to waive covenants following violations and thus are more likely to withhold funds under pre-committed lines of credit, controlling for a rich set of firm and bank characteristics. Our results show that these effects are particularly strong during the recent financial crisis. A two-standard deviation increase in the change in a firm's lenders' average capital ratio (liquidity ratio) during the recent financial crisis is associated at the mean with an increase of around 21% (14%) in the likelihood of having a covenant violation waived. This evidence suggests that lines of credit are a source of liquidity risk for banks because they withhold funds when they face a worsening of their own liquidity risk or financing conditions.

Having shown that bank financial health has an impact on whether a firm retains access to pre-committed credit following a covenant violation, we next study the capital structure implications of the waiver-revocation decision to test the conjecture that firms that have violated

[3] There are two other scenarios that can give rise to restrictions of precommitted credit lines. One is the bankruptcy of the lender providing the line of credit. The other is the possibility that a bank invokes a Material Adverse Change (Mac) clause. Both are rare events. In particular, the latter is typically avoided by banks as it generally leads to costly litigation.

a covenant cannot easily raise external financing. We find that firms that violate a covenant and are not waived suffer a large decrease in drawn credit lines. Instead, for firms that are waived, drawn credit lines increase in the year after the violation. In terms of economic significance, while a covenant violation that is not waived is associated with a fall in the ratio of drawn credit lines to total assets of around 3% of assets, a firm whose covenants are waived following a violation experiences an increase equivalent to around 1% of assets. This evidence suggests that firms become relatively more bank-dependent following a covenant violation if they are waived. We also investigate which financing flows are responsible for the observed changes in capital structure, and find that firms that violate covenants and lose access to lines of credit switch to bond issuance but do not fully compensate for the lost bank finance. On the other hand, firms that violate covenants but retain access to credit lines decrease their usage of bond financing and compensate the loss by drawing down on their lines of credit. The waiver-revocation decision also bears real implications for firms. We find that following a violation, borrowers from financially weaker banks invest less, hire fewer employees and experience lower growth in profitability and sales.

On the whole, our analysis suggests that banks consider lines of credit to be a source of liquidity risk and actively restrict usage of lines when their own financial condition deteriorates. This behavior is at the root of a novel mechanism through which the health of the financial sector affects the ability of firms to obtain external finance precisely in the states in which they need it the most, and in turn has real implications in terms of capital expenditures, hiring activity, and overall performance of firms. By working through the provision of liquidity via credit lines, which are primarily used by medium and large firms with a solid credit worthiness, this novel mechanism complements existing mechanisms, such as the bank lending channel, which operate mainly through financially constrained, bank-dependent firms.

We start in the next section by discussing the related literature and describing the theoretical work that supports our empirical predictions. Section 3 describes our data construction process, and descriptive statistics are provided in Section 4. Section 5 presents our empirical analysis relating bank health to covenant violation outcomes. Section 6 discusses the capital structure implications of covenant violations and lenders' financial health, and Section 7 presents an analysis of the real implications of covenant violations and the waiver-revocation decision. Section 8 concludes the paper.

2 Related Literature and Theoretical Background for Empirical Predictions

2.1 Related Literature

We are not the first to study the degree of commitment in lines of credit, and several papers have explored this question from the perspective of firms. Sufi (2009) scans 10-K filings and documents whether there has been a credit line covenant violation in a given year for a sample of 300 firms for the period 1996-2003. For those firms he also collects information on the limit and availability of lines of credit. He finds that covenant violations are associated with a loss of access to lines of credit on average of around 15-25% of the total or the unused portion of lines of credit. Barakova and Parthasarathy (2012), using a regulatory dataset of large syndicated credit lines (with size larger than $20m and more than 2 banks in the syndicate) that tracks each loan limit and usage year after year for 13,000 private and public firms from 1997 to 2009, arrive at a similar figure for the loss of access following a covenant violation. They also document that average drawdowns are around 30% lower. Despite the similarity of results, both papers differ in their interpretation of them, the former arguing that they suggest that lines of credit are contingent, while the latter argues they are consistent with a high degree of commitment in credit lines. Finally, Berrospide, Meisenzahl, and Sullivan (2012), using hand-collected data from 10-Ks and 10-Qs for 600 firms for the years 2006-2011, find that firms with high leverage or low profits when entering the crisis (who they argue are more likely to have violated a covenant during the crisis) did not see their credit limits go down, so they conclude that covenant violations do not typically result in credit line cancellations. We contribute to these papers in several important ways. First, while they do not report any other reaction of lenders to covenant violations other than explicit limit cuts, we explore interest rate increases, maturity shortenings, covenant tightening, and increased asset pledges, and show that they all lead to comparable reductions in usage as explicit limit cuts. Missing this channel for restriction of access is potentially important: in our data, less than 20% of violations face some explicit limit cut, while more than 60% face alternative consequences that significantly restrict access. Second, we use a rich database that covers the universe of Compustat firms with credit line availability and usage data for all firms. Third, and also importantly, we relate the restriction of access and usage of lines of credit to bank financial health.

Some papers have explored this question from the lenders' perspective. Berger and Udell (1992) showed that in periods of credit market stress the ratio of drawdowns to new loans does not change significantly, which suggests that, to the extent that banks' liquidity risk increases in those episodes and they would want to withhold precommitted credit, they are either unable or unwilling to do it. Huang (2010) shows that during the crisis corporate borrowers served by more distressed banks took out fewer loans under their precommitted lines of credit. A problem

with his analysis, which the author discusses, is that it is unclear if the effects are demand or supply driven, given that there is very little information on borrowers and no information on credit lines with no drawdowns. Our analysis improves on this dimension in three important ways. We have access to a rich set of borrower characteristics, we directly observe bank choices such as waivers or revocations in the context of covenant violations, and we observe all lines of credit, whether they are drawn or not. In analyzing bank health, he focuses on recent stock performance and non-performing loan ratios only, while we also consider deposit ratios, liquidity ratios, capital ratios, bank size, and exposure to ABCP conduits prior to the crisis. The first two, in particular, are key to address whether bank financial health influences the degree of commitment in lines of credit, as several theoretical and empirical papers have suggested deposit issuance, liquidity holdings and provision of liquidity under lines of credit are strongly linked. Also, our study covers the crisis period and a long period before the crisis, and shows that the external validity of results obtained during the crisis might be limited.

Several papers have looked at the consequence of covenant violations in debt instruments in general. Roberts and Sufi (2009) examine the responses of creditors to covenant violations of any debt instrument using 10-K data. They find that if creditors do not waive covenants following a violation, firms issue less debt subsequently, and that creditors are less likely to take actions when firms have greater credit quality. They also capture some specific lender reactions to covenant violations, in particular limit cuts, full waivers, interest rate increases, and additional collateral requirements. Chava and Roberts (2008) and Nini, Smith and Sufi (2010) find a decline in acquisitions and investment spending after a covenant violation. Our contribution to this literature is to analyze the implication of covenant violations for borrowers' ability to access existing committed credit, and to relate these effects to bank financial health.

Our work is related to the literature that studies whether the financial health of banks affects its borrowers. Bernanke and Blinder (1992) find that a tightening of monetary policy leads to a decline in aggregate bank lending activity, and later studies have found that this impact is stronger for small, less liquid and more leveraged banks (Kashyap and Stein (2000), Kishan and Opiela (2000), and Jimenez, Ongena, Peydró and Saurina (2012)), and for banks that are not affiliated with multibank holding companies (Ashcraft (2006)). Abildgren, Buchholst, Qureshi, and Staghøj (2011) study banking crises in Denmark over the last two centuries, and show that recessions associated with banking crises to be particularly deep and protracted, although they do not find evidence that suggests that in the most recent financial crisis bank financial health had a strong causal effect on firm performance in Denmark. Other work has found that shocks to bank capital, such as foreign sector shocks, political events or government policy changes, affect investment spending, capital structure or performance of their borrowers significantly (Peek and Rosengren (2000), Kang and Stulz (2000), Khwaja and Mian (2008), Paravisini (2008), and Chava and Purnanandam (2011)).[4]

[4] Availability of bank credit has also been shown to affect firms' performance indirectly by impacting the ability

The notion that shocks to bank health should affect mostly small, low credit quality firms arise both from theory and empirical evidence. The literature on "bank specialness" (e.g., Fama (1985), Houston and James (1996), Holmstrom and Tirole (1997)) argues that banks facilitate firm financing by mitigating agency and information problems which are more severe for firms with low credit quality. Empirically, that bank lending appears to be a more important source of financing for low credit-quality firms. Rauh and Sufi (2010), for example, find that secured bank debt is a much more important source of debt for firms with low credit-quality. Bharath (2002) finds that the relative cost of bank versus market debt (e.g., bonds) vary systematically with the firm's credit quality - low credit quality firms face lower spreads when borrowing from banks, while high credit quality firms face lower spreads when borrowing from the bond market. Ippolito, Ozdagli and Perez (2013) report results that suggest that bank debt (as a fraction of assets) is higher for smaller, unrated firms.

Nevertheless, the cross-sectional distribution of the usage of credit lines for liquidity management suggests a very different picture. Credit lines tend to be used mostly by profitable, low risk, high credit quality firms, while smaller, riskier, lower credit-quality firms rely mostly on cash (see Sufi (2009) and Acharya, Almeida, Ippolito and Perez (2013)). Thus, the link between bank health and firm outcomes that we characterize in this paper complements the standard bank lending channel. By operating through credit line contracts, it affects primarily large, high credit quality firms.

