Bank Relationship, Covenant Enforcement, and Creditor Control*

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This version: January 2019

Abstract

This paper investigates the effect of the banking relationship on the likelihood of lenders' enforcement of loan covenant violations. We find that if lenders have a long-run relationship with borrowers, these lenders enforce material covenant violations at a substantially lower rate when borrowers breach financial covenants. Moreover, borrowers with such relationships are less likely to experience raises in loan interest rates and a deterioration of subsequent financing and investment activities when they fail to fulfill their financial covenants. Further evidence shows that the mitigation of information asymmetry along the lending relationship, instead of alternative channels (e.g., soft-budget problem), is more likely to be the driving force of the empirical findings. Our results are also robust to several endogeneity concerns.

JEL Classifications: G21, G32
Keywords: Bank relationship, Covenant violation, Loan renegotiation

* We thank Byung-Uk Chong (discussant), Philip Dybvig, Xiang Li (discussant), Haoyu Gao, Pingyang Gao, Wei Shi, Jun Yang, and seminar/conference participants at the 13th Conference on Asia-Pacific Financial Markets, 2018 Greater China Finance Conference, and Southwestern University of Finance and Economics for valuable comments and suggestions. All errors are our own.
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Introduction

A large body of literature in financial intermediation highlights the role of the banking relationship in mitigating the information asymmetry between lenders and borrowers (see, for instance, Boot 2000). Actually, the information accumulated by relationship lending is vital if banks are to utilize their unique technology in monitoring and managing loans:[1] the banking relationship enables lenders to collect sufficient *soft* information about borrowers, through which the lenders are better able to identify the solvency status of the loans. In this situation, the relationship lenders may become less responsive to borrower-specific credit events revealed by *hard* information if the lenders have accumulated enough soft information and have a thorough grasp of what is happening to the borrowers' solvency through their long-run lending relationship.

It is empirically challenging in general to demonstrate how banks evaluate reliability and then make use of hard versus soft information. Banks' enforcement of loan covenant violations by corporate borrowers, however, provides an ideal empirical setting to disentangle the use of soft versus hard information by banks. More specifically, in this paper we examine the covenant violation enforcement behavior of relationship banks to test whether soft information collected via the lending relationship matters when banks monitor and control their borrowers. Debt covenants are contractual restrictions on firms' policies. Once borrowers fail to comply with at least one of the financial covenants specified in loan contracts—a situation defined as *negative covenant slack* in this study—the lenders need to judge whether this negative covenant slack is a material covenant violation or not. The lenders' covenant violation enforcement grants contractual rights to accelerate

[1] Starting from the period before the 2008 financial crisis, we observe unprecedented participation of institutional investors in the corporate loan market, especially in the leverage loan segment (Ivashina and Sun 2011; Berlin et al. 2018). It then raises the concern whether banks are still special in lending to corporate borrowers.

debt repayment or to terminate the loan contracts to the lenders just as in the circumstance of borrowers' payment defaults (Nini et al. 2012). Soft information possessed by lenders may play a crucial role in their enforcement decision on material covenant violations when the borrowers make negative covenant slacks. We therefore investigate the effect of the banking relationship on the likelihood of lenders' enforcement of a material covenant violation when borrowers fail to comply with at least one financial covenant (negative covenant slacks).

Our fixed-effect regressions reveal that lenders tend to push covenant-breaching borrowers into material covenant violation. However, the likelihood of material covenant violation enforcement is much lower if the lender has a long-run relationship with the borrower. The economic magnitude is sizable, with lenders' responsiveness in violation enforcement to negative covenant slack events declining by about 50 percent in relative terms if the covenant-breaching borrower has a bank relationship. According to results from the baseline regression, the conditional likelihood of a material covenant violation is 4.2 percent for a covenant-breaching borrower without any bank relationship, whereas the likelihood declines to 2.1 percent for relationship borrowers. Our results are robust to various measures of bank relationship, such as those constructed at the lender-borrower level or the loan package level.

Next, we identify the underlying mechanism of relationship lenders' less likelihood of material covenant violation enforcement. In this study, we highlight that the mitigation of information asymmetry between relationship lenders and borrowers is the key driving force. To verify this, we conduct empirical tests for subgroups—borrowers with relatively low information asymmetry and borrowers with relatively high information friction in capital market. Specifically, we split the whole sample into two groups with respect to four firm characteristics—namely,

analyst earnings forecast dispersion, discretionary accruals, cash flow volatility, and a dummy indicating being an S&P 500 constituent stock. For samples of firms with more information frictions, we find consistent results with our baseline regression, but for samples of firms with less information asymmetry, we find no evidence. In other words, relationship lenders' less likelihood to enforce material covenant violation against borrowers with negative covenant slacks is observed only for borrowers with high information asymmetry. This is because relationship lenders' informational advantage is marginal for borrowers with less information frictions, whereas soft information by relationship banks is more valuable for the enforcement of covenants on opaque borrowers.

As a next step, we examine whether the lender-borrower relationship has a differential effect on the borrower's funding cost adjustments and subsequent financing and investment activities following negative covenant slacks. For covenant-breaching borrowers, it is highly likely to confront sharp increases in loan interest rates through loan renegotiations. However, for borrowers with banking relationships, we fail to find any significant increase in their loan interest rates given negative covenant slacks. Moreover, relationship borrowers are less likely to switch to conservative financial and investment policies after they breach financial covenants. Consistent with prior literature, we find that the average firm reduces debt, builds up cash holdings, and cuts investments after it breaches at least one of the financial covenants. However, the increase in "conservativeness" of firm policies is of much smaller magnitude for relationship borrowers. Taken together, these findings imply that the lender-borrower relationship relieves those types of adverse impacts on firm financing and investment activities, which are usually subsequent to material covenant violation enforcement by lenders.

On the basis of subsample regressions, we have documented that the mitigation of information friction between lenders and borrowers might be the driving force of our main empirical findings. However, there may be other factors affecting the lender's decision on covenant violation enforcement. First, a long-run lending relationship may be associated with the bank's preference to maintaining large loan market shares, which could lead to the bank's reluctance to enforce a material covenant violation. We conduct a robustness test by adding each bank's loan market share and its interaction with the negative slack dummy as control variables to our baseline regressions. Our main regression results still hold.

Second, lenders' tolerance or leniency[2] toward relationship borrowers' solvency issue may affect their decision to enforce a material covenant violation. To maintain values of relationship loans or extract long-term rents from relationship borrowers, relationship lenders may temporarily tolerate borrowers' minor solvency problems when the borrowers' creditworthiness has not deteriorated seriously. To test this alternative hypothesis (relationship lenders' lenient behavior), we examine how lenders' responses vary with the severity of borrower distress. Previous research, such as Li et al. (2017), has shown that relationship lenders' behaviors do not differ from those of nonrelationship lenders when borrowers are in severe distress. If the leniency hypothesis is true, we would expect that relationship banks are as likely as transaction lenders to enforce covenant violations when faced with very severe negative covenant slacks. However, our regression results show that relationship lenders are still less likely to enforce material covenant violation even for

[2] Relationship lenders' tolerance or leniency is related to the soft-budget constraint or hold-up problem created by the banking relationship (see, for instance, Boot 2000). The soft-budget constraint problem is associated with the relationship lender's reluctance to enforce the covenant violation due to the lender's concern about its adverse effect on the loan value. The hold-up problem may induce the relationship lender to temporarily waive the covenant violation so as to maximize future long-term rents from the relationship borrower.

borrowers having serious negative slacks. We also find that relationship lenders tend to enforce material covenant violations when borrowers seem to be less in distress as revealed by their covenant slack. These results are in sharp contrast to the leniency hypothesis, but rather consistent with the information friction hypothesis because relationship lenders' less responsiveness to severe negative slacks can also be attributable to their holding of sufficient soft information.

There are several endogeneity concerns that might bias the estimates in our paper. First, the formation as well as the duration of the bank relationship might not be random, and negative covenant slacks may be correlated with the lender-borrower relationship.[3] To resolve this endogeneity concern, we first show that there is no significant difference between relationship and nonrelationship lending in the probability of the borrower's making negative covenant slack or of a material covenant violation enforcement by the lender. We then restrict our sample to firms whose accounting ratios are within 0.5 standard deviation from the corresponding covenant threshold. Our aim is to exploit the local randomness of firm quality within this narrow window, as well as the discontinuity of covenant enforcement probability at the threshold. Our main results still hold using the discontinuity sample. Another concern comes from potential reverse causality from violation enforcement to financial covenant slack. It is possible that the current negative covenant slack is a result of uncured violation in the previous quarter. To mitigate this potential bias, we construct a restrictive sample free of reverse causality and find consistent results.

This paper is related to several strands of the literature. First, the paper is part of the literature that addresses topics on the lender-borrower relationship. There is a huge body of literature that

[3] For instance, Prilmeier (2017) documents that whereas the number of covenants does not change monotonically with the lending relationship, covenant tightness declines over the duration of a relationship.

documents the effect of a closer banking relationship on the borrower's financing conditions such as credit availability, collateral, and cost of funds (Boot and Thakor 1994; Petersen and Rajan 1994; Berger and Udell 1995; Bharath et al. 2009; Li et al. 2017). In line with the aforementioned literature, this paper also discusses the effect of the banking relationship on the borrower's financing issues, but highlights the effect of the banking relationship on lenders' material covenant violation enforcement against the borrowers with negative covenant slacks. In addition, this paper discusses how the banking relationship affects the borrowers' subsequent financing and investment activities after the firms' negative covenant slacks. This paper focuses on mitigation of information friction as the main driving force that leads to relationship lenders' less likelihood of material covenant violation enforcement. In this regard, we make an important contribution to the literature that documents the role of banks as an information processor (Diamond 1984; Ramakrishnan and Thakor 1984; Allen 1990; Winton 1995).

Second, this paper contributes to the discussion of the topics related to covenant violations and creditor control. A number of studies investigate the impact of covenant violations on the banks' immediate responses or the borrowers' subsequent credit accesses (Beneish and Press 1993; Chen and Wei 1993; Chava and Roberts 2008; Nini et al. 2012; Denis and Wang 2014; Barakova et al. 2016; Chava et al. 2016). Rather than highlighting the consequences of the covenant violation, this study focuses on the factor that affects the possibility of material covenant violation enforcement by documenting how the banking relationship affects the relationship lenders' behaviors regarding such enforcement.

The rest of the paper is organized as follows. Section 1 provides the theoretical motivation. Section 2 describes the empirical methodology. Section 3 describes the data sources and provides

summary statistics of the sample. Section 4 presents the results. Section 5 concludes.

1 Theoretical Motivation

In this section, we discuss theoretical backgrounds for the question of how the lender-borrower relationship affects the lender's enforcement of a material covenant violation against the borrower who fails to meet at least one of the financial covenants specified in the loan contract.

The theoretical literature on the lender-borrower relationship studies the benefits and costs of relationship lending. Petersen and Rajan (1994), Berger and Udell (1995), and Bharath et al. (2009) document that firms benefit from building relationships with banks, with perks including but not limited to lower interest rates, less collateral, or better credit availability to the borrowers. There is a dark side of relationship banking, as Sharpe (1990) and Rajan (1992) discuss the hold-up problem, which arises from the information monopoly by the relationship lender. As another cost of relationship lending, Boot (2000) addressees the soft-budget constraint, which emerges when the lender cares about the devaluation of the relationship loans. Central to both the positive and negative aspects of relationship banking is how effectively the lender-borrower relationship mitigates the information friction between the two parties.[4]

With regard to the alleviation of information frictions by the banking relationship, this study discusses different effects of the lender-borrower relationship. Our main focus is how differently the relationship lenders respond to their borrower-specific credit events compared with nonrelationship lenders. If borrower-specific shocks manifest themselves in the form of hard

[4] We can find a huge body of literature that highlights the role of banks as information processors. Banks obtain borrower-specific information by screening (Ramakrishnan and Thakor 1984; Allen 1990) and/or monitoring function (Diamond 1984; Winton 1995). The financial intermediaries benefit from information reusability (Greenbaum and Thakor 1995). Bhattacharya and Thakor (1993) document that asymmetric information around a firm "provide[s] the most fundamental explanation for the existence of [financial] intermediaries."

information such as accounting data, which are readily available to general creditors, lenders' response to the shock may be quite different depending on the level of borrower-specific soft information that has been accumulated during the past bank lending relationship. If the relationship lender is better informed about the borrower's solvency situation through superior processing of firm-specific soft information, the decision made by the relationship lender will be quite different from that made by other creditors, who usually rely on hard information.

One of the important credit events related to the borrower's solvency status reflected by hard signals/information is a negative covenant slack. Conceptually, these events happen when the borrower breaches at least one of the accounting ratios (e.g., Debt-to-EBITDA) that are required to be maintained according to financial covenants specified in loan agreements. Financial covenants, usually written on certain accounting ratios, serve as "trip wires" that facilitate the shift of control rights from firm management/shareholders to creditors once they are breached. By law, creditors gain the right to accelerate debt repayment once borrower firms breach covenants (usually financial covenants). Using the threat of payment acceleration, creditors push for significant changes in various firm policies, including but not limited to capital structure (Roberts and Sufi 2009), investment and financing decisions (Nini et al. 2012), governance and executive compensation (Ferreira et al. 2017; Balsam et al. 2018). By exerting influence on firm policies, creditor control serves as a tool to enhance corporate governance and increase firm value (Nini et al. 2012). This is consistent with the view that covenants included in debt contracts help mitigate the conflicts of interest between shareholders and creditors, and hence reduce the agency cost of debt (Smith and Warner 1979).

However, creditor control could sometimes be costly from the perspective of borrowers.[5] Existing studies have shown that borrowers could suffer from the adverse effects of creditor control on various dimensions, such as less access to credit (Sufi 2009), higher cost of future debt financing and a higher probability of default (Freudenberg et al. 2017), and a decline in innovation activities and output after violations (Gu et al. 2017) as well as higher employment risks (Falato and Liang 2017). Besides, in most cases, creditors renegotiate the debt contract after violations, and the new contract tends to contain unfavorable terms to the borrower, such as shorter maturity, higher loan spreads, and stricter covenants (Roberts and Sufi 2009b).