2.2 Theoretical Background for Empirical Predictions

There are not many theoretical papers addressing the determinants of the degree of commitment in lines of credit, and in fact most of the theory papers on lines of credit assume that they are fully committed (Boot, Thakor, and Udell (1987), Holmstrom and Tirole (1998), DeMarzo and Sannikov (2006)).

An early exception is Boot, Greenbaum, and Thakor (1993), who formalize the idea that when a bank honors a credit line promise, even when it is costly for it to do it, it is effectively investing in reputation, which can have value for a bank. Their analysis predicts that banks with stronger balance sheets will be more likely to signal their type and improve their reputational capital by honoring the loan commitments. Diamond and Rajan (2000) present a capital structure theory for banks in which capital ratios affect a lender's bargaining power with respect to its borrowers. In the context of a firm that has a line of credit and has violated a covenant, their theory predicts that lower capital ratios increase the likelihood that the bank will restrict access to precommitted credit when the firm has low credit quality, but may increase it when the firm has a high credit quality. Given that firms with lower credit quality are more likely

of borrowers to extend trade credit to their customers. Garcia-Appendini and Montoriol-Garriga (2013) show that firms with access to lines of credit increase the amount of trade credit provided to their clients, especially when clients suffer from shortages of liquidity.

to be in breach of a financial covenant, their theory would predict that, on average, firms with lower capital ratios would waive a lower share of covenant violations. Both theories thus provide the empirical prediction that bank financial heath should be negatively associated with bank restriction of access to lines of credit following a covenant violation. But they also provide reasons (such as reputational capital concerns) why such effect could be weak.

There is support in the theoretical literature for a link between deposit-taking and credit line issuance, following the argument that there are diversification synergies across deposits and credit lines because the liquidity demands from depositors and borrowers are not perfectly correlated and as a result banks can reduce the total liquidity needed to satisfy both types of customers (Kashyap, Rajan and Stein (2002)). In addition, it could be that deposits are a particular stable source of financing for line of credit drawdowns. Gatev and Strahan (2006) for example suggest that both demands might not be strongly correlated because when systemic shocks that lead firms to draw on their credit lines occur, those same shocks may also result in a flight to safety by savers that increases bank deposits.

Finally, several theories have been put forward to explain why financing frictions that affect banks may influence the transmission of aggregate shocks or monetary policy actions to the real economy. In these theories, aggregate shocks affect banks' external finance premium leading to an additional response in the supply of intermediated credit (Bernanke and Blinder (1988), Bernanke and Gertler (1995), Stein (1998),Bolton and Freixas (2006), Gertler and Kiyotaki (2011)).

3 Data

3.1 Credit Line Covenants, Violations and their Consequences

We collect data on credit line covenant violations and the responses of banks granting the credit lines to the violations for U.S. stock exchange listed firms between 2002 and 2011, and we do so using a detailed text search algorithm. To obtain the data we focus on firms' filings with the Securities and Exchange Commission (SEC), and focus on annual filings (10-K filings), given that our firm balance sheet data is annual. In these filings firms are required to disclose the event of a covenant violation and also to discuss the actual or likely consequences. More specifically, the SEC Interpretive Release No. 33-8350 establishes that "...companies that are, or are reasonably likely to be, in breach of such covenants must disclose material information about that breach and analyze the impact on the company if material..." and that "...companies should consider the impact of debt covenants on their ability to undertake additional debt or equity financing." Unfortunately, the SEC does not require firms to disclose why they are in violation of covenants, and even though firms occasionally report which specific covenants they have violated, there could be important biases in the reporting of this variable, so we choose not to record that information.

The information we collect is the violation of a covenant attached to a line of credit, and the precise consequence of that violation.[5] A credit line in breach of a covenant violation can generate three broad types of responses from banks. It can be *fully waived*, so that there is absolutely no consequence for the borrower and the credit line contract preserves its original terms and conditions, it can be *fully cancelled*, in which case the firm is explicitly restricted from any further access to funds under that line of credit, or it can suffer one or more of a number of alterations to the existing terms and conditions of the credit line contract.[6] We classify these consequences into five categories. *Interest rate increases* happen if the bank reacts by raising the spread over the reference rate on borrowings under the line of credit. A bank can reduce the limit on the line of credit partially without fully revoking the line, and we record this event as a *partial revocation*. It can also adjust the existing covenants to make them stricter, or introduce new ones, resulting in a *covenant tightening*. The response might involve raising the borrowing base requirements, by which a firm can only borrow up to a fraction of the value of certain assets, typically receivables and inventories, or pledging more assets or cash, or requiring capital injections. We record all of these as *asset pledge requirements*. Finally, there might be a *maturity shortening* of the line of credit or of the drawn amounts. We create a residual category, *other*, which includes cases in which the firm is still waiting for a decision from the bank, which could also involve a negotiation between the firm and the bank, and responses which cannot be categorized in any of these buckets. A detailed description of the text search algorithm is provided in the appendix.

Given that covenant violations can be anticipated, it is plausible that the firm and the bank might engage in a renegotiation of contract terms prior to a violation. This is strongly supported by evidence in Roberts and Sufi (2009) who show that only 18% of renegotiations in debt contracts occur following a covenant violation. For this purpose, we also collect all of the above events irrespective of whether there has been a violation. More specifically, we search for any instance in which the terms of a line of credit have been renegotiated with *negative* results for the borrower. We ignore renegotiations that lead to improvements in conditions, as one would expect that the approach of a violation would be unlikely to generate such a result.[7] Of course, the only consequence which we do not record here are waivers, as they cannot occur

[5] Nini, Smith, and Sufi (2010) conduct a similar text search that produces a dummy variable indicating the occurrence of a covenant violation. They do so for any type of debt contract and cannot specify if it is associated to a bond, a term loan, a line of credit, or any other type of debt contract. Our database differs from theirs in that we specifically collect credit line covenant violations, in that we also collect detailed information about the consequence for the firm of the violation, and in that we cover the recent financial crisis.

[6] From a legal point of view, any consequence of a covenant violation that is not a full cancellation of the line of credit can be considered a 'waiver' because the bank does not make use of its right to revoke the line. In our classification we consider as *full waivers* those cases in which there has been no reaction at all from the bank, and we will introduce a definition of *waiver* in Section 3 distinct from the legal concept.

[7] There is one exception, and that is that a bank may relax a covenant when it anticipates a firm might violate it in the future, when that firm has a high creditworthiness, in the context of relationship lending. To the extent that this is a frequent event, our estimates of waiver frequencies (broadly understood to include waivers in anticipation of violations) would be slightly biased downwards.

outside of a formal covenant violation.

Credit line contracts can feature many types of covenants, including financial covenants, dividend restrictions, and prepayment requirements (sweeps). Financial covenants are restrictions on the level of specific accounting variables, and we collect data on the types of financial covenants credit line contracts feature for the firms of our sample from the Loan Pricing Corporation (LPC)'s Dealscan database, a database which is described in more detail in section 3.3. Unfortunately, our covenant violation database cannot capture which covenants are being violated because firms are not obliged to disclose this information in their 10-K filings.

3.2 Firm-level data

We obtain firm-level data from the Capital IQ (CIQ) and Compustat databases for the period of 2002-2011. We restrict ourselves to U.S. firms covered on both databases and traded on AMEX, NASDAQ, or NYSE. We remove utilities (SIC codes 4900-4999) and financial firms (SIC codes 6000-6999). We remove firm-years with negative revenues, and negative or missing assets, obtaining in the end a sample of 32,481 firm-years involving 4,741 unique firms.

CIQ compiles detailed information on capital structure and debt structure by going through financial footnotes contained in firms' 10-K Securities and Exchange Commission (SEC) filings. Most importantly for our purposes, firms provide detailed information on the drawn and undrawn portions of their credit lines in the liquidity and capital resources section under the management discussion, or in the financial footnotes explaining debt obligations, and CIQ compiles this data. 10-K filings typically also contain information on pricing and maturity of credit lines, but this data is not collected by CIQ. Following Sufi (2009) we construct a measure of the amount of credit lines expressed as a percentage of net book assets (Compustat item 6 - item 1). We compute the ratio of cash and investments (item 1) over total book net assets (item 6 - item 1). Following standard procedures, all variables are winsorized at the 0.5% in both tails of the distribution.

3.3 Firm-Lender Relationships and Bank Financial Health Data

We obtain data for firm-lender relationships and exposures from the Loan Pricing Corporation (LPC)'s Dealscan database. Our extract of the database contains detailed information on loans made by financial institutions (including commercial banks, investment banks, insurance companies and pension funds) to U.S. corporations during the period 1981 to 2011. Most of the loans captured by Dealscan are syndicated, although there are some sole-lender loans as well. Importantly, LPC identifies all of the lenders in each syndicate. LPC collects its data from multiple types of SEC filings, from media releases, and from direct contact with borrowers and lenders. It is important to note that due to data limitations we cannot observe which bank is calling the covenant violation, which means that whenever we relate firm-bank relationship or

exposure measures we are doing it with some noise and under certain assumptions.

The share of all corporate lending in the U.S. covered by LPC is large, although clearly biased towards larger loans. Carey and Hrycray (1999) estimated that Dealscan covered between 50% and 75% of the value of all commercial loans in the U.S. during the early 1990s, and Chava and Roberts (2008) suggest that this share has been increasing over time.