Creditor control could be costly even to lenders. Strict creditor control may be beneficial to lenders by reducing the likelihood of loan defaults, but this can be harmful to the lenders' future loan growth in lending markets by deteriorating borrowers' financing and investment activities and threatening the existing lending relationship. Relative sizes of the benefits and the costs will be highly dependent on the intrinsic riskiness of the existing loans. For risky loans, the benefit of strict control may overwhelm its cost because the possibility of default is relatively high. On the other hand, for borrowers with better credit quality, the adverse effect of strict control may be greater than its benefits. This is because those firms are less likely to default on loans and more likely to create long-term revenues for banks once a long-run banking relationship is maintained. Given those benefits and costs, the key to banks' optimal decisions on creditor control is how well the banks are informed about the borrowers' credit quality.

[5] Beatty et al. (2002) show that borrowers are willing to pay higher interest rates in exchange for more flexible accounting practices to avoid costly covenant violations.

Banks' informed decisions on creditor control, given negative covenant slacks, rests on how to manage potential inefficiencies associated with "noisy signals" embedded in financial covenants. Unlike covenants in public bonds, which are often written on easily verifiable events such as rating declines and debt issuance, bank loan covenants are based on noisy indicators of firms' true financial soundness. Efficient handling of violations of loan covenants requires more intensive monitoring and information production (Berlin and Loeys 1988). Ideally, efficient creditor control through financial covenants requires fine-tuned accounting ratios that provide credible information regarding the solvency of borrower firms. For instance, Beatty et al. (2008) show that almost two-thirds of net worth covenants in bank loan agreements contain income escalators, which is an adjustment to net worth covenants that exclude a percentage of positive net income from the calculation of covenants. Tan (2013) documents that financial reporting becomes more conservative after covenant violations, implying that creditors are concerned that previolation performance has been inflated. Interpreting numbers in accounting reports correctly and making informed decisions when firms breach financial covenants therefore requires the lenders to acquire better and more complete information about the borrowers.

For these reasons, lenders' covenant violation enforcement triggered by the borrowers' negative covenant slacks has significant implications for creditors' control over the borrowers and the firms' subsequent financing and investment policies. The lenders' decision on covenant violation enforcement after financial covenant breaches is an ideal setting in which we can identify and measure the lenders' response to signals regarding the creditworthiness of the borrower. More specifically, in this study, we aim to highlight how the possession of soft information changes the way lenders process hard information by examining the distinctive pattern between relationship and nonrelationship lenders on their reactions to negative covenant slacks. This test therefore

provides a new angle beyond the existing literature on research topics related to the lender-borrower relationship as well as creditor's control.

2 Empirical Methodology

This section outlines our empirical methodology. In this study, we examine the effect of the lender-borrower relationship on the likelihood of material covenant violation enforcement conditional on the event that the borrower breaches at least one financial covenant (a negative covenant slack). The regression model is specified as follows.

$$Violation_{i,t} = \alpha_0 + \alpha_1 NegSlackDum_{i,t} + \alpha_2 Relation_{i,t} + \alpha_3 NegSlackDum_{i,t} \times Relation_{i,t} + \Gamma X_{i,t} + FEs + \varepsilon_{i,t} \quad (1)$$

The subscripts *i* and *t* refer to loan package and time (year-quarter), respectively. In other words, each observation in our panel is on the loan-quarter level. We assign one single bank (bank holding company, BHC) as the lead arranger for each loan package. *Violation* is a dummy variable that takes a value of 1 if the lender enforces a material covenant violation against the borrower in the current quarter. *NegSlackDum* is a dummy variable that takes a value of 1 if the borrower has a negative covenant slack from the loan package as of the quarter-end. In this study, a *negative covenant slack* is defined as the situation in which the borrower fails to meet at least one of the financial covenants that require the borrower to maintain its financial ratios (e.g., interest coverage ratio and net worth) within certain ranges. We construct four variables for *Relation* to measure the closeness of the lender-borrower relationship. The first measure, *RelationLoan*, is a dummy variable that identifies a relationship loan package. A *relationship loan package* is defined as one

that is originated within five years after a previous loan package has been made between the same lender and borrower. The second measure for relationship is *RelationBankFirm*, which is a dummy variable that takes a value of 1 if the lender and borrower have originated at least one relationship loan package during the 10-year period ending the prior year. The third one is *FracRelLoanNum*, which is a ratio of the number of the borrower's relationship loan packages originated by its corresponding relationship lenders during the 10-year period ending the prior year to the total number of loans issued by the borrower during the same period. Finally, *FracRelLoanAmt* is a ratio of the amount of the borrower's relationship loan packages originated by its corresponding relationship lenders during the 10-year period ending the prior year to the aggregate amount of the borrower's loan packages originated during the same period.

In these regressions, we employ a set of control variables that represent loan package-, borrower-, and lender (BHC)-level characteristics, which are included in $X_{i,t}$. This set of control variables are listed in the summary statistics in Table 1. The Appendix provides detailed definitions of variables. In these regressions, we use different sets of fixed effects. We start by employing only borrower, lender, and time (year-quarter) fixed effects. We then use time-lender and lender-borrower fixed effects to take into account nonrandom matching between firms and banks, as well as time-varying shocks from the supply side of bank loans. The regression model with this set of fixed effects is the baseline specification of our study. Next, as the most stringent specification, we use loan package and time-lender fixed effects to control for each loan package's time-invariant unique characteristics that may drive the regression results. Standard errors are clustered at the loan package level.

3 Data and Summary Statistics

This section describes our data sources and key variable construction, as well as the summary statistics of the main dependent and independent variables used in our analysis.

3.1 Data

Our main sample consists of syndicated bank loans borrowed by U.S. nonfinancial firms during the period of 1996 to 2008. We start with all syndicated loans with valid financial covenant thresholds in LPC DealScan. They are then merged with Compustat for accounting variables and CRSP for market prices using Michael Robert's link table. Given that our aim is to examine how lender-borrower relationships affect material covenant violation enforcement by the lenders when the borrowers breach financial covenants, we trace each loan to maturity in order to measure time-varying covenant slack.[6] Also, because a firm might have several bank loans outstanding simultaneously and our measures for a lending relationship could change within the life of one loan, our sample is at the loan-quarter level. Specifically, we compile data from several sources as described below.

Loan package characteristics: We rely on DealScan for collecting variables for loan characteristics on the package level. These variables include the loan amount, maturity, number of loan facilities, the loan purpose, and whether the loan is secured or not.

Borrower firm financial condition: We obtain information on a firm's financial condition from the quarterly Compustat data. The firm-level financial condition variables include return-on-

[6] Many loans in DealScan may mature earlier than the prespecified maturity date. This can occur for various reasons such as renegotiation, prepayment, or simply default, leading to measurement errors. In unreported tests, we find consistent results even when we limit samples to an early stage of each loan—e.g., the first quarter (around 25 percent) or the first half (around 50 percent) of each loan's stated maturity.

asset, market-to-book, and firm size (market capitalization).

Lender-borrower relationship: Following the method used in Chakraborty, Goldstein, and MacKinlay (2014), we select the lead agent of each syndicate loan package and manually match the lead lender to the bank holding company (BHC) of the Summary of Deposit through its name. By this process, we can identify the lender-borrower relationship between the BHC and its borrower for each loan package. We then measure the closeness between lenders and borrowers by observing whether the lender originates a relationship loan package with the borrower. Using this measure, we construct a set of the relationship variables described above and see how the lender-borrower relationship varies over time and across firms.

Lender's financial condition: We obtain data related to the BHC's financial condition from the quarterly FR-Y9C and Call Report. The variables for the BHC's financial conditions include BHC size (total assets), total loans, regulatory capital ratio, and leverage ratio.

Covenant Violation: According to SEC Regulation S-X, firms are required to report material violations to debt covenants in the notes of financial statements. Roberts and Sufi (2009a) conduct a fine-tuned key-word search of firms' 10-K and 10-Q filings during the period of 1996-2008. We obtain quarterly firm-level material covenant violations from Amir Sufi's website.[7]

Negative covenant slack: In order to gauge the importance of the bank lending relationship in loan covenant enforcement, we have to construct a time-varying measure of covenant slack that acts as a proxy for the distance to covenant threshold. One of the challenges in measuring the slack of financial covenants is the nonstandard definitions of accounting ratios used in bank loan

[7] We thank Professor Amir Sufi for sharing the covenant violation data on his website.

agreements.[8] We rely on the results in Demerjian and Owens (2016) and select 13 financial covenants for which the definition of covenants is relatively standard. We then calculate the amount of covenant slack of each loan package on a time-varying basis. Specifically, the slack of covenant *j* for loan package *i* at quarter *t* is defined as follows.

$$slack_{i,j,t} = \left(\frac{\theta_{i,j,t} - \theta^*_{i,j,t}}{\sigma_{i,j,t}}\right) * g_{i,j}$$

In the above formula, $\theta^*_{i,j,t}$ and $\theta_{i,j,t}$ represents the threshold and the corresponding accounting ratio of covenant *j* of loan package *i* at quarter *t*. $\sigma_{i,j,t}$ is the volatility (standard deviation) of underlying accounting ratios during the past eight quarters. $g_{i,j}$ is an indicator function which equals 1 if the covenant requires that the firm should maintain one particular accounting ratio above the prespecified covenant threshold (e.g., current ratio). $g_{i,j}$ is equal to −1 if the covenant specifies a maximum value of a certain accounting ratio (e.g., debt-to-EBITDA).[9]

Loan contract renegotiation: We obtain the data for renegotiations to loan contracts for part of our sample loans from Roberts (2015).[10] Relying on borrower firms' SEC filings, Roberts (2015) traces a loan period from its origination to maturity and codes changes to loan facility terms during all subsequent amendments. Because some of the amendments also involve changes to the thresholds of existing covenants, we update covenant thresholds in order to generate a reliable

[8] According to Demerjian and Owens (2016), the definition of fixed charge coverage in actual loan agreements is consistent with the standard definition in only 2.7 percent of cases. The debt-service-coverage covenant is defined in a standard way in 37.9 percent of cases. We therefore exclude these two covenants from the calculation of covenant slack.

[9] In our paper, covenants that specify a minimum include current ratio, quick ratio, cash interest coverage, interest coverage, net worth, tangible net worth, and EBITDA covenant. Covenants with a maximum threshold include debt-to-EBITDA, senior debt-to-EBITDA, senior leverage, debt-to-equity, debt-to-tangible net worth, and leverage covenant.

[10] We thank Professor Michael Roberts for sharing the bank loan renegotiation path data on his website.

measure of covenant slacks.[11] To be consistent with our main sample, we take the average of facility-level amendments (e.g., interest spreads) using the loan facility amount as weight to obtain package-level amendments.

Degree of information friction: When testing whether it is information asymmetry that drives our results, we use several variables to measure relationship banks' informational advantage over potential lenders.

First, it requires more soft information to interpret the financial statements of the firms with more discretionary accruals. We hereby define *opacity* as sum of the absolute value of discretionary accrual from year *t-2* to *t*, where the discretionary accrual is estimated using the modified Jones (1991) model. Next, we also identify situations in which soft information acquired by relationship banks is more valuable. For firms with more volatile cash flows or higher analyst earnings forecast dispersion, hard information revealed through accounting numbers will be less reliable as the signal of firm solvency. Lenders therefore have to rely more on soft information, which gives relationship banks more informational advantage. Cash flow volatility is calculated as the volatility of firms' cash flow during the previous eight quarters. *Analyst earnings forecast dispersion* is defined as the standard deviation of analyst EPS forecasts scaled by the absolute value of the consensus earnings forecast, following Diether et al. (2002). Last, Hegde and McDermott (2003) document that firms' information asymmetry declines after being added into the S&P 500 index. We therefore construct a dummy variable indicating whether a firm's common stock is a constituent of the S&P 500 index in a given year and stipulate that S&P 500 constituent

[11] A large quantity of amended loans are actually coded as new loans by DealScan. We therefore link those loan amendments that involve changes in financial covenants to DealScan to obtain the new covenant thresholds.

stocks have lower information asymmetry.

3.2 Summary Statistics

This section presents summary statistics and univariate test results for key dependent and independent variables in our regression models. Table 1 reports the summary statistics for the variables used in our study. According to the mean values, around 55 percent of sample loans are classified as relationship loans. About 61 percent of observations are assigned to the lender-borrower pairs with a close relationship. Around 39 percent of loan-quarters have negative covenant slack and around 7 percent of firms experience material covenant violations during the sample period. The average proportion of a borrower's relationship loan packages from its relationship lender is around 14 percent among the borrower's entire loan packages for the last 10 years.

Table 2 shows the results of univariate tests for whether mean values of key variables are significantly different between treated (relationship) and control (nonrelationship) groups. In Panel A, the treated group consists of relationship loan packages. In Panel B, the treated group consists of the loan packages that originated between a relationship lender and its borrower. In Panel A, we observe that relationship loan packages are less likely to have negative covenant slack. The borrower with the relationship loan package is less likely to experience material covenant violations. However, those differences may be driven by lender or borrower characteristics, which may be highly related to the lender-borrower relationship. Later in regressions, we find that there is no significant difference between relationship and nonrelationship loan packages for the likelihood of negative covenant slacks or material covenant violations after controlling for lender or borrower characteristics in Table 10.

From the middle part of Panel A in Table 2, we find that borrowers with relationship loan packages are more likely to have high leverage, large market capitalization, a high market-to-book ratio, and a low Whited-Wu index. Relationship loan packages are more likely to lend a large amount but less likely to be secured by collateral. Lenders with relationship loan packages tend to have a large size, high leverage, and a low capital ratio. In Panel B, we find similar patterns as in Panel A for the differences of variables between two groups—loan packages made by relationship lender-borrowers and packages made by nonrelationship lender-borrowers.

As can be seen from the univariate test results, there are differences in many dimensions between relationship loans (or loans between borrowers and lenders with relationship) and nonrelationship loans (or loans between borrowers and lenders with no close relationship). In order to take into account the matching effect in the loan market, we add those control variables listed above in the regression models. In addition, we employ loan package, lender, and borrower fixed effects to completely control for the variation in outcome variables that may be driven by unique characteristics of loan packages, lenders, and borrowers.

The key hypothesis we are testing in this paper is that relationship banks are less responsive to the borrowers' negative covenant slacks because these lenders rely more on soft information acquired through the lending relationship. In Figures 1 and 2, we plot the probability of a material covenant violation against the standardized distance between current accounting ratios and corresponding covenant thresholds (i.e., the covenant slack) for loans with different relationship strength. In Figure 1, we use the full sample used in baseline regressions. In Figure 2, we use an alternative sample where there are no breaches of financial covenants or material covenant violations in the prior quarter once we find the borrower breaches a financial covenant in the

current quarter.[12] As expected, violation probability does not change with the standardized distance (covenant slack) when the slack is positive, but there is clearly a jump in violation probability when the standardized distance (covenant slack) becomes negative in both Figures 1 and 2. This is consistent with financial covenants (and hence violations) serving as trip wires for creditor control. A finding more relevant to our paper is that the increase is significantly smaller if the loan is borrowed from a relationship lender. Note that the probability of violating covenants is almost indistinguishable between relationship loans and loans from arm-length lenders when the slack is positive. The increase in violation probability at the threshold, however, is much smaller for loans borrowed from a relationship lender, as shown in Panels A and B of both figures, in which a dummy indicating lending relationship is used. A similar pattern can be observed in Panels C and D of both figures, where sample loan-quarters are divided into quartile according to the strength of the banking relationship.

4 Empirical Results

This section discusses five sets of empirical results. First, we report the results of regressions that relate the likelihood of lenders' material covenant violation enforcement to the closeness of the lender-borrower relationship conditional on the borrower's breaching of financial covenants. Second, in order to identify the underlying driving force of the regression results, we run the same regressions on subsamples formed according to the level of the borrowers' information asymmetry. Third, we move on to testing whether the lender-borrower relationship affects loan interest spread adjustments and borrowers' future financing and investment activities

[12] We aim to resolve the reverse causality concern by putting a filter that requires no breach and no violation in the prior quarter. How we construct the sample will be explained in more detail in Section 4.3.3.

when borrowers have negative covenant slacks. Fourth, we conduct additional tests to discuss whether several alternative channels are able to explain our baseline regression results beyond the information asymmetry mitigation channel. Last, we try to resolve potential endogeneity concerns that could bias our estimates.

4.1 Lending relationship and violation enforcement

First, we run fixed-effect regressions to examine the effect of the lender-borrower relationship on the lender's enforcement of material covenant violation against its borrowers when these borrowers breach financial covenants. Table 3 reports results of the regressions specified in Equation (1). In Panel A, the closeness of the bank lending relationship is measured by *RelationLoan*, by which each loan is classified into being either relationship or nonrelationship. In Panel B, the relationship proximity is captured by *RelationBankFirm*, which gauges the closeness of the lender-borrower relationship each quarter. In these regressions, the main coefficients of interest are those for the interaction terms of *RelationLoan* × *NegSlackDum* (Panel A) and *RelationBankFirm* × *NegSlackDum* (Panel B).

According to the regression results in Panel A, the interaction terms are negative and statistically significant in both panels. The estimated value ranges from −0.017 to −0.028, depending on the fixed effects employed in regressions. As stricter fixed effects are employed, the coefficient magnitude of the interaction term becomes larger. These coefficients are also economically significant because the absolute value of the estimated coefficients corresponds to around 26 to 42 percent of the mean value of *Violation* (i.e., the unconditional violation probability).[13] These interaction terms can also be compared with *NegSlackDum* in the same table.

[13] The average probability of a material covenant violation is about 6.6 percent in our sample. The coefficient estimate in Column

All the *NegSlackDum* values are positive and statistically significant, with the magnitude ranging from 0.041 to 0.049. In other words, the probability of having a material covenant violation is about 4 to 5 percent once a borrower without any bank relationship breaches financial covenants. Combined with the coefficient magnitude of the interaction terms, the estimated (conditional) probability of violation for covenant-breaching borrowers with a bank relationship is about 2.4 percent in Column (1) and 2.1 percent in Columns (2) and (3).[14] We find similar regression results in Panel B. Hence, our results imply that having a bank relationship decreases the probability of a material covenant violation by a half or more when borrowers breach financial covenants.

We then replace the relationship dummy variable with continuous relationship variables *FracRelLoanNum* and *FracRelLoanAmt*. Panels C and D of Table 3 report the results. Again, the estimated coefficient of the interaction terms in both Panels C and D are negative and strongly significant regardless of the fixed effects that are controlled in those regressions. Taken together, these findings indicate that as borrowers have a stronger relationship with their lenders, they become less likely to face enforcement of material covenant violations after they breach financial covenants.[15]

(1) is therefore equivalent to 0.26 (0.017 / 0.066 = 0.26) of the average violation probability. The corresponding ratios are 0.32 and 0.42 in Columns (2) and (3) of Panel A.

[14] By construction, the conditional probability of material violation for covenant-breaching borrowers who have a bank relationship is just the sum of the coefficient of *NegSlackDum* and the interaction term (*RelationLoan* × *NegSlackDum*). Therefore, the corresponding probability in Column (1) is just the sum of 0.041 and −0.017, which is 0.024. Similar calculations apply for the rest of the columns.

[15] Recent research has demonstrated that the syndicated bank loan market underwent significant shifts, including but not limited to the rising popularity of "covenant-lite" loans and institutional investors' participation into loan syndicates (see, for instance, Berlin et al. 2018). It is possible that the changing role and incentive of lead banks affects our results. We therefore re-run our analysis using subsamples grouped by the time of loan origination (before 2001 or afterward) and by loan type (single-tranche versus multiple-tranche loans). Regardless of which subsamples are used, the regression results (in the Internet Appendix) are consistent with our main findings in Table 3.

4.2 Relationship and information friction

Next, we try to identify the underlying mechanisms that drive the regression results reported in Table 3. As discussed in our theoretical motivation section, a long-run lender-borrower relationship relieves information friction, which could lead to distinct lender response to new signals of the creditworthiness of borrowers (such as negative covenant slacks). To test this conjecture, we run separate regressions for subgroups of firms that have relatively high or low information friction. If a relationship lender's lower responsiveness to negative covenant slack is due to superior information, we would expect the effect to be stronger for firms that are more opaque.

Table 4 reports the regression results. We employ four different indicators that measure firm-level information asymmetry—namely, the degree of analyst forecast dispersion, opacity, cash flow volatility, and whether the company stock is an S&P 500 constituent. Panels A to D in Table 4 compare regression results between the two types of firms. As for analyst forecast dispersion, opacity, and cash flow volatility, firms within the bottom 50 percent are assigned to the group with less information asymmetry. As for S&P 500 constituents, if the company stock is included in the S&P 500 constituent list, it is then considered to have less information asymmetry. Other firms in the sample are regarded as the borrowers with relatively high information asymmetry.

In all panels of Table 4, we find that the coefficient estimate for *RelationLoan* × *NegSlackDum* is no longer statistically different from 0 (Column 1) for borrowers with less severe information asymmetry. In contrast, for those firms with relatively high information asymmetry, the interaction terms remain negative and statistically significant (Column 2), which is consistent

with the results in our baseline regressions. In Column 3, we confirm those findings through constructing a triple interaction term, *RelationLoan* × *NegSlackDum* × *LowFriction*. Again, relationship banks are significantly less responsive to negative slack events for informationally opaque borrowers, as revealed by the significantly negative coefficient estimate of the interaction term *RelationLoan* × *NegSlackDum*. However, this difference in responsiveness almost completely disappears for more transparent borrowers. The coefficient estimate of the triple interaction term is significantly positive with a sizable economic magnitude.[16] This implies that the responsiveness to negative covenant slack is not that different between relationship and nonrelationship lenders for transparent borrowers.

Those results highlight that, if the information friction is not severe in a capital market, the incremental benefit of holding soft information through the banking relationship is limited when there is firm-specific credit event identified by hard information (negative slacks). In other words, the finding of relationship lenders' less likelihood to enforce material covenant violation given negative covenant slacks is mainly driven by the mitigation of information friction between lenders and borrowers resulting from their mutual long-run and close relationship.

4.3 Effect on loan interest rates and firm policies

In this section, we examine how the lending relationship affects borrowers' loan interest rate adjustments and subsequent firm policies when borrowers breach financial covenants. Covenant violations provide the lenders with the right to renegotiate the existing loans just as in payment default (Nini et al. 2012). As a result of loan renegotiations after the negative credit events

[16] We find similar regression results when replacing *RelationLoan* and its interaction of *RelationLoan* × *NegSlackDum* with *RelationBankFirm* and the interaction of *RelationBankFirm* × *NegSlackDum*. Those results are reported in our Internet Appendix.

and violation enforcements, loan interest rates are expected to increase to compensate lenders for bearing higher credit risks. If maintaining the banking relationship decreases the likelihood of material covenant violation enforcement by lenders, loan interest rate adjustments following covenant breaches should be more borrower-friendly. To test this prediction, we set up the regression model shown below.

$$\begin{aligned} LoanRateIncrease_{i,t} \\ &= \alpha_0 + \alpha_1 NegSlackDum_{i,t} + \alpha_2 Relation_{i,t} \\ &+ \alpha_3 NegSlackDum_{i,t} \times Relation_{i,t} + \Gamma X_{i,t} + FEs + \varepsilon_{i,t} \end{aligned} \quad (2)$$

In this regression model, $LoanRateIncrease_{i,t}$ is a dummy variable that takes a value of 1 if we observe a loan interest rate increase after loan agreement renegotiations, 0 otherwise. According to the results reported in Panel A of Table 5, firms with negative covenant slacks are more likely to encounter a jump in loan interest rates (Column 1). However, for borrowers that have a close relationship with their lenders, we cannot find any significant increases in their loan interest rates (Column 2). In Panel B, we replace the dummy dependent variable with a continuous variable, *LoanRateChange*, which is the difference between loan interest spreads over the London Interbank Offered Rate (LIBOR) after loan renegotiations and prior interest spreads, scaled by the latter. The regression results are consistent with those in Panel A.[17]

We then turn to the change in firm policies. Existing studies have documented that firms' subsequent financing and investment activities tend to be more conservative after covenant violations (for example, see Sufi 2009; Freudenberg et al. 2017; Falato and Liang 2017; Gu et al.

[17] We also use *RelationBankFirm* instead of *RelationLoan* as the relationship measure. The results are robust to the change of the bank relationship measure (see Internet Appendix).

2017). If a close lending relationship makes lenders less likely to enforce material covenant violations following negative covenant slack, we would expect that firms with such relationships are not as conservative as those without relationship lenders once they breach financial covenants.

To test this prediction, we replace the dependent variable with the change in the borrower firm's subsequent financing and investment activities and run a regression similar to our baseline. The regression models are designed as follows.

$$Y_{i,t} = \alpha_0 + \alpha_1 NegSlackDum_{i,t} + \alpha_2 RelationLoan_{i,t} + \alpha_3 NegSlackDum_{i,t} \times RelationLoan_{i,t} + \Gamma X_{i,t} + FEs + \varepsilon_{i,t} \quad (3)$$

The dependent variable, $Y_{i,t}$, represents the change in firm policies, including the change in a firm's total debt, leverage ratio, cash ratio, and tangible assets (in natural logarithm) during the next four quarters. We try two different specifications for these outcome variables: One is average quarterly change in the next four quarters (Panel A; Δ*DebtAve*, Δ*LeverageAve*, Δ*CashRatioAve*, and Δ*PPENTAve*) and the other is annual change during the next year from the current quarter-end (violation quarter) (Panel B; Δ*Debt*, Δ*Leverage*, Δ*CashRatio*, and Δ*PPENT*). In this part, we focus on the regression specifications used for our baseline analysis—that is, using *RelationLoan* dummy as the relationship measure and controlling for quarter-lender as well as borrower-lender fixed effects.

The results are reported in Table 6. In both panels of this table, we observe that if the borrower faces negative covenant slack, firm policies tend to become more conservative, consistent with what is found in previous studies such as Nini et al. (2012). Specifically, the firm is more likely to reduce its debt, leverage ratio and tangible assets, and increase its cash ratio after

financial covenant breaches, as evidenced by the coefficient estimate of *NegSlackDum*. However, the coefficient of the interaction term *RelationLoan* × *NegSlackDum* has opposite signs to that of *NegSlackDum* in all specifications.[18] In other words, the increase in the conservativeness of firm policies is offset significantly if the borrower maintains bank relationships. Take the annual change in firm leverage as an example. The coefficient estimate of *NegSlackDum* in Column 3 of Panel B indicates that firms without a bank relationship build up 1 percent more cash after negative covenant slacks. For firms with a bank relationship, however, the buildup of cash is of much smaller magnitude. In fact, those firms only increase their cash holdings by 0.3 percent.

4.4 Potential alternative channels

4.4.1 Relationship lender's loan market share concern

In the previous section, we test the conjecture that the less responsiveness of relationship banks to negative covenant slack is a result of superior (soft) information possessed by these banks. We find that the effect only exists for borrowers that are more opaque, in support of this hypothesis. However, there may exist factors that drive the regression results beyond the reduced information friction. One of the alternative stories is the bank wants to maintain its loan market share. This may simultaneously determine the lender-borrower relationship and the bank's material covenant violation decision. If banks are willing to maintain or even expand their loan market share, they may be quite reluctant to enforce a material covenant violation and break the relationship with the borrowers even if they discover insolvency problems of the borrowers through their negative covenant slacks.

[18] Instead of *RelationLoan*, we also use *RelationBankFirm* in the regressions as the robustness. Our regression results are robust to using different relationship dummy variables. Those results are reported in the Internet Appendix.

To test this alternative channel, we construct a new variable, *LoanMktShare*, to interact with *NegSlackDum*, adding both to our baseline regression models as in Equation (4). *LoanMktShare* is the lender's (BHC's) total loan market share identified through the DealScan data, and this variable is used as proxy for the lender's preference to maintain its loan market shares. Except for the addition of these new variables, all other regression specifications are the same as in Equation (1).

$$\begin{aligned} Violation_{i,t} = \ & \alpha_0 + \alpha_1 NegSlackDum_{i,t} + \alpha_2 Relation_{i,t} \\ & + \alpha_3 NegSlackDum_{i,t} \times Relation_{i,t} + \alpha_4 LoanMktShare_{i,t} \\ & + \alpha_5 NegSlackDum_{i,t} \times LoanMktShare_{i,t} + \Gamma X_{i,t} + FEs + \varepsilon_{i,t} \end{aligned} \quad (4)$$

The regression results are reported in Table 7. As predicted, if the lender cares more about its loan market share, it is less likely to enforce a material covenant violation given negative covenant slacks. These findings are identified by the negative and significant coefficients of *NegSlackDum* × *LoanMktShare.* However, even after the addition of this set of variables to control for banks' intention of maintaining market share, our main regression coefficients, *NegSlackDum* × *Relation*, are still negative and statistically significant. Thus, our main regression results are still robust to the addition of new control variables related to the lenders' preference to maintain their loan market shares.