For the purpose of addressing the question of how bank financial health affects covenant violation outcomes, we need to provide a measure of a firm's exposure to different banks weighted by the amount of lending originated by each bank to that firm in recent years, which should capture with a high degree of precision the identity and weight of the lenders of the currently outstanding bank loans a firm has in its balance sheet. LPC Dealscan reports the lending allocations for banks in a syndicate, but only does so for around a third of observations. We thus estimate a simple model of bank allocations that only depends on (i) the status of the bank as lead lender or participant, (ii) the number of lead banks, and (iii) the number of participant banks. We consider a lender to be a lead lender when its role contains any of the following terms: "agent", "arranger", "lead" or "manager". Otherwise the bank is a participant. Once we have estimated the model, and for consistency, we apply the estimates to all observations, including the ones for which we had data.[8]

Next, we calculate for each firm and year the share that each bank has in all of the lending done in the previous 5 years (not including the current year), and this share is calculated using the estimated allocations and the total loan amounts. If we cannot find the relevant financial health indicator for the bank, we substitute it by its nearest parent bank with available data. If we cannot find a parent bank with available data, we eliminate that bank and adjust, for each firm-year, the shares of the other banks proportionally so that they add up to 100%.

The exposure of each firm to its lenders' financial health is calculated the average financial health ratio of the banks with which a firm has borrowed from in the previous 5 years, weighted by the share lent by each bank during those years. More specifically, we multiply the exposure variable times the financial health of the bank, to construct a firm-year variable that captures the weighted average health of the banks a firm is borrowing from. We extract bank financial information from the quarterly FFIEC Call Reports, which all regulated U.S. commercial banks are required to file, and also directly from the filings of foreign banks. In the case of the U.S., because some banks are owned by a common holding company, we aggregate the bank-level data for banks with common ownership by summing Call Report data at the holding company level for multibank holding companies (see Cornetta, McNuttb, Strahan, and Tehranian (2011)). Our bank level financial health proxies and controls are constructed as follows. The Bank Deposit Ratio is calculated as Total Deposits (Call Report item RCFD2200)

[8] The model fit in the sample for which we do have lending allocations is good. The correlation between estimated and actual allocations is 0.95 and highly significant, and the R^2 of a regression explaining the allocation of lead lenders using the variables we use (number of leads and number of participant banks) is 34%.

over Total Assets (RCFD2170). The Bank Liquidity Ratio variable is calculated as liquid assets (cash (RCFD0010), federal funds sold (RCONB987 + RCFDB989), and securities excluding MBS/ABS (RCFD1754+RCFD1773 - (RCFD8500 + RCFD8504 + RCFDC026 + RCFD8503 + RCFD8507 + RCFDC027)), divided by total assets. The Bank Capital Ratio variable is calculated as the book value of capital (RCFD3210) divided by total assets. The nonperforming loans ratio is defined as loans past due 90 days or more and nonaccruals (RCFD1407 + RCFD1403) divided by total loans (RCFD1400). Finally, lender size is calculated as total assets.

4 Credit Line Usage, Covenants, and Covenant Violations and Their Consequences

Table 1 provides univariate evidence on the differences in firm characteristics across the samples of firms with and without a line of credit. In column 1 we report mean and median values for the entire sample, while column 2 and 3 contain values for the sub-samples of firms with and without a line of credit, respectively. Table 1 allows for a broad comparison of firms with and without a line of credit. The main picture that emerges from the table is that the sample of firms with a line of credit is significantly different from the rest along all the dimensions reported in the table. Firms with a line of credit are more profitable, more leveraged, are more likely to pay dividends, have lower beta, and are more likely to be rated. These firms also invest more in working capital and capex, but have lower R&D expenses. Overall, these characteristics suggest that firms with a line of credit are more established, mature firms with fewer growth opportunities and more stable cash flows.

TABLE 1 ABOUT HERE

Credit line contracts can feature many types of covenants, including financial covenants, dividend restrictions, and prepayment requirements (sweeps). Financial covenants are restrictions on the level of specific accounting variables, and Table 2 presents a list of financial covenants found in the loans in our sample, with information on their frequency and values. The most common financial covenants in our sample have to do with leverage restrictions (such as the maximum debt to tangible net worth and leverage ratios), with interest coverage limitations (minimum fixed charge coverage and interest coverage ratios), and with capitalization and collateral requirements (minimum net worth and tangible net worth restrictions), in line with the evidence in Chava and Roberts (2008). The frequency of non-financial covenants is discussed in Bradley and Roberts (2004). They find that 85% of loans in their sample contain dividend restrictions, which specify the maximum amount, frequency and recipients of the dividends. They also find that around half of the loans of their sample contain asset, debt or equity sweeps, which

establish the amount of the lent amount that needs to be repaid if the firm liquidates assets, issues debt, or issues equity, above a pre-specified level.

TABLE 2 ABOUT HERE

Table 3 provides some summary statistics related to covenant violations and their consequences. Even though we collect data for every firm that files annual filings with the SEC, we focus in most of the analysis on those firms for which we can also provide balance sheet data from Compustat and Capital IQ. In that sample, containing 37,022 firm-year observations, we observe an annual frequency of credit line covenant violations of 6.18%, conditional on having outstanding credit under a line of credit at the end of the previous fiscal year. This frequency is more than three times higher for small firms (with book assets smaller than $100 m., with a frequency of 8.44%) than for large firms (with book assets larger than $2.5 bn., with a frequency of 2.74%). Unrated firms (6.93%) are more than twice as likely to violate a covenant as rated ones (3.11%). Unfortunately, our covenant violation database cannot capture which covenants are being violated as firms do not always disclose this information.

TABLE 3 ABOUT HERE

In our database we observe 2,288 instances of a covenant violation and in Table 3 we also display the frequency of each consequence following a covenant violation. Close to 17% of violations are fully waived by banks, but surprisingly waivers are much more frequent for small and unrated firms.[9] Whereas firms larger than $250 m. enjoy full waiver rates of around 11%, firms below that size face waiver rates above 17%. Similarly, while rated firms enjoy a full waiver on only 8.62% of the cases on average, unrated firms do so on 17.92% of the cases.[10]

The most common consequences of a violation other than waivers are covenant adjustments (42.31% of the cases), interest rate increases (23.38%) and full or partial revocations (18.14%). It is important to stress that around 65% of covenant violations generate reactions from banks

[9] Roberts and Sufi (2009) report a much higher frequency of waivers than us (63%). The large gap could be due to the following reasons. Our data includes the crisis (their sample is 1996-2005, ours 2002-2011), during which waivers fell substantially. In our data, the frequency was 21% in 2003-2007, 12% in 2008-2009, and 18% in 2010. They only look at three consequences (interest rate increase, partial and full revocation, and additional collateral), and they consider the residual as waivers, while we specifically look at waivers. We also record two other important consequences, covenant tightening (turns out to be the most frequent (34%) and the one that has most important consequences), and maturity shortenings, as well as the 'others' category. We have a residual category "others" in which we include cases in negotiation (this is somewhat frequent), and cases that could not clearly be classified into any of the buckets. The frequency of this event is high, 27%. Some of these may be waivers, expressed in a non-standard way. But we took the stand not to classify them as waivers. Waivers are relatively easy to pick up as they are typically expressed in a very clear and homogeneous way. Importantly, they look at covenants for all debt types (term loans, credit lines, and corporate bonds). Waiver frequency might be different for term loans and corporate bonds relative to LCs. Finally, the SEC introduced a new rule in 2003 specifying the reporting requirements concerning covenant violations and their consequences, which may bias their early data (they acknowledge this in the paper).

[10] A plausible explanation for this evidence could be that firm-lender relationships, which enable firms to enjoy a higher rate of waivers following violations, are more relevant for smaller, unrated firms, although we do not pursue this question in this paper.

which are *not* full waivers or limit cuts. This point is important because many existing empirical papers measure the degree of commitment in lines of credit by evaluating the reductions in limits following covenant violations or a deterioration in a firm's performance, but this evidence suggests that the bulk of the cases in which there is some reaction from a bank, such reaction is not a limit cut. We will next show that these non-revocation reactions are in fact associated with similar decreases in subsequent usage of lines of credit, suggesting that banks can effectively restrict access to line of credit indirectly, by means of alternative measures such as covenant tightenings or interest rate increases.

In Tables 4 and 5 we explore this further, and study how credit line availability and usage is affected following a covenant violation, and also in the case of each possible consequence. In Table 4 we study the effects of violations, regardless of the consequence, and show that they are preceded by heavy drawdowns by the violating firm, especially if the firm is unrated, and followed by a strong reduction in usage, with a lag of one year. We observe that undrawn credit availability in the context of a covenant violation is associated with decreases on the year of the violation and in the year after as well. The effects on undrawn credit have to always be interpreted with caution, however, as a reduction in available credit might come about due to usage or due to a limit cut by the bank. For this reason, line usage is a better indicator of the degree of restriction in usage exerted by a bank.

TABLE 4 ABOUT HERE

In Table 5 we associate each of the possible consequences of a covenant violation to changes in available undrawn credit and to usage of lines of credit, in the year before the violation, on the year of the violation, and on the year after the violation. Several patterns are worth noting. Drawdowns on the year of the violation do not depend in a significant way on the consequence of the violation, but on the year after they are strongly negatively associated with certain consequences such as revocations, maturity shortenings, and asset pledges. Non-waivers and interest rate increases are also associated, with a lag of one year, with lower drawdowns (or larger drawn credit repayments), but the difference is not statistically significant. Available undrawn credit is not strongly associated with any consequence, other than revocations, which suggests that using variations in credit line limits as a proxy of the degree of restriction of access to lines of credit is not desirable. This evidence instead suggests is that banks are able to indirectly restrict credit line drawdowns by imposing stricter covenants, raising interest rates, or increasing borrowing base requirements, all of which may make drawdowns impossible or at least unattractive to firms, but that do not show up in the data as revocations. Based on this evidence, and for the purposes of the analysis in sections 5 to 7 we construct a dummy variable *waiver* which indicates whether the lender has effectively restricted access to the line of credit or not. Waiver takes the value 1 if the covenant was fully waived or if the only consequence

was a covenant adjustment. It takes the value 0 in the case in which the violation resulted in at least one of the following consequences: full or partial revocation, maturity shortening, interest rate increase, or increased asset pledge.