4.4.2 Soft budget or hold-up problem

As another alternative hypothesis, the close relationship between lenders and borrowers may be highly related to the soft-budget constraint problem or the hold-up problem (see, for instance, Boot 2000). Those problems are also likely to affect the lender's behavior related to its enforcement of a material covenant violation against the borrower with negative covenant slacks.

Soft-budget constraints make a lender reluctant to enforce material covenant violations against its relationship loans given the event of negative slacks because the lender may have concerns about potential negative effect on the loan value. The hold-up problem is associated with the lender's long-run rent-seeking from its relationship borrowers in the future. To extract more rents from the relationship borrowers, the lender needs to continue its relationship with the borrower even though negative slack might signal problematic repayment prospects. Just as the information friction channel suggests, the soft-budget constraint or the hold-up problem could also generate the observed pattern (i.e., a decline in the possibility of material violation enforcement against negative slack borrowers by the relationship lender).

Although reduced information frictions and the soft-budget constraint (or the hold-up problem) imply similar empirical findings, the underlying mechanisms are quite different. As for the mitigation of information asymmetry, the driving force is whether the lender is better-informed on the borrower's solvency status. On the other hand, for both the soft-budget constraint and the hold-up problem, the regression results will be driven by the lender's lenient attitude about the borrower's solvency problems. In this situation, the relationship lender may tolerate the borrower's minor solvency problems temporarily unless the borrower's creditworthiness becomes seriously deteriorated. To identify which forces drive our baseline regression results, we run the following test.

$$
\begin{aligned}
Violation_{i,t} = \ & \alpha_0 + \alpha_1 Relation_{i,t} + \alpha_2 NegSlackDum_{i,t} \\
& + \alpha_3 NegSlackDum_{i,t} \times Relation_{i,t} \\
& + \alpha_4 SevereSlack_{i,t}(MoreSlack_{i,t}) \\
& + \alpha_5 SevereSlack_{i,t}(MoreSlack_{i,t}) \times Relation_{i,t} + \Gamma X_{i,t} + FEs + \varepsilon_{i,t}
\end{aligned}
\tag{5}
$$

In the above model, we modify Equation (1) by adding *SevereSlack* (or *MoreSlack*). *SevereSlack* takes the value of 1 if the absolute value of the average standardized distance between the financial ratios and its covenant threshold exceed the median of the absolute value of the average standardized distance of the entire sample with *NegSlackDum* = 1. *MoreSlack* takes the value of 1 if the fraction of the breached financial covenants among total number of financial covenants included in the loan contract is greater than the median value of the entire sample with *NegSlackDum* = 1. All other regression specifications are the same as in Equation (1).

The results are reported in Table 8. In both Panels A (adding *SevereSlack*) and B (adding *MoreSlack*), the coefficients of *SevereSlack* and *Moreslack* are positive and significant, meaning that the likelihood of violation enforcement increases if the borrower faces more severe negative slacks or breaches more financial covenant requirements. On the other hand, their interaction terms with relationship variables, which are *Relation* × *SevereSlack* and *Relation* × *Moreslack,* are mostly significantly negative. The regression results imply that relationship lenders are still less likely to enforce material covenant violation even though borrowers seem to be in bad shape according to covenant slacks. This is against the hypothesis that relationship lenders are lenient with regard to borrowers' minor solvency problems if the borrower's creditworthiness has not severely deteriorated.

If lenders' leniency is behind our results, another very natural implication is that borrowers

are supposed to be in worse shape, reflected by negative covenant slacks, when relationship banks are enforcing violations. The information friction story, however, says that banks put much less weight on hard information conveyed by covenant slacks and rely more on soft information in enforcement decision-making. It therefore does not say anything about the severity of financial covenant breaches at the time of violation enforcement. To contrast these two competing hypotheses, we run the following regression that relates the average negative covenant slack to banking relationship and violation enforcement.

$$AveSlack_{i,t} = \alpha_0 + \alpha_1 Violation_{i,t} + \alpha_2 Relation_{i,t} + \alpha_3 Violaton_{i,t} \times Relation_{i,t} + \Gamma X_{i,t} + FEs + \varepsilon_{i,t} \quad (6)$$

In these regressions, *Violation* dummy and its interaction with relationship dummies are used as independent variables. Outcome variable is *AveSlack*, which represents the severity of the negative covenant slacks. *AveSlack* is the mean value of the standardized distance of the firm's financial ratio against its corresponding threshold level for each loan package in the quarter. Thus, if *AveSlack* is negative and its absolute value is large, the borrower faces more serious negative covenant slacks, on average. Table 9 reports the regression results. In all four specifications, coefficient estimates for *Relation* × *Violation* are positive and statistically significant. These results imply that the severity of negative slacks for the borrowers that face material covenant violations is less serious even for relationship borrowers than for the nonrelationship borrowers. The results are not consistent with the hypothesis of relationship lenders' leniency, but rather consistent with the hypothesis of relationship lenders' informational advantage. According to the regression results, relationship lenders' covenant violation enforcement is less dependent on the negative covenant slack. This means relationship lenders rely on other unobserved (soft)

information, different from the (hard) signal generated by the negative covenant slacks. This is the hypothesis of the relieved information friction by banking relationship.

More generally, we test whether relationship banks are less likely to enforce material covenant violations unconditionally. We run regressions of *Violation* on the relationship dummy (*RelationLoan* or *RelationBankFirm*) without including its interaction with the dummy for negative covenant slack. If relationship lenders are more lenient about the borrower's solvency problem, we may predict that the relationship lenders will be less likely to enforce material covenant violations regardless of whether the lenders detect negative slacks or not. According to the first two columns of Table 10, neither the coefficient of *RelationLoan* (Panel A) nor that of *RelationBankFirm* (Panel B) are statistically significant. In other words, the probability of material covenant violation enforcement is not statistically different between relationship and nonrelationship lenders.

Last, we compare borrowers' credit ratings by the intensity of the lender-borrower relationship. We do not find any significant differences in credit ratings across borrowers with different levels of banking relationships. These results are another evidence against the lender's leniency. The results are reported in the Internet Appendix.

4.5 Endogeneity of negative covenant slack

In our baseline regressions, we measure the likelihood of material covenant violation enforcement conditional on borrowers' negative covenant slacks. However, the negative covenant slacks may be affected endogenously by the banking relationship. In fact, both components in covenant slacks (i.e., covenant threshold and the corresponding accounting numbers) could be affected by the lending relationship. Existing studies such as Aslan (2015) find that bank

relationships have a significant impact on both financing and investment policies of firms. Firms with a stronger bank relationship are more leveraged, invest more, and have a preference to debt financing. Given certain strictness of financial covenants, relationship borrowers are more likely to violate covenants. On the other hand, bank relationship also determines the strictness of financial covenants. Specifically, Prilmeier (2017) demonstrates that whereas the number of covenants do not have a monotonic relationship with bank relationship, financial covenant tightness declines along lending relationship. It then becomes an empirical question whether bank relationship makes it more likely for borrowers to have negative covenant slacks. Regarding this concern, we run regressions of *NegSlackDum* on the relationship dummies (*RelationLoan* or *RelationBankFirm*). The results are reported in the last two columns of Table 10. According to the results, we cannot see any significant difference in the probability of negative covenant slacks between relationship and nonrelationship borrowers.

One endogeneity concern is that the formation as well as the duration of a bank relationship is with no doubt nonrandom. Moreover, our empirical design could suffer from reverse causality, as uncured material covenant violations might lead to negative covenant slacks in the next period. To verify our results are robust to these two concerns, we transform the baseline regressions (*Violation* on *NegSlackDum*) into a triple difference-in-differences format (DDD). In this DDD regression, we compare three types of differences: pre- versus post-period, treated versus control groups, and relationship versus nonrelationship loan (or lender-borrower). First, we create an event window of two consecutive quarters (pre-period and post-period). Second, we construct treated and control groups. The treated group consists of the observations that do not have any negative covenant slack and material covenant violation enforcement in the pre-period and have a negative covenant slack in the post-period. The control group consists of the observations that do not have

any negative covenant slack and material covenant violation in the pre-period and do not have negative covenant slack in the post-period. Third, we use the same relationship measure as in the baseline regressions. The regression model with DDD is designed as below.

$$\begin{aligned} Violation_{i,t} = \ & \alpha_0 + \alpha_1 Treated_{i,t} + \alpha_2 Post_{i,t} + \alpha_3 Treated_{i,t} \times Post_{i,t} \\ & + \alpha_4 Relation_{i,t} + \alpha_5 Relation_{i,t} \times Treated_{i,t} \\ & + \alpha_6 Relation_{i,t} \times Post_{i,t} + \alpha_7 Relation_{i,t} \times Treated_{i,t} \times Post_{i,t} \\ & + \Gamma X_{i,t} + FEs + \varepsilon_{i,t} \end{aligned} \tag{7}$$

In the above regression, *Treated* equals 1 for the treated group, 0 otherwise. *Post* takes the value of 1 for the post-period, 0 otherwise. In this regression, we employ within-cohort-loan (package) and within-cohort-time (quarter) fixed effects. Samples with the same lender and same two-quarter window are assigned to the same cohort. The regression results are reported in Panel A of Table 11. All the triple interaction terms are negative and significant. As an extension, we run the DDD regression with matched samples by matching every observation with *RelationBankFirm* = 1 with a control observation with *RelationBankFirm* = 0 that is in the same industry (3-digit SIC code) and in the same cohort (same two-quarter window and same lender) and is closest in terms of the borrower firm's size (market capitalization) and market-to-book ratio. The empirical results of this DDD with the matched samples are reported in Panel B of Table 11. The results are similar to those in Panel A of the same table.

Unobservable firm characteristics might determine both our outcome variable (i.e., *Violation*) and our two key independent variables (i.e., *Relation* and *NegSlackDum*), leading to omitted variable bias. Here we rely on the randomness of firms' accounting ratios around covenant threshold to draw causal inferences. Specifically, we form a subsample that belongs to a narrow

window where the standardized distance between the covenant threshold and the corresponding financial ratio turns from positive to negative. We pick the interval with standardized distance between −0.5 and +0.5. More than 85 percent of observations are dropped after limiting the sample to firm-quarters lying within this interval. We then re-run the baseline regression of *Violation* on *NegSlackDum* using this discontinuity sample. Results are reported in Table 12. The coefficient estimate of the interaction term is significant in each specification, indicating that our results are robust to the correction of possible omitted variable bias.

5 Conclusion

This study highlights the importance of soft information that is accumulated by banks during repeated lending in the enforcement of material covenant violation when banks identify borrower-specific credit events identified by hard information (negative covenant slacks). We find that if lenders have a long-run relationship with borrowers, the lenders enforce material covenant violation at a substantially lower rate when the borrowers breach at least one of their financial covenants. As a consequence, borrowers with such close banking relationships are less likely to suffer from increases in loan interest rates and a deterioration of subsequent financing and investment activities even when the borrowers fail to fulfill the covenant requirements.

In this study, we document that it is the reduced information friction between relationship lenders and borrowers, rather than banks' preference to maintaining market share or the soft-budget problem, that lies behind our main results. This finding presents a new view on issues surrounding the banking relationship and reemphasizes the specialness of banks' role as an information processor.

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Appendix: Variable Definition

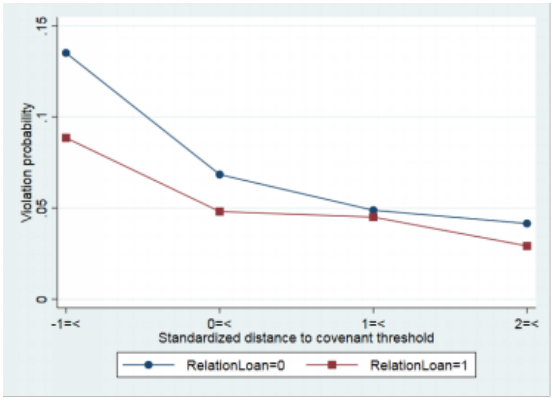
Variable	Definition	Level
Relationship measure		
RelationLoan (dummy)	Dummy that takes the value of one for the relationship loan package, which is the loan package that is originated within five years after another loan has been made between the lender and the borrower.	Loan package
RelationBankFirm (dummy)	Dummy that takes a value of one for the pair of lender and borrower that have at least one relationship loan package during the last 10 years until the prior year.	Lender-borrower-Quarter
FracRelLoanNum	Fraction of the numbers of the borrower's total relationship loan packages originated by its corresponding relationship lenders during the last 10 years until the prior year over the number of the borrower's entire loan packages originated during the last 10 years until the prior year.	Lender-borrower-Quarter
FracRelLoanAmt	Fraction of the amount of the borrower's total relationship loan packages originated by its corresponding relationship lenders during the last 10 years until the prior year over the amount of the borrower's entire loan packages originated during the last 10 years until the prior year.	Lender-borrower-Quarter
Key dependent/independent		
Violation (dummy)	Dummy that takes the value of one for the borrower firm that experiences material covenant violations in the quarter.	Borrower-Quarter
LoanRateIncrease (dummy)	Dummy that takes the value of one if loan interest rates increases as a result of loan renegotiation, zero otherwise.	Loan-Quarter
LoanRateChange	Difference between loan interest spreads over LIBOR after loan renegotiations and prior interest spreads, scaled by the latter.	Loan-Quarter
NegSlackDum (dummy)	Dummy that takes the value of one for the package on which the borrower breaches a financial covenant threshold (having negative covenant slack) in the quarter.	Loan package
AveSlack	Mean value of covenant slack (the distance between the firm's financial ratio and the corresponding threshold in covenants) for each loan package in the quarter.	Loan package
CreditRating	Average credit rating of the borrower firm as of the quarter-end. This is the mean of maximum and minimum ratings for the borrower firm after converting the letter ratings (AAA to D) into numbers (21 to 1)	Borrower-Quarter
LoanMktShare	Ratio of the amount of total loan facilities arranged by the lender during the calendar year over total amounts of loan facilities provided in the loan market during the same year.	Lender-Quarter
Borrower's subsequent financing and investment activities		
ΔDebtAve	Average quarterly change in the next four quarters for natural logarithm of total debt of the borrower firm	Borrower-Quarter
ΔLeverageAve	Average quarterly change in the next four quarters for total debt scaled by total assets.	Borrower-Quarter

Variable	Definition	Level
ΔCashRatioAve	Average quarterly change in the next four quarters for cash and short-term investments scaled by total assets.	Borrower-Quarter
ΔPPENTAve	Average quarterly change in the next four quarters for natural logarithm of net tangible assets	Borrower-Quarter
ΔDebt	Annual change in the next one year for natural logarithm of total debt of the borrower firm	Borrower-Quarter
ΔLeverage	Annual change in the next one year for total debt scaled by total assets.	Borrower-Quarter
ΔCashRatio	Annual change in the next one year for cash and short-term investments scaled by total assets.	Borrower-Quarter
ΔPPENT	Annual change in the next one year for natural logarithm of net tangible assets	Borrower-Quarter
Borrower controls		
Book leverage	The ratio of total debt to book value of assets.	Borrower-Quarter
Ln(MktCap)	The natural logarithm of total market capitalization which is product between fiscal-year end stock and the number of shares outstanding.	Borrower-Quarter
Market-to-Book	The natural logarithm of the ratio of market capitalization to the book value of common equity.	Borrower-Quarter
Return on Assets	The ratio of earnings before extraordinary items to total assets.	Borrower-Quarter
Whited-Wu index	A measure of financial constraints following Whited and Wu (2006).	Borrower-Quarter
Loan package controls		
Number of loan facilities	The total number of facilities included in a loan package.	Loan package
Term loan facility (dummy)	A dummy variable which equals one if a loan package contains at least one term loan facility.	Loan package
Tranche-B facility (dummy)	A dummy which equals one if a loan package contains at least one term loan B facility.	Loan package
Secured (dummy)	A dummy which equals one if a loan has collateral	Loan package
Loan purpose	Loans are categorized into 5 types according to their purposes, namely loans issued for corporate, refinancing, restructuring, investment and other purposes.	Loan package
Refinancing loan (dummy)	A dummy indicating that the loan is a refinancing loan.	Loan package
Ln(Loan amount)	The natural logarithm of loan package amount.	Loan package
NumFinCovenantSweep	The total number of financial covenants and general (sweep) covenants. General sweep covenants include excess cash flow sweep, asset sales sweep, debt issuance sweep, equity issuance sweep, insurance proceeds sweep and dividend payment restrictions.	Loan package
Ln(weighted avg AISD)	The natural logarithm of the weighted average all-in-spread-drawn (AISD) in which the weight is the amount of each loan facility.	Loan package

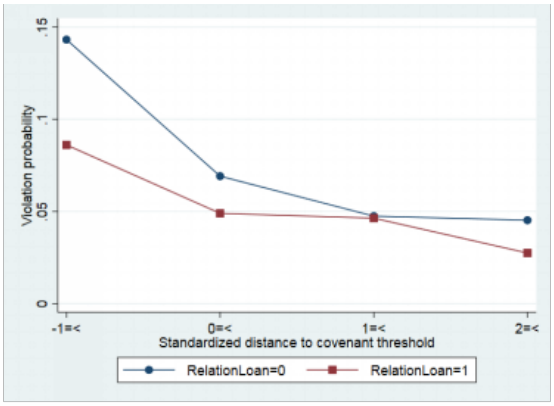
Variable	Definition	Level
Ln(weighted avg maturity)	The natural logarithm of the weighted average maturity in which the weight is the amount of each loan facility.	Loan package
Lender controls		
Ln(Total assets)	Natural logarithm of total assets at quarter-end	Lender-Quarter
Ln(Total loans)	Natural logarithm of total loans at quarter-end	Lender-Quarter
Ln(Allowance)	Natural logarithm of total allowance at quarter-end	Lender-Quarter
Ln(Charge-off)	Natural logarithm of total charge-off during the quarter	Lender-Quarter
Ln(Provision)	Natural logarithm of total assets at quarter-end	Lender-Quarter
Leverage Ratio	Ratio of tier1 capital over total asset at quarter-end	Lender-Quarter
Capital Ratio	Ratio of tier1 capital over risk weighted asset at quarter-end	Lender-Quarter
Degree of information friction		
Analyst forecast dispersion	Analyst forecast dispersion, defined as the standard deviation of analyst earnings forecasts scaled by the absolute value of the consensus earnings forecast, following Diether et al. (2002).	Borrower-Quarter
Opacity	Measured as sum of the absolute value of discretionary accrual from t-2 to t, where discretionary accrual is estimated using the modified Jones (1991) model.	Borrower-Quarter
Cash flow volatility	The volatility of firms' cash flow during the past eight quarters.	Borrower-Quarter
S&P500 constituent	A dummy indicating whether the firm is an S&P 500 constituent stock in a given year.	Borrower-Quarter

Figure 1
Violation enforcement probability and lender-borrower relationship

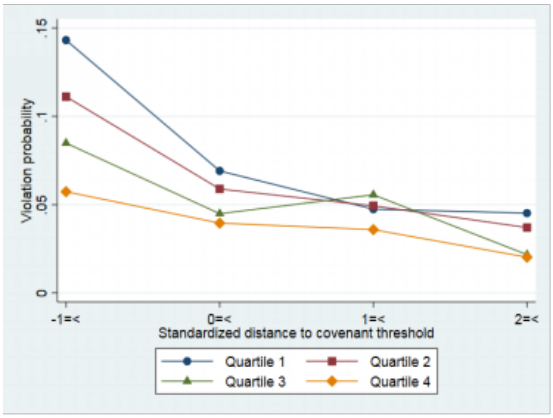
This figure presents the probability of material covenant violation enforcement depending on the distribution of covenant slack (i.e. standardized distance to the covenant threshold) for sample firms with different strength of bank relationship. Bank relationship is measured by (A) *RelationLoan* dummy which equals one if the loan is originated within five years after previous loan package has been made between the same lender and borrower, (B) *RelationBankFirm* dummy indicating whether the lender and borrower have originated at least one relationship loan package during the last 10 years until the prior year, (C) quartile values of *FracRelLoanNum* which is fraction of the borrower's number of loan packages originated by its corresponding relationship lenders during the last 10 years over the borrower's total number of loans issued during the same period, and (D) quartile values of *FracRelLoanAmt* which is fraction of the amount of the borrower's total relationship loan packages originated by its corresponding relationship lenders during the last 10 years over the entire amount of the borrower's loan packages originated during the last 10 years. For these quartile values, 1 represents the bottom quartile and 4 is the top quartile. Violation probability is each group's average value of *Violation* dummy, which equal 1 for the borrower that experiences material covenant violations in the quarter.



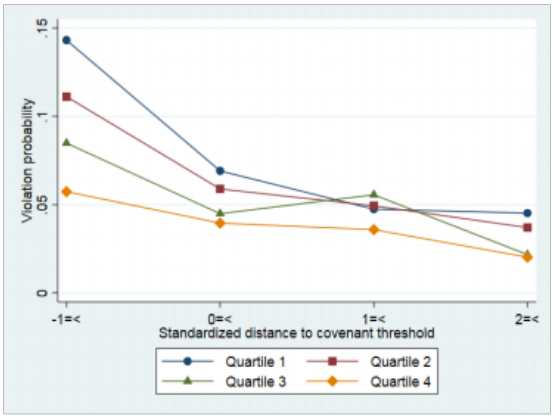
A. Conditional on values of *RelationLoan* dummy



B. Conditional on values of *RelationBankFirm* dummy



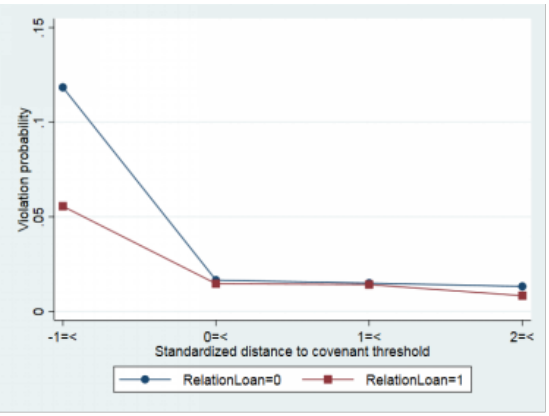
C. Conditional on quartile values of *FracRelLoanNum*



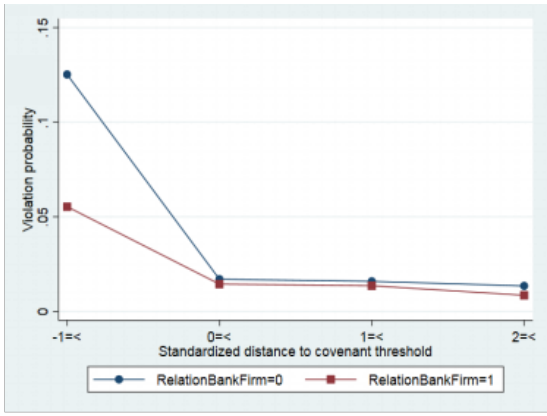
D. Conditional on quartile values of *FracRelLoanAmt*

Figure 2
Violation enforcement probability and lender-borrower relationship for DDD samples

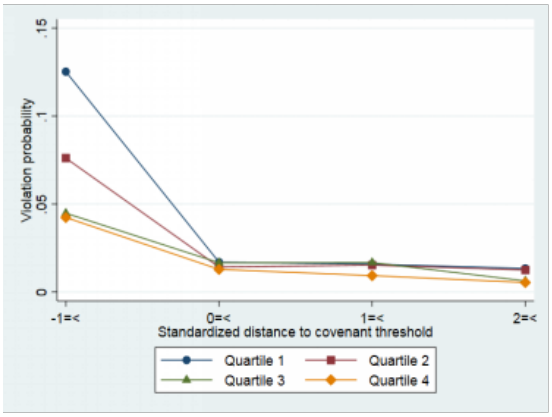
This figure presents the probability of material covenant violation enforcement depending on the distribution of covenant slack (i.e. standardized distance to the covenant threshold) for sample firms with different strength of bank relationship used in a triple difference-in-differences specification (DDD). Bank relationship is measured by (A) *RelationLoan* dummy which equals one if the loan is originated within five years after previous loan package made between the same lender and borrower, (B) *RelationBankFirm* dummy indicating whether the lender and borrower have originated at least one relationship loan package during the last 10 years until the prior year, (C) quartile values of *FracRelLoanNum*, the fraction of the borrower's number of loan packages originated by its corresponding relationship lenders during the last 10 years over the borrower's total number of loans issued during the same period, and (D) quartile values of *FracRelLoanAmt*, the fraction of the amount of the borrower's total relationship loan packages originated by its corresponding relationship lenders during the last 10 years over the entire amount of the borrower's loan packages originated during the last 10 years. For (C) and (D), 1 represents the bottom quartile and 4 is the top quartile. Violation probability is each group's average value of *Violation* dummy, which equal 1 for the borrower that faces material covenant violations in the quarter.



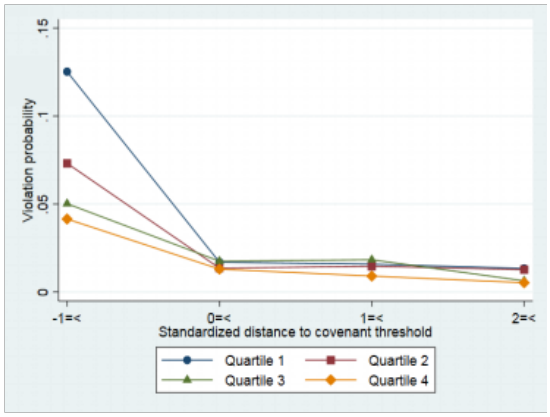
A. Conditional on values of *RelationLoan* dummy



B. Conditional on values of *RelationBankFirm* dummy



C. Conditional on quartile values of *FracRelLoanNum*



D. Conditional on quartile values of *FracRelLoanAmt*

Table 1
Summary statistics

This table reports summary statistics for key dependent and independent variables in analyses of the effect of lender-borrower relationship on the covenant violation given negative covenant slacks. Variable definitions are provided in the appendix.

`				Percentile Distribution		
	N	Mean	S.D.	25th	Median	75th
Relationship measure						
RelationLoan (dummy)	67983	0.548	0.498	0.000	1.000	1.000
RelationBankFirm (dummy)	67983	0.607	0.488	0.000	1.000	1.000
FracRelLoanNum	67983	0.140	0.167	0.000	0.100	0.200
FracRelLoanAmt	67983	0.144	0.171	0.000	0.100	0.200
Key dependent/independent						
Violation (dummy)	67983	0.066	0.248	0.000	0.000	0.000
LoanRateIncrease (dummy)	2021	0.033	0.179	0.000	0.000	0.000
LoanRateChange	2021	-0.001	0.165	0.000	0.000	0.000
NegSlackDum (dummy)	67983	0.392	0.488	0.000	0.000	1.000
AveSlack	67983	5.813	11.902	0.557	3.025	6.967
CreditRating	34211	11.215	2.786	9.000	11.000	13.000
LoanMktShare	65900	0.033	0.030	0.003	0.031	0.055
Borrower's subsequent financing and investment activities						
ΔDebtAve	64731	0.006	0.241	-0.039	-0.000	0.052
ΔLeverageAve	67409	0.001	0.027	-0.010	-0.001	0.009
ΔCashRatioAve	67863	0.001	0.017	-0.003	0.000	0.004
ΔPPENTAve	67800	-0.001	0.013	-0.005	-0.001	0.004
ΔDebt	61987	0.052	0.787	-0.148	-0.000	0.215
ΔLeverage	65305	0.002	0.102	-0.041	-0.005	0.034
ΔCashRatio	65711	0.003	0.065	-0.011	0.000	0.016
ΔPPENT	65662	-0.003	0.050	-0.019	-0.002	0.014
Borrower controls						
Book leverage	67983	0.301	0.183	0.167	0.295	0.424
Ln(MktCap)	67983	6.409	1.906	5.171	6.526	7.688
Market-to-Book	67983	0.703	0.840	0.251	0.702	1.150
Return on Assets	67983	0.006	0.053	0.002	0.010	0.019
Whited-Wu index	67983	-0.354	0.097	-0.423	-0.353	-0.289
Loan package controls						
Number of loan facilities	67983	1.577	0.864	1.000	1.000	2.000
Term loan facility (dummy)	67983	0.347	0.476	0.000	0.000	1.000
Tranche-B facility (dummy)	67983	0.001	0.030	0.000	0.000	0.000
Secured facility (dummy)	67983	0.573	0.495	0.000	1.000	1.000
Loan purpose	67983	2.870	1.670	1.000	4.000	4.000
Refinancing loan (dummy)	67983	0.726	0.446	0.000	1.000	1.000
Ln(Loan amount)	67983	5.067	1.501	4.111	5.170	6.111
NumFinCovenantSweep	67983	5.768	2.972	3.000	5.000	9.000
Ln(weighted avg AISD)	67983	4.857	0.775	4.331	5.017	5.443
Ln(weighted avg maturity)	67983	3.823	0.471	3.611	3.958	4.111

Table 1 - Continued

`				Percentile Distribution		
	N	Mean	S.D.	25th	Median	75th
Lender controls						
Ln(Total assets)	67983	19.517	1.585	18.920	19.890	20.501
Ln(Total loans)	67983	18.835	1.503	18.288	19.191	19.825
Ln(Allowance)	67983	14.728	1.536	14.028	15.146	15.766
Ln(Charge-off)	67983	13.353	2.155	12.670	13.900	14.716
Ln(Provision)	67983	12.221	2.531	11.497	12.974	13.649
Leverage Ratio	67983	11.947	2.595	10.168	11.368	13.237
Capital Ratio	67983	0.080	0.015	0.070	0.080	0.089

Table 2
Univariate test

This table reports the results of univariate tests for the null hypotheses that differences in variables between the relationship loans and nonrelationship loans are equal to zero. In Panel A and B, the lender-borrower relationship is measured by each loan package level and by firm-BHC-year level, respectively. Statistical significance at the 10%, 5% and 1% levels is denoted by *,** and ***, respectively.