TABLE 5 ABOUT HERE

In Figure 1 we present the evolution through time of covenant violations and their consequences. The frequency of covenant violations has been pretty stable during the 2002-2010 period, with a very small increase during 2008 and 2009. The frequency of waivers and revocations, however, displays a much more volatile pattern. Waivers were low in the initial periods (2002 and 2003), increases substantially during 2004-2005, and decreased substantially afterwards, particularly during 2008-2010 when they were about half as likely as in the 2004-2005 peak (22.37% in 2005 versus 10.97% and 10.90% in 2008 and 2009 respectively). A similar but inverted pattern is present for revocations. The revocation rate in 2009 was 21.47% while it was only 12.40% in 2006. Taken together, this evidence suggests that while violation frequency is pretty stable through time, banks' reactions to these violations vary significantly with the business cycle and the state of financial markets.

FIGURE 1 ABOUT HERE

5 Bank Financial Health and Degree of Commitment in Credit Lines

In this section we explore whether the financial health of financial intermediaries affects their decision to restrict access to credit under available lines of credit following a covenant violation. This decision is captured by the variable *waiver*, whose construction is explained in Section 4. We restrict ourselves to the sample of firms that have violated a covenant in period t, and study how their lenders' financial health, measured in $t-1$, affects whether the covenants generate a restriction of access to undrawn credit or not. Our base specification for this analysis is as follows:

$$\begin{aligned} Waiver_{i,t} = \alpha_0 + \alpha_1 BankHealth_{i,t-1} + \alpha_2 FirmControls_{i,t-1} \\ +\alpha_3 BankControls_{i,t-1} + \varepsilon_{i,t}, \quad \text{if } violation = 1 \end{aligned} \tag{1}$$

where the subscript i refers to each firm, and $BankHealth_{i,t}$ is constructed using two different measures, which are the changes in $t-1$ in the liquidity ratios and the capital ratios of lenders. The set of firm level controls includes size, presence of a credit rating, profitability, the market-to-book ratio, and cash flow volatility. The set of bank level controls includes the capital ratio, size, the deposit ratio, the wholesale ratio, the liquidity ratio, and the nonperforming loans

ratio.

The choice of bank health variables responds to existing evidence and theory from the literatures studying the bank lending channel of monetary policy. Kashyap and Stein (2000), Kishan and Opiela (2000) and Jimenez, Ongena, Peydró and Saurina (2012) find that liquid and well-capitalized banks display a lower sensitivity of their lending supply to monetary policy shocks. This suggests that these two measures might be relevant proxies for the degree of financing frictions facing banks, and thus of their ability and willingness to allow for drawdowns under loan commitments that can be legally withheld because there has been a covenant violation. We choose to measure bank financial health using changes rather than levels because the latter might expose us to two important sources of endogeneity biases due to selection and omitted variables bias. On the one hand, it is likely that there is some endogenous matching of banks to firms, possibly driven by bank health. On the other, contractual terms of the credit lines might also be endogenous and driven by bank health, even if matching to borrowers was exogenous. Using changes might expose us however to reverse causality because a worsening of borrowers' risk causes a worsening of bank health, which would introduce a positive bias in the relationship between bank health and the waiver decision. To deal partially with this concern we use lagged values of our financial health measures.

Our prediction is that financially healthy banks are more likely than weak banks to waive covenant violations ($\alpha_1 > 0$). We also conjecture that the strength of this effect is likely to be stronger during the recent financial crisis when compared to the pre-crisis period, and for this reason we run this regression separately on subsamples of crisis period and pre-crisis period observations. The crisis period is defined to include fiscal years 2007, 2008 and 2009, excluding firm-year observations of firms filing in June or July 2007. The pre-crisis period is defined to include fiscal years 2004, 2005 and 2006, and firm-year observations of firms filing in June or July 2007.

TABLE 6 ABOUT HERE

The results from running the Probit regression in 1 are displayed in Table 6, and are consistent with our prediction. Firms that have violated a covenant are more likely to get waived if their bank suffered an increase in its capital or liquidity ratio in the previous year, controlling for relevant firm and bank characteristics. This effect is only present during the crisis, and the difference between crisis and pre-crisis periods is statistically significant. The effects are economically stronger when we focus on firms that have access to substantial amounts of available lines of credit, suggesting that financially weak banks are even more reluctant to allow access to precommitted credit when firms have large credit lines. To get an idea of magnitudes, a two-standard deviation increase in the change in the capital ratio is associated at the mean with an increase of around 21% (=10.83*0.0192) in the likelihood of being waived. This effect increases

to around 27% (=14.26*0.0192) for firms with available credit lines above 10% of total assets. Similar magnitudes (14% and 25%) are obtained when focusing on changes in bank liquidity ratios.

The information on which covenants are being violated is potentially very relevant for how a bank's financial health affects its decision to waive or call a covenant violation. However, one aspect that is crucial for our story and is common to most (if not all) types of covenant violations is that they legally transfer the right to the lender to cancel the line of credit. A bank in financial distress which wishes to decrease its exposure to liquidity demands by its credit line customers needs the legal ability to do so, and the majority of covenant violations provide it. The type of covenant that is violated is of course still very relevant, although arguably more so for credit line cancellation decisions by financially healthy banks, which are based entirely on the firm's financial condition. A cause for concern in terms of possible biases in our estimation is that the types of covenants violated and bank financial health changes are related. This could be because banks' preference for certain types of covenants is related to their financial health, or because a common factor drives bank health and the violation of certain types of covenants. We partly address these concerns by measuring bank health as lagged changes, and by controlling for a large set of bank characteristics. A key area for future research is to expand the analysis to include as much information as possible on the types of covenants being violated.

6 Capital Structure Implications of Covenant Violations

Having shown that bank financial health has an impact on whether a firm retains access to precommitted credit following a covenant violation, we next explore the capital structure implications of the waiver decision. Our prediction is that firms that have violated a covenant cannot raise much financing, except if covenants are waived and they retained some access to their credit lines. If this is proven to be so, it carries the implication that firms become effectively bank-dependent following a covenant violation.

We explore this prediction using two tests. First, we test whether firms that violate a covenant during the crisis and are waived see drawn credit lines increase in importance as a source of external finance. We do so by testing whether drawn credit lines as a share of total bank debt, total debt, or total assets, increases in the year after a covenant violation if the covenants are waived by the lenders, and also by testing if the difference between the change in the importance of drawn credit lines between waived and non-waived firms is positive and significant. We do so by running the following regression:

$$\begin{aligned}\Delta DrawnCreditLines_t/X_{t-1} &= \alpha_0 + \alpha_1 DummyViolation_{\text{t-1}} \\ &\quad +\alpha_2 DummyViolation_{\text{t-1}} * Waiver_{t-1} \\ &\quad +\alpha_3 FirmControls_{i,t} + \varepsilon_{i,t}, \end{aligned} \tag{2}$$

where X_{t-1} is either total bank debt, total debt, or total assets. We predict α_1 to be negative, α_2 to be positive, and $\alpha_1 < \alpha_2$, such that the net effect of a waived covenant violation for a firm is to experience an increase in the dependence on credit lines as a source of finance.

The results of running regression (2) on the sample of all firms during the crisis period is displayed in Table 7. We find that while firms that violated a covenant and were not waived suffered a large decrease in drawn credit lines as a share of total bank debt, total debt, or total assets, for those that were waived drawn credit lines increased as a share of bank debt, total debt, or total assets, in the year after the violation. In terms of economic significance, while a covenant violation that is not waived is associated with a fall in the drawn credit line to total bank debt ratio of around 10 percentage points, a waived violation is associated with an increase of around 4 percentage points. As a share of total assets, a non-waived firm loses drawn credit equivalent to 3% of assets, while a waived one sees an increase equivalent to around 0.5 to 1% of assets.

TABLE 7 ABOUT HERE

The waiver decision is clearly endogenous, which gives rise to concerns about estimation biases due to omitted variables, despite the fact that our results are robust to including a rich set of firm level controls. The concerns are attenuated due to the fact that there is no clear unobserved firm characteristic that might be driving both the waiver decision and the dependence on credit lines as a source of external finance in the same direction. Nonetheless, to deal with these concerns we introduce an instrumental variables regression analysis in which we deal with the possible endogeneity of $DummyViolation{*}Waiver$. As instruments, we use the change in lender liquidity ratio and the change in lender capital ratio. The rationale for these instruments is based on the observed positive relation between them and the waiver decision following a covenant violation, as shown in the results of Table 6 discussed in Section 5 (relevance condition), but that the health of a bank in period $t-2$ is unlikely to directly affect the change in the relative importance of credit lines in the capital structure of a firm in period t (exclusion restriction). The results of our instrumental variables regressions are in Table 8 and confirm our results obtained in the regressions of Table 7.

TABLE 8 ABOUT HERE

Second, we dig deeper into which financing flows are responsible for the observed changes in capital structure, and test whether firms that violate a covenant during the crisis and are waived see net drawdowns of credit lines increase and net variations in bonds, equity, and loan financing decrease, while those covenant violators which are not waived see a decrease in the net variation of all forms of external finance. We measure net drawdowns of credit lines during period t as drawdowns net of repayment of outstanding drawn credit lines during period t, over total assets at the end of period $t-1$, and net variations in loans and bonds similarly. Net equity issues are defined as the sale of common and preferred stock during period t net of the purchase of common and preferred stock, relative to total assets at the end of period $t-1$. We run a similar regression to (2), in which the dependent variables are the net variations in each of the four financing instruments.

The results for this analysis are displayed in Table 9. Net loan originations and equity issues are relatively unresponsive both to waived and non-waived covenant violations, while credit line drawdowns and bond issues react strongly. Firms that violate a covenant and are not waived by their lenders suffer a decrease in net credit line drawdowns equivalent to around 2.5% of total assets. Firms that violate a covenant and are waived experience an increase of roughly the same size. These patterns seem to be compensated by the behavior of net bond issues. Firms that violate a covenant and are not waived by their lenders experience an increase of around 1.8% of total assets in net bond issuance, in contrast with firms that violate a covenant and are waived, which experience a decrease of around 2.1%. In short, covenant violations apparently induce an important change in the composition of external finance. Firms that violate covenants and lose access to lines of credit switch to bond issuance but do not fully compensate for the lost bank finance. On the other hand, firms that violate covenants but retain access to credit lines decrease their usage of bond financing and compensate the loss by drawing down on their lines of credit. The precise type of covenant being violated can affect the capital structure implications of violations in an important way, and the lack of information about this aspect limits our analysis of this point.

TABLE 9 ABOUT HERE

Taken together, this evidence suggests that firms that violate a covenant see the relative cost of non-credit line finance increase. So even if firms that were revoked during the crisis retained access to bond financing, the preference of the waived ones for credit line financing must mean that the waiver outcome ultimately has a potentially large impact on the cost of capital, and hence potentially also on investment and hiring. We explore the real implications of covenant violations and their consequences for access to precommitted credit in the next section.

7 Real Implications of Covenant Violations and Banks' Waiver Decisions

So far the evidence has shown that the degree of restriction of access to bank lines of credit imposed following a covenant violation has important implications for firms' external finance composition, and that the waiver decision is influenced by lenders' financial health. This opens the possibility of a novel mechanism through which the health of the financial sector gets transmitted to the real economy, by affecting the access to precommitted credit that firms that have violated a covenant on a debt product have. The prediction of this novel mechanism is that firms that have violated a covenant and had access to their credit lines revoked because they were insured by weak banks invested less, hired less and performed worse than similar firms that had covenants waived because they were borrowing from relatively stronger banks. To test this prediction, we restrict ourselves to the sample of firms that have violated a covenant in period t, and study how their lenders' financial health, measured in $t-1$, affects whether the performance of the firm in period $t+1$. Our base specification for this analysis is as follows:

$$\begin{aligned} Performance_{i,t} &= \alpha_0 + \alpha_1 Waiver_{i,t-1} + \alpha_2 FirmControls_{i,t-1} \\ +\alpha_3 BankControls_{i,t-2} + \varepsilon_{i,t}, &\quad \text{if violation=1} \end{aligned} \tag{3}$$

where $Waiver_{i,t-1}$ is instrumented using our main measures of bank health, which are the changes in $t-2$ in the liquidity ratios and the capital ratios of lenders. The timing of the variables in this regression reflects the characteristics of the effects we are trying to test. We are interested in the real implications in period t of a covenant violation in period $t-1$, whose outcome in terms of a waiver or a revocation is driven by changes in lender health during period $t-2$. The set of firm level controls includes size, presence of a credit rating, profitability, the market-to-book ratio, and cash flow volatility. The set of bank level controls includes the capital ratio, size, the deposit ratio, the wholesale ratio, the liquidity ratio, and the nonperforming loans ratio. As performance measures we focus on changes in capital expenditures, scaled by previous year assets, changes in employment relative to the previous year's total workforce, changes in sales over total assets in the previous period, and the variation in profitability.

The rationale for our choice of the liquidity ratios and the capital ratios of lenders as instruments for the waiver variable is based on the evidence that the waiver decision is strongly associated to these bank health measures (relevance condition), as shown in the results of regression (1) in Section 5, but that these bank health measures do not directly impact firm performance (exclusion restriction). The reasoning for the exclusion condition is that changes in period t-2 in bank health are unlikely to have an impact on investment, hiring, or sales of firms in period t, other than through the waiver-revocation decision, for the sample of firms that have violated a covenant.

table 10 About Here

The result of running the instrumental variables regression (3) is in Table 10. We find significant evidence consistent with the prediction that firms that have violated a covenant and had access to their credit lines revoked because their banks were in poor financial health invested and hired less and performed relatively worse than those firms that had their covenants waived because they were borrowing from relatively stronger banks. Results are sometimes larger in economic magnitude for firms with substantial access to lines of credit, relative to those that have access to smaller amounts of precommitted credit, as would be expected, but their statistical significance is typically lower due to the loss in the number of observations. The economic magnitudes are significant. Revocations of credit lines induced by poor bank health are associated on average with drops in profitability about 10% larger and drops in hiring about 20% larger, relative to those firms that were waived.

8 Conclusion

An important feature of bank credit lines is that they contain covenants that allow lenders to revoke access to further drawdowns in bad states of the world. We show that covenant violations are often waived by banks and also that shocks to bank health transmit to firms in the economy through their waiver-revocation decision. Healthy banks are more likely to waive covenant violations, which means that firms that rely on credit lines provided by weak banks may be affected by shocks to bank health. Importantly, following a covenant violation, even large and high-quality firms may find it difficult to substitute credit lines for other forms of financing, and may thus be very sensitive to the revocation of credit lines. In addition, we show that shocks to bank health matter the most if they coincide with an aggregate shortage of liquidity, such as the recent financial crisis, which makes it difficult for banks and firms to raise financing. Decisions on restriction of access to credit lines driven by bank financial health have important implications for the capital structure of firms, and for their investment, hiring, and overall performance.

The standard bank lending channel predicts that bank health may affect investment and other real variables of credit constrained firms that cannot access other types of financing. However, much of bank lending is done through bank credit lines, and credit lines are more commonly used by large, high credit quality firms. Credit lines provide liquidity insurance to such firms, allowing them to access bank financing in states of world in which their financial performance deteriorates. As a result, large, high-credit quality firms may not draw down on credit lines often, but at the same time credit line access can be very important for them in some states of the world. Our channel thus complements existing theories by expanding the set of firms for which bank financial health might be relevant to include also medium and large firms that are typically financially unconstrained.

Further research could explore how the consequences of violations vary depending on the type of covenant being violated. Further work could also study whether the transmission of monetary policy also occurs through the channels identified in this paper. We have identified a bank's liquidity position to be one of the main determinants of the degree of access to precommitted credit that it grants, and monetary policy, and more generally liquidity provision policies to intermediaries, can hence be highly relevant for this mechanism.

9 Appendix - Covenant Violation Outcomes Database Construction

The first step entails downloading the 10-K filing from the SEC website. Next, we extract the paragraphs (henceforth, credit-line paragraphs) containing the terms "line(s) of credit," "credit facility/line," "revolving/revolver credit/line/loan," "credit/loan/financing agreement," and "borrowing/working capital/ loan facility." The consequent search for violations and consequences is done using these paragraphs. We believe that this step minimizes false positives (as covenant violations may also pertain to other debt instruments) and speeds the algorithm up (as we are searching among fewer words). Moreover, if a certain paragraph has any of the keywords, we also save the paragraph following it, as it is possible that it still discusses the company's lines of credit even though no keyword is explicitly stated.

Subsequently, we look for mentions of amendments to credit line agreements in these credit-line paragraphs. The keywords we specifically use are "amend," "modif," "restate," "renegotiate," and "forbearance." We have noticed, though, that companies sometimes include amendments from previous fiscal years. Therefore, we have decided to employ particular controls to be more certain that an amendment is from the filing year. We extract the sentence containing the "hit" and check if there is any date in it. If there is and it is before the start of the fiscal year, we cross the sentence out. We also remove any sentence following it up until the mention of a "current" amendment to the credit line agreement. Finally, we save the remaining paragraphs with the aforementioned keywords as amendment paragraphs.

We next search for paragraphs that contain mentions of covenant violations (henceforth, violation paragraphs). We proceed in three steps. First, we rid the paragraphs of mentions of credit lines from previous years, in the same way as in our extraction of the amendment paragraphs. We then find paragraphs which talk about covenants using the keywords "restriction," "covenant," "provision," "requir," and "terms." We further control for references to previous fiscal years, to hypothetical statements (e.g. those including "possible," "potential," "shall," and "might"), and to covenants for other debt instruments. Thirdly, from these covenant paragraphs, we search for mentions of violations. In particular, some of the keywords used are "viol," "did not/unable to/failed to comply/meet/satisfy," "not in/out of compliance," "non-compliance," "in compliance... except for," "breach," "default," and "waiv." We further apply controls tailored to each keyword to minimize false positives. For example, the text search would pick up neither "violated an immaterial provision" nor "to avoid the breach." This is the point where the dummy for covenant violations is obtained for the company-fiscal year observation. We then keep these paragraphs as violation paragraphs.

Finally, we search for consequences to covenant violations in the amendment and violation paragraphs. Here, we assume that any amendment to terms of a credit line agreement in a year with a violation is the result of the breach of the covenant. The consequences we consider

are full revocation, partial revocation, maturity shortening, covenant tightening, interest rate increase, additional pledge of assets, and waivers. We remove hypothetical statements and references to previous fiscal years. We likewise apply consequence-specific controls to minimize false positives.