Panel A: Relationship is measured by each loan package level						
	RelationLoan = 1		RelationLoan = 0		Mean Diff	(t-stat)
	Mean	Median	Mean	Median		
Key dependent/independent						
Violation (dummy)	0.054	0.000	0.080	0.000	-0.027***	(-13.94)
LoanRateIncrease (dummy)	0.034	0.000	0.032	0.000	0.001	(0.14)
LoanRateChange	-0.004	0.000	0.005	0.000	-0.009	(-1.16)
NegSlackDum (dummy)	0.378	0.000	0.410	0.000	-0.032***	(-8.47)
AveSlack	6.167	3.323	5.383	2.662	0.784***	(8.55)
CreditRating	11.353	11.000	10.945	11.000	0.408***	(12.85)
LoanMktShare	0.036	0.036	0.028	0.014	0.008***	(33.62)
Borrower's subsequent financing and investment activities						
ΔDebtAve	0.008	0.000	0.003	-0.001	0.005**	(2.65)
ΔLeverageAve	0.000	-0.001	0.001	-0.001	-0.001***	(-3.73)
ΔCashRatioAve	0.001	0.000	0.001	0.000	0.000	(0.51)
ΔPPENTAve	-0.001	-0.000	-0.001	-0.001	0.000	(0.88)
ΔDebt	0.056	0.000	0.047	-0.003	0.009	(1.36)
ΔLeverage	0.001	-0.006	0.003	-0.004	-0.002*	(-2.47)
ΔCashRatio	0.003	0.000	0.003	0.000	0.000	(0.86)
ΔPPENT	-0.003	-0.002	-0.003	-0.002	0.000	(1.25)
Borrower controls						
Book leverage	0.315	0.308	0.284	0.278	0.031***	(22.06)
Ln(MktCap)	6.861	6.932	5.859	5.978	1.002***	(70.70)
Market-to-Book	0.736	0.732	0.663	0.658	0.073***	(11.24)
Return on Assets	0.009	0.010	0.004	0.009	0.005***	(12.56)
Whited-Wu index	-0.378	-0.375	-0.326	-0.324	-0.051***	(-71.01)
Loan package controls						
Number of loan facilities	1.550	1.000	1.611	1.000	-0.061***	(-9.14)
Term loan facility (dummy)	0.313	0.000	0.388	0.000	-0.075***	(-20.51)
Tranche-B facility (dummy)	0.001	0.000	0.001	0.000	0.000	(1.32)
Secured facility (dummy)	0.525	1.000	0.632	1.000	-0.107***	(-28.22)
Loan purpose	2.776	3.000	2.984	4.000	-0.208***	(-16.16)
Refinancing loan (dummy)	0.812	1.000	0.621	1.000	0.190***	(56.58)
Ln(Loan amount)	5.484	5.525	4.559	4.615	0.925***	(84.01)
NumFinCovenantSweep	5.679	5.000	5.875	5.000	-0.195***	(-8.54)
Ln(weighted avg AISD)	4.766	4.836	4.967	5.142	-0.201***	(-33.97)
Ln(weighted avg maturity)	3.829	4.025	3.816	3.892	0.014***	(3.77)
Lender controls						
Ln(Total assets)	19.767	20.248	19.212	19.617	0.555***	(46.14)
Ln(Total loans)	19.047	19.500	18.579	18.962	0.469***	(40.95)
Ln(Allowance)	14.929	15.420	14.484	15.056	0.445***	(38.01)
Ln(Charge-off)	13.598	13.989	13.055	13.627	0.543***	(32.96)
Ln(Provision)	12.446	13.102	11.947	12.731	0.499***	(25.72)
Leverage Ratio	12.027	11.399	11.851	11.367	0.176***	(8.80)
Capital Ratio	0.079	0.080	0.080	0.081	-0.001***	(-10.22)

Table 2 - Continued

Panel B: Relationship is measured by the borrower-lender-year level						
	RelationBankFirm = 1		RelationBankFirm = 0		Mean Diff	(t-stat)
	Mean	Median	Mean	Median		
Key dependent/independent						
Violation (dummy)	0.054	0.000	0.084	0.000	-0.029***	(-15.18)
LoanRateIncrease (dummy)	0.028	0.000	0.044	0.000	-0.016	(-1.91)
LoanRateChange	-0.003	0.000	0.003	0.000	-0.006	(-0.75)
NegSlackDum (dummy)	0.384	0.000	0.405	0.000	-0.021***	(-5.59)
AveSlack	6.169	3.380	5.264	2.530	0.905***	(9.69)
CreditRating	11.324	11.000	10.906	11.000	0.418***	(12.20)
LoanMktShare	0.037	0.036	0.026	0.008	0.011***	(45.36)
Borrower's subsequent financing and investment activities						
ΔDebtAve	0.006	-0.000	0.005	-0.001	0.001	(0.52)
ΔLeverageAve	0.000	-0.002	0.001	-0.001	-0.001***	(-6.19)
ΔCashRatioAve	0.001	0.000	0.001	0.000	0.000	(1.04)
ΔPPENTAve	-0.001	-0.001	-0.001	-0.001	-0.000	(-0.17)
ΔDebt	0.048	0.000	0.058	-0.001	-0.009	(-1.41)
ΔLeverage	0.001	-0.006	0.005	-0.003	-0.004***	(-4.80)
ΔCashRatio	0.003	0.000	0.002	0.000	0.001	(1.43)
ΔPPENT	-0.003	-0.002	-0.003	-0.002	0.000	(0.64)
Borrower controls						
Book leverage	0.319	0.311	0.275	0.268	0.043***	(30.41)
Ln(MktCap)	6.859	6.931	5.714	5.819	1.144***	(79.98)
Market-to-Book	0.731	0.729	0.661	0.651	0.070***	(10.62)
Return on Assets	0.009	0.010	0.003	0.009	0.006***	(14.90)
Whited-Wu index	-0.378	-0.375	-0.318	-0.316	-0.060***	(-81.60)
Loan package controls						
Number of loan facilities	1.601	1.000	1.541	1.000	0.060***	(8.84)
Term loan facility (dummy)	0.329	0.000	0.374	0.000	-0.046***	(-12.25)
Tranche-B facility (dummy)	0.001	0.000	0.001	0.000	-0.000	(-0.37)
Secured facility (dummy)	0.531	1.000	0.639	1.000	-0.108***	(-27.90)
Loan purpose	2.886	4.000	2.845	4.000	0.041**	(3.12)
Refinancing loan (dummy)	0.785	1.000	0.634	1.000	0.151***	(43.57)
Ln(Loan amount)	5.480	5.525	4.428	4.528	1.052***	(94.99)
NumFinCovenantSweep	5.766	5.000	5.770	5.000	-0.005	(-0.20)
Ln(weighted avg AISD)	4.764	4.836	4.999	5.170	-0.235***	(-39.08)
Ln(weighted avg maturity)	3.864	4.078	3.760	3.864	0.105***	(28.45)
Lender controls						
Ln(Total assets)	19.803	20.254	19.075	19.441	0.728***	(60.06)
Ln(Total loans)	19.078	19.515	18.462	18.916	0.616***	(53.25)
Ln(Allowance)	14.958	15.442	14.374	14.966	0.584***	(49.31)
Ln(Charge-off)	13.602	13.989	12.967	13.550	0.635***	(37.94)
Ln(Provision)	12.493	13.136	11.801	12.553	0.692***	(35.16)
Leverage Ratio	12.048	11.399	11.792	11.344	0.257***	(12.62)
Capital Ratio	0.079	0.080	0.081	0.081	-0.002***	(-14.72)

Table 3
Violation enforcement and lending relationship given negative slacks

This table examines the effect of the lender-borrower relationship on the probability of material covenant violation enforcement given negative covenant slacks. *Violation* takes the value of one for the borrower firm that experiences material covenant violations in the quarter. *NegSlackDum* takes the value of one for the loan package on which the borrower breaches a financial covenant threshold (having negative covenant slack) in the quarter. In Panel A, *RelationLoan* takes the value of one for the relationship loan package, which is the loan package that is originated within five years after another loan has been made between the lender and the borrower. In Panel B, *RelationBankFirm* takes a value of one for the pair of lender and borrower that have originated at least one relationship loan package during the last 10 years until the prior year. In Panel C, *FracRelLoanNum* is the fraction of the total number of the borrower's relationship loan packages from its corresponding relationship lenders during the last 10 years until the prior year over the total number of the borrower's loan packages originated during the last 10 years until the prior year. In Panel D, *FracRelLoanAmt* is the fraction of the total amount of the borrower's relationship loans from its corresponding relationship lenders during the last 10 years until the prior year over the entire amount of the borrower's loan packages originated during the last 10 years until the prior year. The regressions include a set of control variables for borrower (firm), lender (bank holding company) and loan (package) characteristics. The coefficients on these variables are not reported for compactness. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: Relationship is measured by each loan package level			
Dependent variable	Violation		
	(1)	(2)	(3)
NegSlackDum	0.041***	0.042***	0.049***
	(8.64)	(7.94)	(7.29)
RelationLoan	0.008***	0.008**	
	(2.72)	(2.45)	
RelationLoan × NegSlackDum	-0.017***	-0.021***	-0.028***
	(-3.16)	(-3.63)	(-3.31)
Observations	67983	67983	67983
Adjusted R^2	0.285	0.324	0.318
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter, Borrower, Lender FEs	Y	N	N
Quarter-Lender FE	N	Y	Y
Borrower-Lender FE	N	Y	N
Loan FE	N	N	Y

Table 3 – Continued

Panel B: Relationship is measured by the borrower-lender-year level			
Dependent variable	Violation		
	(1)	(2)	(3)
NegSlackDum	0.044***	0.046***	0.048***
	(8.26)	(7.55)	(7.38)
RelationBankFirm	0.013***	0.011***	0.011**
	(4.04)	(2.76)	(2.32)
RelationBankFirm × NegSlackDum	-0.020***	-0.025***	-0.023***
	(-3.40)	(-3.73)	(-3.26)
Observations	67983	67983	67983
Adjusted R^2	0.285	0.324	0.318
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter, Borrower, Lender FEs	Y	N	N
Quarter-Lender FE	N	Y	Y
Borrower-Lender FE	N	Y	N
Loan FE	N	N	Y

Panel C: Relationship intensity is measured by the fraction of the numbers of relationship loan packages			
Dependent variable	Violation		
	(1)	(2)	(3)
NegSlackDum	0.043***	0.042***	0.046***
	(10.11)	(8.83)	(8.66)
FracRelLoanNum	0.026**	0.010	0.019
	(2.23)	(0.47)	(0.69)
FracRelLoanNum × NegSlackDum	-0.079***	-0.078***	-0.093***
	(-5.26)	(-4.87)	(-4.66)
Observations	67983	67983	67983
Adjusted R^2	0.285	0.324	0.318
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter, Borrower, Lender FEs	Y	N	N
Quarter-Lender FE	N	Y	Y
Borrower-Lender FE	N	Y	N
Loan FE	N	N	Y

Table 3 – Continued

Panel D: Relationship intensity is measured by the fraction of the amounts of relationship loan packages			
Dependent variable	Violation		
	(1)	(2)	(3)
NegSlackDum	0.043***	0.041***	0.046***
	(10.04)	(8.74)	(8.57)
FracRelLoanAmt	0.027**	0.016	0.026
	(2.41)	(0.79)	(0.95)
FracRelLoanAmt × NegSlackDum	-0.075***	-0.073***	-0.088***
	(-5.13)	(-4.73)	(-4.50)
Observations	67983	67983	67983
Adjusted R^2	0.285	0.324	0.318
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter, Borrower, Lender FEs	Y	N	N
Quarter-Lender FE	N	Y	Y
Borrower-Lender FE	N	Y	N
Loan FE	N	N	Y

Table 4
Violation enforcement and lending relationship: the role of information asymmetry

This table examines the effect of the lender-borrower relationship on the probability of material covenant violation enforcement given negative covenant slacks conditional on the degree of information friction around the borrower firm. The information friction is measured by four different indicators – analyst forecast dispersion, opacity, cash flow volatility and whether to be S&P500 constituent or not. Detailed variable definitions can be found in the Appendix. Each borrower firm is classified into the group of borrowers with low information asymmetry and the group of borrowers with high information asymmetry based on the level of each indicator. In each panel, we use different indicator to classify firms into two groups. In Column 3 of each panel, *LowFriction* is a dummy variable that takes a value of one if the borrower is the firm with low information friction measured by the indicators above. All other regression specifications are the same as in Table 3. The coefficients on control variables are not reported for compactness. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: Measured by analyst forecast dispersion			
Dependent variable	Violation		
	(1)	(2)	(3)
Information friction is	Low (below median)	High (above median)	Both
NegSlackDum	0.007	0.054***	0.054***
	(1.55)	(6.19)	(6.24)
RelationLoan	0.002	0.006	0.006
	(0.87)	(0.99)	(1.00)
RelationLoan × NegSlackDum	-0.003	-0.027***	-0.027***
	(-0.59)	(-2.84)	(-2.86)
NegSlackDum × LowFriction			-0.047***
			(-4.83)
RelationLoan × LowFriction			-0.004
			(-0.62)
RelationLoan × NegSlackDum × LowFriction			0.024**
			(2.33)
Observations	28364	28304	56668
Adjusted R^2	0.281	0.332	0.343
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender-LowFriction FE	N	N	Y
Borrower-Lender-LowFriction FE	N	N	Y