The final text-search algorithm is a result of multiple rounds of coding and testing on a manually-read random sample of 100 SEC filings. We start with an algorithm that does not have keyword-specific controls and applied it to the sample. We look into each of the error (of both Types I and II) and, consequently, revise the code to correct the mistakes. We iterate this procedure until we are quite satisfied with the performance of the algorithm in-sample. Afterwards, we manually read another random sample of 100 and test the algorithm out-of-sample. The algorithm is not expected to work perfectly out-of-sample, so upon discovery of the shortcomings of the procedure when applied to the second sample, we implement the same recursion of coding and testing to the now bigger sample of 200. More random samples of 100 filings are picked until the algorithm yields acceptable out-of-sample results.

10 References

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Figure 1. Time Trends in Covenant Violations and Their Consequences

These graphs provide times series evidence of the evolution of covenant violations and their consequences between 2002 and 2010. In the bottom figures, *Small Firms* are those in the bottom tercile of size measured by assets, while *Large Firms* are those in the top tercile.

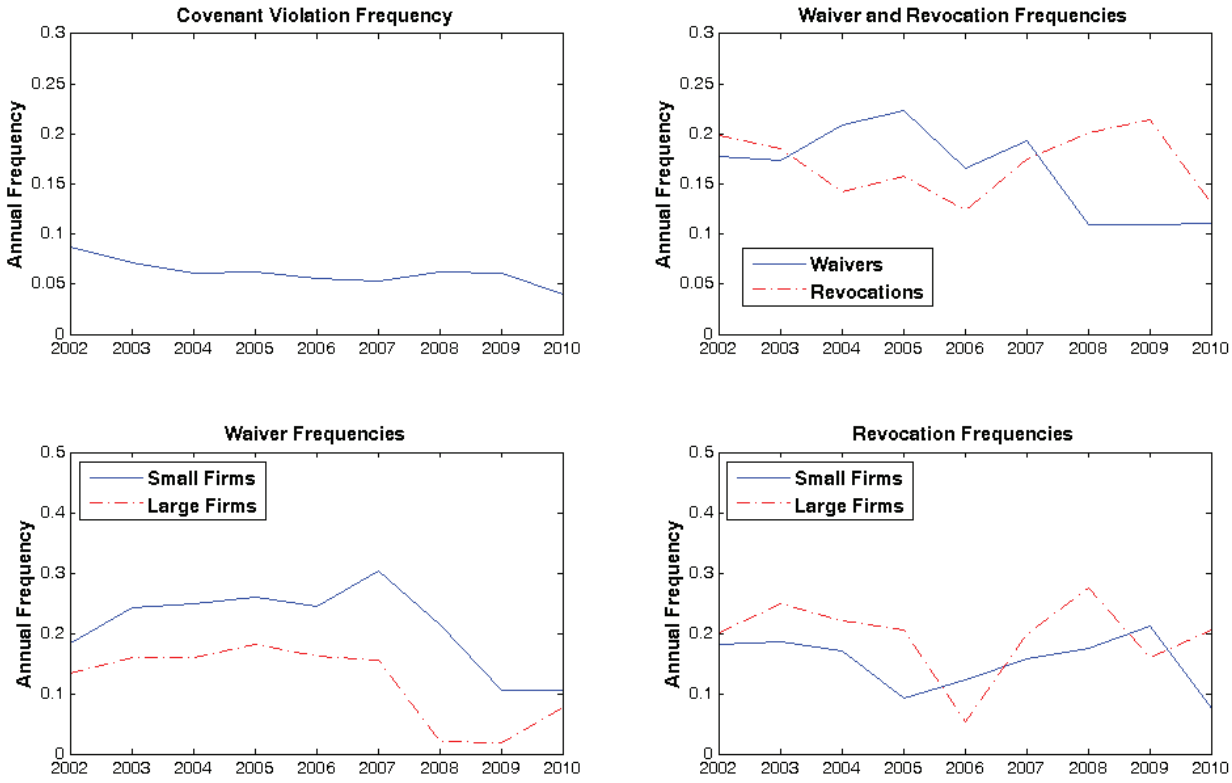

Table 1
Comparison of Firms with and without Credit Lines

This table provides summary statistics for the entire sample and for the restricted samples of firms with and without a credit line. The entire sample consists of non-utilities (excluding SIC codes 4900-4949) and non-financials (excluding SIC codes 6000-6999) U.S. firms covered by both Capital IQ and Compustat from 2002 to 2011. We have removed firm- years with 1) negative revenues, and 2) negative or missing assets. After the above filters, the sample consists of 32,671 firm-year observations involving 4,741 unique firms. In this table, "size" is measured as the book value of assets. All variables are winsorized at the 0.5% in both tails of the distribution. The last two columns test for differences between samples with and without undrawn credit using the unequal variances t-test and the two-sample Wilcoxon rank-sum (Mann-Whitney) test.

	(1)	(2)	(3)	(4)	(5)
	Entire Sample	Sample of Firms with a Credit Line	Sample of Firms without a Credit Line	Test of Difference with vs. without a Credit Line	
	Mean [Median]	Mean [Median]	Mean [Median]	t-test p-value	MW p-value
Cash/ Net At	0.657	0.350	1.517	45.658	80.044
	[0.147]	[0.094]	[0.576]	(0.000)	(0.000)
Credit Lines/Net At	0.106	0.156			
	[0.071]	[0.124]			
Cash/ Net At	0.115	0.093	0.185	33.527	50.649
(market value)	[0.054]	[0.043]	[0.100]	(0.000)	(0.000)
Credit Lines/Net At	0.067	0.096			
(market value)	[0.041]	[0.071]			
Profitability	0.059	0.097	-0.048	-46.411	-52.245
	[0.107]	[0.119]	[0.045]	(0.000)	(0.000)
Size	2181.0	2618.9	952.8	-30.560	-55.191
	[317.2]	[453.8]	[118.5]	(0.000)	(0.000)
Book Leverage	0.211	0.232	0.151	-30.678	-49.071
	[0.152]	[0.192]	[0.017]	(0.000)	(0.000)
M/B	1.728	1.576	2.195	28.841	32.753
	[1.232]	[1.152]	[1.582]	(0.000)	(0.000)
Tangibility	0.248	0.273	0.177	-39.567	-47.168
	[0.167]	[0.197]	[0.094]	(0.000)	(0.000)
NWC/At	0.050	0.076	-0.019	-43.110	-44.129
	[0.042]	[0.064]	[-0.015]	(0.000)	(0.000)
Capex/At	0.054	0.057	0.045	-16.503	-32.671
	[0.033]	[0.036]	[0.023]	(0.000)	(0.000)
R&D/Sales	0.370	0.136	1.034	29.731	63.398
	[0.005]	[0.000]	[0.106]	(0.000)	(0.000)
Dividend Payer	0.275	0.330	0.117	-49.989	-40.888
	[0.000]	[0.000]	[0.000]	(0.000)	(0.000)
Beta KMV	1.245	1.176	1.419	13.428	12.227
	[1.099]	[1.054]	[1.247]	(0.000)	(0.000)
Rating Dummy	0.265	0.327	0.092	-59.701	-46.715
	[0.000]	[0.000]	[0.000]	(0.000)	(0.000)
Observations	32671	22186	10485		

Table 2
Summary of Covenant Restrictions

The table presents a list of financial covenant restrictions found in loans to nonfinancial firms in our sample in the intersection of the merged Capital IQ-Compustat database and Dealscan during the period 1995 to 2011. Columns 1 and 2 present information about the frequency of each type of covenant, and columns 3-9 present information about the distribution of the specific numerical values found in the covenant restrictions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Type of Covenant	Frequency	Percent	Mean	SD	p10	p25	Median	p75	p90
Max. Capex	2,074	9.14	0.47	0.73	0.06	0.13	0.27	0.53	1.00
Max. Debt to EBITDA	4,019	17.72	3.83	1.44	2.50	3.00	3.50	4.50	5.75
Max. Debt to Equity	53	0.23	1.95	2.46	0.50	0.65	0.80	2.75	4.00
Max. Debt to Tangible Net Worth	496	2.19	2.58	2.42	0.60	1.00	2.00	3.00	6.00
Max. Leverage ratio	1,449	6.39	0.57	0.11	0.40	0.53	0.60	0.65	0.68
Max. Loan to Value	16	0.07	1.14	0.86	0.60	0.64	0.75	1.27	2.85
Max. Senior Debt to EBITDA	734	3.24	3.07	1.26	1.75	2.15	3.00	3.70	5.00
Max. Senior Leverage	33	0.15	0.58	0.69	0.15	0.23	0.35	0.58	0.95
Min. Cash Interest Coverage	70	0.31	2.12	1.06	1.00	1.20	2.00	3.00	3.50
Min. Current Ratio	474	2.09	1.15	0.31	1.00	1.00	1.00	1.20	1.50
Min. Debt Service Coverage	388	1.71	1.58	0.69	1.10	1.20	1.30	1.75	2.50
Min. EBITDA	980	4.32	0.56	1.04	0.00	0.05	0.24	0.61	1.43
Min. Fixed Charge Coverage	3,415	15.06	1.47	0.58	1.00	1.10	1.25	1.65	2.25
Min. Interest Coverage	3,741	16.49	2.76	0.92	1.70	2.00	2.75	3.00	4.00
Min. Quick Ratio	138	0.61	1.33	0.43	0.80	1.00	1.25	1.50	2.00
Net Worth	2,581	11.38	2.84	2.60	0.60	1.11	1.94	3.60	6.78
Other Ratio	4	0.02	1.92	0.14	1.75	1.75	2.00	2.00	2.00
Tangible Net Worth	2,015	8.88	2.40	2.49	0.30	0.78	1.50	3.00	5.56
Total	22,680	100							

Table 3

How covenant violations and their consequences vary across the sample

This table provides summary statistics related to credit line covenant violations and their consequences for the sample of firms with a credit line at the beginning of the period (26.578 firm-years), and summary statistics of the consequences of these violations for the subset of firms that have violated a covenant in a given year. It combines data from a text search of all 10-K filings for the Compustat universe of U.S. firms for 2002 to 2011 with data from Capital IQ. There is a residual violation consequence which is not reported, which includes cases in negotiation and consequences which are different from any of the above. Note that covenant violations often generate more than one consequence.

		Consequences (conditional on a violation)					
	Percentage of firms reporting a violation	Waiver	Full or Partial Revoc-ation	Interest rate increase	Maturity Shorten--ing	Covenant Adjust-ment	Asset Pledge
Totals							
Total sample	6.18%	16.96%	18.14%	23.38%	9.75%	42.31%	9.04%
Firms with book leverage > 0.05	6.34%	16.33%	16.88%	22.51%	9.13%	44.74%	8.49%
By Industry							
Agric., minerals, construction	5.13%	3.16%	11.58%	27.37%	16.84%	55.79%	8.42%
Manufacturing	4.73%	19.11%	17.41%	18.18%	8.47%	41.76%	7.70%
Transp., comm., and utilities	5.96%	14.02%	25.23%	22.43%	10.28%	42.99%	6.54%
Trade—wholesale	5.82%	16.39%	18.03%	24.59%	1.64%	42.62%	16.39%
Trade—retail	4.75%	19.42%	8.74%	21.36%	3.88%	30.10%	1.94%
Services	5.26%	21.97%	15.92%	20.70%	6.69%	42.68%	7.96%
By Size (Book Assets)							
Less than $100M	8.53%	20.52%	16.64%	19.87%	10.07%	39.83%	8.50%
$100M to $250M	7.30%	17.49%	19.62%	25.77%	7.33%	45.63%	10.87%
$250M to $500M	6.05%	11.81%	19.19%	27.68%	14.76%	45.76%	8.86%
$500M to $1,000M	5.60%	11.20%	18.67%	29.05%	9.13%	45.23%	11.62%
$1,000M to $2,500M	3.66%	10.00%	23.75%	26.25%	7.50%	44.38%	6.25%
$2,500M to $5,000M	2.74%	11.48%	14.75%	22.95%	8.20%	40.98%	1.64%
Borrower has no credit rating	6.93%	17.92%	17.97%	23.27%	9.77%	41.97%	9.18%
Borrower has credit rating	3.11%	8.62%	20.26%	25.43%	9.05%	44.40%	8.62%

Table 4

How access to credit lines and drawdowns are related to covenant violations

This table provides summary statistics related to credit line covenant violations for the sample of firms with credit line availability at the beginning of the period equivalent to at least 5% of total assets. It combines data from a text search of all 10-K and 10-Q filings for the Compustat universe of U.S. firms for 2002 to 2011 with data from Capital IQ. Panels A, B and C contain the statistics on the year before, on the year, and on the year after a covenant violation, respectively.

	Covenant Violation in Year t (dummy)		
	All Firms (Undrawn Credit >5% of Assets)	Unrated Firms (Undrawn Credit >5% of Assets)	Rated Firms (Undrawn Credit >5% of Assets)
Panel A: Changes in the year before the event			
Number of Observations	1,514	1,157	357
ΔUndrawn Credit$_{t-1,t-2}$/ Assets$_{t-2}$	-0.013***	-0.013***	-0.014***
Drawdowns$_{t-1}$/ Assets$_{t-2}$	0.009***	0.012***	-0.003
Panel B: Changes in the year of the event			
Number of Observations	1,584	1,215	369
ΔUndrawn Credit$_{t,t-1}$/ Assets$_{t-1}$	-0.017***	-0.021***	-0.003
Drawdowns$_{t}$/ Assets$_{t-1}$	-0.006***	-0.004	-0.013***
Panel C: Changes in the year after the event			
Number of Observations	1,521	1,172	349
ΔUndrawn Credit$_{t+1,t}$ / Assets$_{t}$	-0.007***	-0.011***	0.006
Drawdowns$_{t+1}$/ Assets$_{t}$	-0.016***	-0.019***	-0.006***

Table 5

How access to credit lines and drawdowns are related to the consequences of a covenant violation

This table provides summary statistics related to credit line covenant violations for the sample of firms with a credit line at the beginning of the period (15,458 firm-years), and summary statistics of the consequences of these violations for the subset of firms that have violated a covenant in a given year (#### instances) and had undrawn credit at the beginning of the period equivalent to at least 2% of assets. It combines data from a text search of all 10-K filings for the Compustat universe of U.S. firms for 2002 to 2011 with data from Capital IQ. For every event and outcome (whether a violation has occurred, or whether, conditional on a violation, one of its consequences has occurred) the average effect across 4 categories is displayed: (i) the change in undrawn credit between t-1 and t, (ii) between t-1 and t+1, (iii) the amount drawn (positive) or repaid(negative) in t, (iv) in t+1. The differences between samples with and without a violation or a given consequence are tested using the unequal variances t-test. There is a residual violation consequence which is not reported, which includes cases in negotiation and consequences which are different from any of the above.

Panel A: Patterns of undrawn and drawn credit lines related to a renegotiation with a covenant violation

	Renegotiation and Covenant Violation in Year t (dummy)											
	Fully Waived		Full or Partial Revocation		Interest rate increase		Maturity Shortening		Covenant adjustment		Asset Pledge	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Panel A: Changes one years before the event												
Number of obs.	90	479	107	462	139	430	40	529	254	315	41	528
ΔUndrawn Credit$_{t-1,t-2}$/ Undrawn Credit$_{t-1}$	7.40%	2.98%	-11.06%	7.09%**	-1.66%	5.41%	0.35%	3.93%	-5.47%	11.0%***	-10.98%	4.82%
Drawdowns$_{t-1,t-2}$/ Undrawn Credit $_{t-1}$	11.44%	10.94%	10.04%	11.11%	17.35%	8.98%	6.26%	11.38%	13.12%	9.33%	5.53%	11.45%
Panel B: Changes in the year of the event												
Number of obs.	112	570	125	557	158	524	48	634	307	375	53	629
ΔUndrawn Credit$_{t,t-1}$/ Undrawn Credit$_{t-1}$	2.01%	-4.94%	-16.10%	-1.04%**	-10.35%	-1.82%	-32.04%	-1.66%***	-3.81%	-3.78%	-15.83%	-2.78%
Drawdowns$_{t,t-1}$/ Undrawn Credit $_{t-1}$	-0.56%	2.44%	1.86%	1.97%	4.80%	1.09%	11.99%	1.19%	4.46%	-0.10%	12.41%	1.07%
Panel C: Changes one year after the event												
Number of obs.	94	461	105	450	129	426	38	517	249	306	44	511
ΔUndrawn Credit$_{t+1,t}$ / Undrawn Credit$_{t-1}$	9.75%	5.98%	-9.85%	10.4%***	2.17%	7.96%	4.68%	6.76%	1.62%	10.69%	5.29%	6.73%
Drawdowns$_{t+1,t}$/ Undrawn Credit $_{t-1}$	-2.90%	-5.07%	-14.42%	-2.44**	-7.78%	-3.77%	-26.48%	-3.10%**	-3.77%	-5.46%	-25.08%	-2.95%***

Table 6

Are healthy lenders more likely to waive covenant violations, particularly so during the crisis?

This table presents Probit regression results to study the relation between the financial health of a firm's lenders and the occurrence of a waiver on a debt covenant violation. The sample consists of firm-years in which a firm suffered a covenant violation on any debt product, between 2004 and 2009. Columns 1 and 2 contain regressions for the crisis period, which starts in August 2007 and ends in May 2010. Columns 3 and 4 contain regressions for the pre-crisis period, which starts in June 2004 and ends in July 2007. The regression reports marginal effects. All control variables are lagged. Robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Crisis Period		Pre-Crisis Period	
	(1)	(2)	(3)	(4)
Dep Var: Waiver (dummy)	Firms with LC	LC>10% Assets	Firms with LC	LC>10% Assets
Change in Lender Capital Ratio$_{t-1}$	10.83***	14.26***	3.659	5.298
	(2.669)	(2.624)	(1.346)	(1.360)
Change in Lender Liquidity Ratio$_{t-1}$	2.005*	3.537**	0.307	1.232
	(1.818)	(2.302)	(0.290)	(0.834)
Size $_{t-1}$	-0.065***	-0.096***	-0.0820***	-0.097***
	(-3.090)	(-2.949)	(-3.614)	(-2.800)
Rated $_{t-1}$ (dummy)	-0.0138	-0.0871	-0.0556	-0.001
	(-0.203)	(-0.918)	(-0.758)	(-0.008)
Profitability $_{t-1}$	-0.320	-0.185	-0.191	-0.181
	(-1.223)	(-0.692)	(-0.920)	(-0.638)
Lender Capital Ratio $_{t-1}$	-6.775**	-7.477	-1.276	1.117
	(-1.999)	(-1.630)	(-0.438)	(0.253)
Lender Size $_{t-1}$	-0.00162	-0.0164	-0.0231	-0.0147
	(-0.0646)	(-0.549)	(-1.134)	(-0.520)
Lender Deposit Ratio $_{t-1}$	-2.360*	-2.796*	-1.111	-0.152
	(-1.872)	(-1.915)	(-1.431)	(-0.127)
Lender Liquidity Ratio $_{t-1}$	-1.040**	-0.800	0.287	1.136**
	(-2.494)	(-1.621)	(0.761)	(2.135)
Lender Non-Perform Ratio $_{t-1}$	-10.85***	-13.23***	-5.896	11.28
	(-3.524)	(-3.274)	(-0.628)	(0.803)
Observations	397	209	458	236
R-squared _	0.101	0.152	0.0704	0.100