Table 4 – Continued

Panel B: Measured by opacity			
Dependent variable	Violation		
	(1)	(2)	(3)
Information friction is	Low (below median)	High (above median)	Both
NegSlackDum	0.026***	0.046***	0.046***
	(4.04)	(5.20)	(5.24)
RelationLoan	-0.000	0.014**	0.014**
	(-0.15)	(2.29)	(2.31)
RelationLoan × NegSlackDum	-0.008	-0.028***	-0.028***
	(-1.20)	(-2.88)	(-2.90)
NegSlackDum × LowFriction			-0.019*
			(-1.81)
RelationLoan × LowFriction			-0.014**
			(-2.11)
RelationLoan × NegSlackDum × LowFriction			0.020*
			(1.68)
Observations	31299	31225	62524
Adjusted R^2	0.330	0.360	0.359
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender-LowFriction FE	N	N	Y
Borrower-Lender-LowFriction FE	N	N	Y

Panel C: Measured by cash flow volatility			
Dependent variable	Violation		
	(1)	(2)	(3)
Information friction is	Low (below median)	High (above median)	Both
NegSlackDum	0.018***	0.055***	0.055***
	(2.73)	(6.39)	(6.44)
RelationLoan	0.007**	0.007	0.007
	(2.06)	(1.14)	(1.15)
RelationLoan × NegSlackDum	-0.008	-0.030***	-0.030***
	(-1.04)	(-3.15)	(-3.17)
NegSlackDum × LowFriction			-0.037***
			(-3.40)
RelationLoan × LowFriction			0.000
			(0.03)
RelationLoan × NegSlackDum × LowFriction			0.022*
			(1.88)
Observations	29041	28988	58029
Adjusted R^2	0.332	0.367	0.367
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender-LowFriction FE	N	N	Y
Borrower-Lender-LowFriction FE	N	N	Y

Table 4 – Continued

Panel D: Measured by S&P500 constituent			
Dependent variable	Violation		
	(1)	(2)	(3)
Information friction is	Low (constituent)	High (non-constituent)	Both
NegSlackDum	0.007	0.044***	0.044***
	(0.45)	(7.85)	(7.85)
RelationLoan	-0.004	0.009**	0.009**
	(-0.84)	(2.45)	(2.45)
RelationLoan × NegSlackDum	0.007	-0.022***	-0.022***
	(0.47)	(-3.55)	(-3.55)
NegSlackDum × LowFriction			-0.037**
			(-2.29)
RelationLoan × LowFriction			-0.013**
			(-2.19)
RelationLoan × NegSlackDum × LowFriction			0.030*
			(1.75)
Observations	11226	56757	67983
Adjusted R^2	0.218	0.323	0.322
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender-LowFriction FE	N	N	Y
Borrower-Lender-LowFriction FE	N	N	Y

Table 5
Loan interest rate adjustment and lending relationship

This table examines the effect of the lender-borrower relationship on the likelihood of loan interest rate increase through loan renegotiations given negative covenant slacks. In Panel A, *LoanRateIncrease* is a dummy that takes the value of one if the loan interest rates increase as a result of loan renegotiations, zero otherwise. In Panel B, *LoanRateChange* is the difference between loan interest spreads over LIBOR after loan renegotiations and prior interest spreads, scaled by the latter. All other regression specifications are the same as in Table 3. The coefficients on control variables are not reported for compactness. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: Loan interest spread increase dummy			
Dependent variable	LoanRateIncrease		
	(1)	(2)	(3)
Samples	RelationLoan=0	RelationLoan=1	Both
NegSlackDum	0.116**	-0.016	0.116***
	(2.18)	(-1.05)	(2.67)
RelationLoan × NegSlackDum			-0.133***
			(-2.84)
Observations	649	1372	2021
Adjusted R^2	0.110	0.122	0.117
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender-RelationLoan FE	N	N	Y
Borrower-Lender-RelationLoan FE	N	N	Y

Panel B: The relative change in loan interest spreads			
Dependent variable	LoanRateChange		
	(1)	(2)	(3)
Samples	RelationLoan=0	RelationLoan=1	Both
NegSlackDum	0.050*	-0.011	0.050**
	(1.86)	(-0.82)	(2.28)
RelationLoan × NegSlackDum			-0.061**
			(-2.33)
Observations	649	1372	2021
Adjusted R^2	-0.157	0.428	0.332
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender-RelationLoan FE	N	N	Y
Borrower-Lender-RelationLoan FE	N	N	Y

Table 6
Firm financing/investment policies and lending relationship

This table examines the effect of the lender-borrower relationship on the borrower firm's financing and investment activities in the next four quarters given negative covenant slacks in the current quarter. *Debt* is the natural logarithm of total debt of the borrower firm. *Leverage* is total debt scaled by total assets. *CashRatio* is cash and short-term investments scaled by total assets. *PPENT* is the natural logarithm of net tangible assets. All other regression specifications are the same as in Table 3. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: Average quarterly change in the next four quarters				
Dependent variable	ΔDebtAve	ΔLeverageAve	ΔCashRatioAve	ΔPPENTAve
	(1)	(2)	(3)	(4)
NegSlackDum	-0.025***	-0.001**	0.003***	-0.001**
	(-4.47)	(-2.45)	(5.79)	(-2.30)
RelationLoan	-0.018***	-0.001***	0.001***	-0.001**
	(-3.81)	(-2.97)	(3.44)	(-2.39)
RelationLoan × NegSlackDum	0.021***	0.001**	-0.002***	0.001***
	(3.22)	(2.03)	(-3.69)	(3.02)
Observations	64731	67409	67863	67800
Adjusted R^2	0.353	0.440	0.187	0.240
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Panel B: Annual change in the next one year				
Dependent variable	ΔDebt	ΔLeverage	ΔCashRatio	ΔPPENT
	(1)	(2)	(3)	(4)
NegSlackDum	-0.071***	-0.005**	0.010***	-0.002*
	(-3.98)	(-2.40)	(5.84)	(-1.94)
RelationLoan	-0.044***	-0.005**	0.004***	-0.002**
	(-2.87)	(-2.50)	(3.57)	(-2.50)
RelationLoan × NegSlackDum	0.054***	0.004*	-0.007***	0.004***
	(2.69)	(1.66)	(-3.76)	(3.05)
Observations	61987	65305	65711	65662
Adjusted R^2	0.324	0.433	0.182	0.227
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Table 7
Violation enforcement and lending relationship: controlling for loan market share

This table examines the effect of the lender-borrower relationship on the probability of material covenant violation enforcement given negative covenant slacks, controlling for lenders' loan market share. *LoanMktShare* is the ratio of the aggregate amount of loans arranged by the lender during the calendar year over the total loan market volume that year. All other regression specifications are the same as in Table 3. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Dependent variable	Violation			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
NegSlackDum	0.052***	0.055***	0.052***	0.052***
	(8.01)	(7.69)	(8.48)	(8.42)
Relation	0.007**	0.010**	0.011	0.018
	(2.18)	(2.53)	(0.51)	(0.85)
Relation × NegSlackDum	-0.018***	-0.021***	-0.070***	-0.066***
	(-3.19)	(-3.21)	(-4.43)	(-4.27)
LoanMktShare × NegSlackDum	-0.329***	-0.316***	-0.311***	-0.312***
	(-3.19)	(-3.09)	(-3.04)	(-3.05)
Observations	65900	65900	65900	65900
Adjusted R^2	0.319	0.319	0.319	0.319
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Table 8
The severity of covenant breaches and violation enforcement

This table examines how the effect of lending relationship on material covenant violations (given negative covenant slack) varies with the severity of covenant breaches. We use two proxies, namely a dummy indicating severe negative slack and a dummy indicating abnormally more covenants breached, to measure the severity of breaches. *SevereSlack* takes the value of one if the absolute value of the average standardized distance between the financial ratios and its covenant threshold exceed the median of the absolute value of the average standardized distance of the entire samples with *NegSlackDum* = 1. *MoreSlack* takes the value of one if the percentage of financial covenants that breach the minimum or maximum requirements specified in the loan contract as of the quarter-end is greater than the median value of the entire samples with *NegSlackDum* = 1. All other regression specifications are the same as in Table 3. Standard errors are clustered at the borrower level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: Decomposed by severity of negative slacks				
Dependent variable	Violation			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
Relation	0.008***	0.012***	0.010	0.016
	(2.64)	(2.84)	(0.46)	(0.78)
NegSlackDum	0.026***	0.028***	0.024***	0.024***
	(4.31)	(4.20)	(4.61)	(4.59)
Relation × NegSlackDum	-0.011*	-0.014*	-0.031	-0.030
	(-1.66)	(-1.90)	(-1.62)	(-1.60)
SevereSlack	0.043***	0.046***	0.047***	0.046***
	(5.42)	(5.25)	(6.68)	(6.59)
Relation × SevereSlack	-0.023**	-0.025**	-0.110***	-0.103***
	(-2.37)	(-2.43)	(-4.25)	(-4.07)
Observations	67983	67983	67983	67983
Adjusted R^2	0.325	0.325	0.325	0.325
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Table 8 - Continued

Panel B: Decomposed by fraction of negative slacks				
Dependent variable	Violation			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
Relation	0.008**	0.011***	0.010	0.016
	(2.44)	(2.64)	(0.48)	(0.80)
NegSlackDum	0.028***	0.030***	0.024***	0.024***
	(4.98)	(4.72)	(4.86)	(4.78)
Relation × NegSlackDum	-0.020***	-0.021***	-0.048***	-0.044***
	(-3.19)	(-2.98)	(-2.78)	(-2.66)
MoreSlack	0.051***	0.057***	0.064***	0.064***
	(5.83)	(5.65)	(7.98)	(7.96)
Relation × MoreSlack	-0.001	-0.011	-0.091***	-0.088***
	(-0.11)	(-0.91)	(-3.05)	(-3.03)
Observations	67983	67983	67983	67983
Adjusted R^2	0.326	0.326	0.326	0.326
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Table 9
The severity of distress in violation and lending relationship

This table relates the severity of negative covenant slacks to the lender-borrower relationship given material covenant violation enforcement. *AveSlack* is the mean value of standardized distance between the firm's financial ratio and the corresponding covenant threshold in the current quarter. *Violation* takes the value of one for borrower firms that experience material covenant violation enforcement in the current quarter. The regressions limit the sample to observations with *NegSlackDum* = 1, i.e., firms that are in breach of financial covenants. All other regression specifications are the same as in Table 3. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. t-statistics are in parentheses.

Dependent variable	AveSlack			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
Violation	-0.498**	-0.658***	-0.441**	-0.442**
	(-2.17)	(-2.67)	(-2.17)	(-2.17)
Relation	0.132	0.375*	-3.769*	-3.690*
	(0.70)	(1.75)	(-1.82)	(-1.80)
Relation × Violation	0.595**	0.816***	2.205**	2.173**
	(2.11)	(2.61)	(2.12)	(2.15)
Observations	26655	26655	26655	26655
Adjusted R^2	0.584	0.584	0.584	0.584
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Table 10
The probability of covenant violation/breach and lending relationship

This table examines whether the probability of material covenant violations and the likelihood of breaching financial covenants varies with lending relationship. The dependent variable is either a dummy indicating material covenant violations (*Violation*), or a dummy which equals one if the borrower breaches financial covenants (*NegSlackDum*). We control for the same set of variables as in Table 3 in all specifications. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: Relationship is measured at the loan package level				
Dependent variable	Violation		NegSlackDum	
	(1)	(2)	(1)	(2)
RelationLoan	0.002	-0.001	-0.011	-0.007
	(0.82)	(-0.28)	(-1.17)	(-0.73)
Observations	67983	67983	67983	67983
Adjusted R^2	0.301	0.322	0.502	0.531
Borrower, Lender, Loan Controls	N	Y	N	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Panel B: Relationship is measured at the borrower-lender-year level				
Dependent variable	Violation		NegSlackDum	
	(1)	(2)	(1)	(2)
RelationBankFirm	0.005	0.002	0.013	0.007
	(1.03)	(0.55)	(1.21)	(0.73)
Observations	67983	67983	67983	67983
Adjusted R^2	0.301	0.322	0.502	0.531
Borrower, Lender, Loan Controls	N	Y	N	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Table 11
Violation enforcement and lending relationship: Triple-differences analysis

This table examines the effect of the lender-borrower relationship on the probability of material covenant violation enforcement given negative covenant slacks using a triple difference-in-differences setting (DDD). Observations are loan-quarter panel in a two-quarter window – one for pre-period and one for post-period. If observations have values of *Violation*=0 and *NegSlackDum*=0 in pre-period and *NegSlackDum*=1 in post-period, those observations are classified to the treated group. If observations have values of *Violation*=0 and *NegSlackDum*=0 in pre-period and *NegSlackDum*=0 in post-period, those observations are classified to the control group. Samples with the same lender and same two-quarter window are assigned to the same cohort. *Treated* takes the value of one for the treated group, 0 otherwise. *Post* takes the value of one for the post-period, 0 otherwise. Panel A reports the regression results using the original sample. Panel B reports the results using t he matched sample. In Panel B, every observation with *RelationBankFirm* =1 is matched with a control observation with *RelationBankFirm* =0 that is in the same industry (3-digit SIC code) and in the same cohort (same two-quarter window and same lender) and is closest in terms of the borrower firm's size (market capitalization) and market-to-book ratio. All other regression specifications are the same as in Table 3. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: Original sample				
Dependent variable	Violation			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
Treated × Post	0.078***	0.077***	0.073***	0.073***
	(8.03)	(7.35)	(8.86)	(8.87)
Relation		0.003	-0.020	-0.014
		(0.76)	(-0.69)	(-0.50)
Relation × Treated		-0.015	-0.308**	-0.311**
		(-0.67)	(-2.40)	(-2.47)
Relation × Post	-0.002	-0.004*	-0.009*	-0.009**
	(-1.11)	(-1.89)	(-1.83)	(-2.02)
Relation × Post × Treated	-0.042***	-0.037***	-0.117***	-0.113***
	(-3.60)	(-3.00)	(-3.83)	(-3.83)
Observations	69846	69846	69846	69846
Adjusted R^2	0.057	0.057	0.057	0.057
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter- Cohort FE	Y	Y	Y	Y
Loan- Cohort FE	Y	Y	Y	Y

Table 11 - Continued

Panel B: Matched sample				
Dependent variable	Violation			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
Treated × Post	0.077***	0.068***	0.067***	0.067***
	(3.47)	(2.97)	(3.60)	(3.59)
Relation			0.002	0.009
			(0.03)	(0.15)
Relation × Treated			-0.234	-0.267*
			(-1.51)	(-1.72)
Relation × Post	-0.000	-0.002	-0.004	-0.004
	(-0.09)	(-0.71)	(-0.52)	(-0.53)
Relation × Post × Treated	-0.070***	-0.048*	-0.197***	-0.188***
	(-2.91)	(-1.88)	(-3.03)	(-2.96)
Observations	22816	22816	22816	22816
Adjusted R^2	0.281	0.279	0.280	0.280
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Cohort FE	Y	Y	Y	Y
Loan-Cohort FE	Y	Y	Y	Y

Table 12
Violation enforcement and lending relationship: A discontinuity sample

This table examines the effect of the lender-borrower relationship on the probability of material covenant violation enforcement given negative covenant slacks using a discontinuity sample. We restrict the sample to include only those observations whose average standardized distance between the financial ratios and its covenant threshold is between -0.5 and +0.5. All other regression specifications are the same as in Table 3. Standard errors are clustered at the borrower level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Dependent variable	Violation			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
NegSlackDum	0.038***	0.047***	0.034***	0.034***
	(2.90)	(3.15)	(3.03)	(3.04)
Relation	0.021*	0.009	0.046	0.067
	(1.88)	(0.53)	(0.53)	(0.79)
Relation × NegSlackDum	-0.033**	-0.044**	-0.107**	-0.104**
	(-2.24)	(-2.54)	(-2.40)	(-2.39)
Observations	8850	8850	8850	8850
Adjusted R^2	0.416	0.416	0.416	0.416
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Internet Appendix for "Bank Relationship, Covenant Enforcement, and Creditor Control"

Table A.1
Violation enforcement and lending relationship: Period of loan origination

This table examines the effect of the lender-borrower relationship on the probability of material covenant violation enforcement given negative covenant slacks by loan origination years – before or after 2001. All other specifications are the same as in Table 3. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: loan package originated before 2001				
Dependent variable	Violation			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
NegSlackDum	0.050***	0.051***	0.051***	0.050***
	(6.56)	(5.98)	(7.43)	(7.32)
Relation	0.003	0.009	0.003	0.013
	(0.57)	(1.33)	(0.07)	(0.36)
Relation × NegSlackDum	-0.022**	-0.021**	-0.102***	-0.094***
	(-2.50)	(-2.19)	(-3.86)	(-3.65)
Observations	36504	36504	36504	36504
Adjusted R^2	0.328	0.328	0.328	0.328
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Panel B: loan package originated from 2001 and thereafter				
Dependent variable	Violation			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
NegSlackDum	0.031***	0.039***	0.031***	0.031***
	(3.79)	(4.25)	(4.27)	(4.26)
Relation	0.007	0.008	-0.028	-0.021
	(1.47)	(1.34)	(-0.89)	(-0.67)
Relation × NegSlackDum	-0.016*	-0.027***	-0.055**	-0.053**
	(-1.85)	(-2.75)	(-2.38)	(-2.37)
Observations	31479	31479	31479	31479
Adjusted R^2	0.334	0.335	0.334	0.334
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Table A.2
Violation enforcement and lending relationship: Types of loans

This table examines the effect of the lender-borrower relationship on the probability of material covenant violation enforcement given negative covenant slacks by types – loan packages with a single loan tranche and those with multiple tranches. All other specifications are the same as in Table 3. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: loan packages with a single loan tranche				
Dependent variable	Violation			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
NegSlackDum	0.039***	0.041***	0.036***	0.036***
	(5.37)	(5.30)	(5.95)	(5.90)
Relation	0.002	0.003	0.004	0.011
	(0.47)	(0.64)	(0.16)	(0.43)
Relation × NegSlackDum	-0.017**	-0.019**	-0.049**	-0.046**
	(-2.15)	(-2.24)	(-2.25)	(-2.17)
Observations	40638	40638	40638	40638
Adjusted R^2	0.322	0.323	0.322	0.322
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Panel B: loan packages with multiple loan tranches				
Dependent variable	Violation			
	(1)	(2)	(3)	(4)
Relation is	RelationLoan	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
NegSlackDum	0.041***	0.047***	0.045***	0.045***
	(4.59)	(4.46)	(5.53)	(5.47)
Relation	0.015**	0.016*	-0.003	0.004
	(2.27)	(1.95)	(-0.08)	(0.10)
Relation × NegSlackDum	-0.024**	-0.028**	-0.113***	-0.107***
	(-2.25)	(-2.50)	(-4.16)	(-4.05)
Observations	27345	27345	27345	27345
Adjusted R^2	0.340	0.340	0.340	0.340
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Table A.3
Violation enforcement and lending relationship: the role of information asymmetry

This table examines the effect of the lender-borrower relationship on the probability of material covenant violation enforcement given negative covenant slacks conditional on the degree of information friction around the borrower firm. Except for using *RelationBankFirm* and *RelationBankFirm* × *NegSlackDum* instead of *RelationLoan* and *RelationLoan* × *NegSlackDum*, all other specifications are the same as in Table 4. The coefficients on control variables are not reported for compactness. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: Measured by analyst forecast dispersion			
Dependent variable	Violation		
	(1)	(2)	(3)
Information friction is	Low (below median)	High (above median)	Both
NegSlackDum	0.008	0.054***	0.054***
	(1.22)	(5.36)	(5.40)
RelationBankFirm	0.002	0.006	0.006
	(0.66)	(0.70)	(0.70)
RelationBankFirm × NegSlackDum	-0.004	-0.024**	-0.024**
	(-0.53)	(-2.15)	(-2.17)
NegSlackDum × LowFriction			-0.046***
			(-3.88)
RelationBankFirm × LowFriction			-0.004
			(-0.43)
RelationBankFirm × NegSlackDum × LowFriction			0.020
			(1.58)
Observations	28364	28304	56668
Adjusted R^2	0.281	0.332	0.343
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender- LowFriction FE	N	N	Y
Borrower-Lender- LowFriction FE	N	N	Y

Table A.3 – Continued

Panel B: Measured by Measured by opacity			
Dependent variable	Violation		
	(1)	(2)	(3)
Information friction is	Low (below median)	High (above median)	Both
NegSlackDum	0.025***	0.051***	0.051***
	(3.19)	(5.28)	(5.32)
RelationBankFirm	-0.004	0.019**	0.019**
	(-0.86)	(2.21)	(2.23)
RelationBankFirm × NegSlackDum	-0.006	-0.034***	-0.034***
	(-0.73)	(-3.20)	(-3.23)
NegSlackDum × LowFriction			-0.026**
			(-2.08)
RelationBankFirm × LowFriction			-0.024**
			(-2.37)
RelationBankFirm × NegSlackDum × LowFriction			0.028**
			(2.05)
Observations	31299	31225	62524
Adjusted R^2	0.330	0.360	0.359
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender- LowFriction FE	N	N	Y
Borrower-Lender- LowFriction FE	N	N	Y

Panel C: Measured by cash flow volatility			
Dependent variable	Violation		
	(1)	(2)	(3)
Information friction is	Low (below median)	High (above median)	Both
NegSlackDum	0.022**	0.059***	0.059***
	(2.45)	(6.13)	(6.18)
RelationBankFirm	-0.001	0.014*	0.014*
	(-0.16)	(1.69)	(1.70)
RelationBankFirm × NegSlackDum	-0.012	-0.033***	-0.033***
	(-1.19)	(-2.99)	(-3.02)
NegSlackDum × LowFriction			-0.038***
			(-2.90)
RelationBankFirm × LowFriction			-0.015
			(-1.53)
RelationBankFirm × NegSlackDum × LowFriction			0.021
			(1.47)
Observations	29041	28988	58029
Adjusted R^2	0.332	0.367	0.367
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender- LowFriction FE	N	N	Y
Borrower-Lender- LowFriction FE	N	N	Y

Table A.3 – Continued

Panel D: Measured by S&P500 constituent			
Dependent variable	Violation		
	(1)	(2)	(3)
Information friction is	Low (constituent)	High (non-constituent)	Both
NegSlackDum	-0.021	0.049***	0.049***
	(-0.83)	(7.79)	(7.79)
RelationBankFirm	-0.006	0.014***	0.014***
	(-0.84)	(2.81)	(2.81)
RelationBankFirm × NegSlackDum	0.040	-0.028***	-0.028***
	(1.40)	(-4.06)	(-4.06)
NegSlackDum × LowFriction			-0.071***
			(-2.69)
RelationBankFirm × LowFriction			-0.020**
			(-2.38)
RelationBankFirm × NegSlackDum × LowFriction			0.068**
			(2.33)
Observations	11226	56757	67983
Adjusted R^2	0.219	0.323	0.322
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender- LowFriction FE	N	N	Y
Borrower-Lender- LowFriction FE	N	N	Y

Table A.4
Loan interest rate adjustment and lending relationship

This table examines the effect of the lender-borrower relationship on the likelihood of loan interest rate increase after loan renegotiations given negative covenant slacks. Except for employing *RelationBankFirm* instead of *RelationLoan*, all other specifications are the same as in Table 5. The coefficients on control variables are not reported for compactness. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: Dummy variable for the dependent variable			
Dependent variable	LoanRateIncrease		
	(1)	(2)	(3)
Samples	RelationBankFirm=0	RelationBankFirm=1	Both
NegSlackDum	0.131**	-0.006	0.131***
	(2.42)	(-0.46)	(2.89)
RelationBankFirm × NegSlackDum			-0.137***
			(-2.87)
Observations	686	1335	2021
Adjusted R^2	0.097	0.116	0.153
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender- RelationBankFirm FE	N	N	Y
Borrower-Lender- RelationBankFirm FE	N	N	Y

Panel B: Continuous variable for the dependent variable			
Dependent variable	LoanRateChange		
	(1)	(2)	(3)
Samples	RelationBankFirm=0	RelationBankFirm=1	Both
NegSlackDum	0.038	-0.007	0.038*
	(1.42)	(-0.55)	(1.69)
RelationBankFirm × NegSlackDum			-0.045*
			(-1.67)
Observations	686	1335	2021
Adjusted R^2	0.111	0.207	0.123
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	N
Borrower-Lender FE	Y	Y	N
Quarter-Lender- RelationBankFirm FE	N	N	Y
Borrower-Lender- RelationBankFirm FE	N	N	Y

Table A.5
Firm financing/investment policies and lending relationship

This table examines the effect of the lender-borrower relationship on the borrower firm's financing and investment activities in the next four quarters given negative covenant slacks in this quarter. Except for using *RelationBankFirm* and *RelationBankFirm* × *NegSlackDum* instead of *RelationLoan* and *RelationLoan* × *NegSlackDum*, all other specifications are the same as in Table 6. The coefficients on control variables are not reported for compactness. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A: average quarterly change in the next four quarters				
Dependent variable	Δ*DebtAve*	Δ*LeverageAve*	Δ*CashRatioAve*	Δ*PPENTAve*
NegSlackDum	-0.027***	-0.001**	0.003***	-0.001*
	(-4.28)	(-2.15)	(5.25)	(-1.77)
RelationBankFirm	-0.027***	-0.002***	0.001**	-0.001**
	(-4.14)	(-2.81)	(2.22)	(-2.08)
RelationBankFirm × NegSlackDum	0.021***	0.001	-0.002***	0.001**
	(2.91)	(1.55)	(-3.24)	(2.06)
Observations	64731	67409	67863	67800
Adjusted R^2	0.353	0.440	0.187	0.239
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Panel B: annual change in the next one year				
Dependent variable	Δ*Debt*	Δ*Leverage*	Δ*CashRatio*	Δ*PPENT*
NegSlackDum	-0.071***	-0.006**	0.011***	-0.002
	(-3.76)	(-2.22)	(5.44)	(-1.47)
RelationBankFirm	-0.056***	-0.006**	0.004**	-0.003**
	(-2.84)	(-2.56)	(2.49)	(-2.02)
RelationBankFirm × NegSlackDum	0.049**	0.004	-0.007***	0.003**
	(2.17)	(1.43)	(-3.46)	(2.10)
Observations	61987	65305	65711	65662
Adjusted R^2	0.324	0.433	0.182	0.227
Borrower, Lender, Loan Controls	Y	Y	Y	Y
Quarter-Lender FE	Y	Y	Y	Y
Borrower-Lender FE	Y	Y	Y	Y

Table A.6
Credit rating, violation and lending relationship

This table relates borrower's credit rating to the lender-borrower relationship given the material covenant violation enforcement. *CreditRating* is the average credit rating of the borrower firm as of the quarter. All other regression specifications are the same as in Table 3. Standard errors are clustered at the loan package level. Statistical significance at the 10%, 5% and 1% levels is denoted by *, ** and ***, respectively. *t*-statistics are in parentheses.

Panel A			
Dependent variable	CreditRating		
	(1)	(2)	(3)
Relation is	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
Violation	0.011	-0.529	-0.497
	(0.20)	(-1.48)	(-1.39)
Relation	0.069	0.037	0.041
	(0.93)	(0.60)	(0.66)
Relation × Violation	-0.131	-0.376	-0.389
	(-1.25)	(-1.18)	(-1.27)
Observations	21744	21744	21744
Adjusted R^2	0.940	0.940	0.940
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	Y
Borrower-Lender FE	Y	Y	Y

Panel B			
Dependent variable	CreditRating		
	(1)	(2)	(3)
Relation is	RelationBankFirm	FracRelLoanNum	FracRelLoanAmt
Relation	0.006	-0.540	-0.509
	(0.11)	(-1.51)	(-1.42)
Observations	21744	21744	21744
Adjusted R^2	0.940	0.940	0.940
Borrower, Lender, Loan Controls	Y	Y	Y
Quarter-Lender FE	Y	Y	Y
Borrower-Lender FE	Y	Y	Y