Table 7
Covenant Violations and Dependence on Bank Lines of Credit

This table presents regression results to study the relation between the covenant violations, the waiver decision of the lender, and bank dependence. Columns (1) and (2) study how drawn credit lines as a share of total bank debt (drawn credit lines plus term loans outstanding) is affected by covenant violations that occurred in the previous year and by the lender's waiver decision. Columns (3) and (4) focus on the response of drawn credit lines as a share of total debt (bank debt plus bonds outstanding), and columns (5) and (6) on the response of drawn credit lines over total assets. The sample consists of firms in the top quartile of undrawn credit line availability (firms with credit lines at the end of the previous year in excess of 15% of total assets) during the crisis years of 2008 and 2009. All control variables are lagged. Robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Δ(Drawn Credit Lines / Bank Debt)$_t$		Δ(Drawn Credit Lines / Total Debt)$_t$		Δ(Drawn Credit Lines / Total Assets)$_t$	
	(1)	(2)	(3)	(4)	(5)	(6)
	No Controls	Controls	No Controls	Controls	No Controls	Controls
Covenant Violation$_{t-1}$ (dummy)	-0.110**	-0.106**	-0.0988**	-0.0969**	-0.0298**	-0.0320**
	(-2.416)	(-2.355)	(-2.406)	(-2.382)	(-2.175)	(-2.345)
Covenant Violation$_{t-1}$*Waiver $_{t-1}$	0.161**	0.142**	0.116**	0.0921*	0.0374**	0.0384**
	(2.526)	(2.270)	(2.079)	(1.656)	(1.966)	(2.029)
Size $_{t-1}$		-0.0145**		-0.0179***		-0.00122
		(-2.501)		(-2.772)		(-0.741)
Rated $_{t-1}$ (dummy)		0.0333		0.0255		0.00376
		(1.443)		(1.208)		(0.533)
Market-to-Book $_{t-1}$		-0.0181		0.0129		0.00412
		(-1.427)		(1.035)		(1.156)
Profitability $_{t-1}$		0.0541		-0.0548		-0.00113
		(1.113)		(-0.937)		(-0.0904)
Observations	1,400	1,337	1,123	1,100	2,097	2,010
R-squared _	0.005	0.011	0.005	0.016	0.002	0.003

Table 8
Covenant Violations and Dependence on Bank Lines of Credit: Instrumental Variables Estimation

This table presents instrumental variables regression results to study the relation between the covenant violations, the waiver decision of the lender, and bank dependence. The endogenous variable being instrumented is the interaction term *Covenant Violation*Waiver* and the instruments are *Change in Lender Liquidity Ratio* and *Change in Lender Capital Ratio*. Columns (1) and (2) study how drawn credit lines as a share of total bank debt (drawn credit lines plus term loans outstanding) is affected by covenant violations that occurred in the previous year and by the lender's waiver decision. Columns (3) and (4) focus on the response of drawn credit lines as a share of total debt (bank debt plus bonds outstanding), and columns (5) and (6) on the response of drawn credit lines over total assets. The sample consists of firms in the top quartile of undrawn credit line availability (firms with credit lines at the end of the previous year in excess of 15% of total assets) during the crisis years of 2008 and 2009. All control variables are lagged. Robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Δ(Drawn Credit Lines / Bank Debt)$_t$		Δ(Drawn Credit Lines / Total Debt)$_t$		Δ(Drawn Credit Lines / Total Assets)$_t$	
	(1)	(2)	(3)	(4)	(5)	(6)
	No Controls	Controls	No Controls	Controls	No Controls	Controls
Covenant Violation$_{t-1}$ (dummy)	-1.029	-0.884	-1.447*	-1.440**	-1.369*	-0.931**
	(-1.127)	(-1.120)	(-1.778)	(-2.499)	(-1.651)	(-1.990)
Covenant Violation$_{t-1}$*Waiver $_{t-1}$	2.730	2.451	3.397*	3.842**	3.350	2.333*
	(1.120)	(1.099)	(1.786)	(2.474)	(1.624)	(1.943)
Size $_{t-1}$		0.0253		0.0474		0.0122
		(0.674)		(1.589)		(1.012)
Rated $_{t-1}$ (dummy)		-0.0477		-0.103		-0.0295
		(-0.615)		(-1.481)		(-0.864)
Market-to-Book $_{t-1}$		-0.00145		0.0170		0.0197*
		(-0.0846)		(0.716)		(1.809)
Profitability $_{t-1}$		0.134		0.571*		0.0926
		(0.750)		(1.942)		(0.933)
Observations	1,148	1,114	1,250	1,245	1,735	1,682
R-squared	0.001	0.017	0.002	0.013	0.002	0.023

Table 9

Covenant Violations and Issuance of Bonds and Equity, Origination of Bank Loans, and Drawdowns of Credit Lines

This table presents regression results to study the relation between the covenant violations, the waiver decision of the lender, and net variations in different financing instruments. Columns (1) and (2) study credit line drawdowns, net of repayments of outstanding drawn amounts and as a share of total assets, on the year after a covenant violation. Columns (3) and (4) focus on the response of net spot loan originations, and columns (5) and (6) on net bond issues. Columns (7) and (8) study net equity issues. The sample consists of firms in the top quartile of undrawn credit line availability (firms with credit lines at the end of the previous year in excess of 15% of total assets) during the crisis years of 2008 and 2009. All control variables are lagged. Robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Net Credit Line Drawdowns		Net Loan Originations		Net Bond Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No Controls	Controls	No Controls	Controls	No Controls	Controls	No Controls	Controls
Covenant Violation$_{t-1}$ (dummy)	-0.025**	-0.025**	-0.009	-0.008	0.0172*	0.0187*	-0.008	0.001
	(-2.508)	(-2.551)	(-1.020)	(-1.017)	(1.724)	(1.899)	(-0.293)	(0.0123)
Covenant Violation$_{t-1}$*Waiver $_{t-1}$	0.021	0.023*	-0.006	-0.004	-0.0237*	-0.0213	0.013	0.009
	(1.572)	(1.663)	(-0.493)	(-0.420)	(-1.737)	(-1.578)	(0.349)	(0.313)
Size $_{t-1}$		0.001		0.002***		0.005***		-0.013***
		(1.229)		(2.821)		(4.749)		(-5.065)
Rated $_{t-1}$ (dummy)		-0.002		-0.012**		-0.004		0.007
		(-0.556)		(-2.510)		(-0.795)		(0.621)
Market-to-Book $_{t-1}$		0.001		0.001**		0.001*		0.020***
		(1.198)		(2.075)		(1.719)		(13.85)
Observations	2,238	2,148	2,231	2,144	2,209	2,127	1,989	1,908
R-squared _	0.050	0.051	0.010	0.018	0.002	0.016	0.001	0.177

Table 10
Do firms that borrow from healthy lenders perform better following a covenant violation?

This table presents instrumental variables regression results to study the relation between the financial health of a firm's lenders and the performance of the firm following a debt covenant violation. The waiver decision is instrumented using *Change in Lender Capital Ratio* and *Change in Lender Liquidity Ratio* in the year before the covenant violation. The sample consists of firm-years in which a firm suffered a covenant violation on any debt product during the crisis period between August 2007 and May 2010. All control variables are lagged. Robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Sales Growth$_{t+1}$		Change in Profitability$_{+1}$		Workforce Growth$_{t+1}$		Investment$_{t+1}$	
	(1)	(2)	(3)	(4)	(3)	(4)	(3)	(4)
Dep Var: Performance Measure	Firms with LC	LC>15% Assets	Firms with LC	LC>15% Assets	Firms with LC	LC>15% Assets	Firms with LC	LC>15% Assets
Waiver$_{t-1}$	1.072**	0.786*	0.0837*	0.109	0.201	0.264**	0.409*	0.0272
	(2.403)	(1.882)	(1.741)	(1.606)	(1.427)	(2.037)	(1.670)	(0.158)
Size $_{t-1}$	0.104*	0.163*	0.00379	0.0102	0.0117	0.0652**	0.0318	0.0193
	(1.845)	(1.942)	(0.525)	(1.026)	(0.612)	(2.115)	(1.460)	(0.428)
Rated $_{t-1}$ (dummy)	0.0195	-0.277	0.0141	0.00798	0.0392	-0.123	-0.0306	-0.0240
	(0.183)	(-1.153)	(0.978)	(0.443)	(1.046)	(-1.347)	(-0.654)	(-0.175)
Market to Book Ratio $_{t-1}$	0.170***	0.132**	0.00915	0.0105	0.0545***	0.0612**	0.0525**	0.0273
	(3.144)	(2.202)	(1.292)	(1.229)	(2.983)	(2.550)	(2.486)	(0.743)
Observations	221	62	221	193	219	63	221	63
R-squared _	0.110	0.091	0.015	0.013	0.085	0.077	0.067	0.047