Finance and Economics Discussion Series

Federal Reserve Board, Washington, D.C.
ISSN 1936-2854 (Print)
ISSN 2767-3898 (Online)

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2026-008

Please cite this paper as:
Degerli, Ahmet, and Jing Wang (2026). "Monetary Policy Exposure of Banks and Loan Contracting," Finance and Economics Discussion Series 2026-008. Washington: Board of Governors of the Federal Reserve System, https://doi.org/10.17016/FEDS.2026.008.

Monetary Policy Exposure of Banks and Loan Contracting*

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January 26, 2026

Abstract

We provide evidence that banks use loan covenants to prepare for future monetary policy tightening, thereby facilitating the bank lending channel of monetary policy transmission. Specifically, banks with greater monetary policy exposure—those whose lending capacity contracts more as the federal funds rate increases—include stricter financial covenants in loan contracts, granting them flexibility to reduce existing loan commitments during monetary policy tightening when firms breach covenants. The resulting credit reductions to covenant violators by high-exposure banks account for over one-third of the total decline in credit during recent federal funds rate hikes.

Keywords: Loan contracting, Covenant strictness, Covenant violations, Monetary policy exposure, Monetary policy transmission, Bank lending channel

JEL classification: G21, E52, M41, G32

*We would like to thank Manuel Adelino, Yavuz Arslan, Allen N. Berger, Alon Brav, Mahfuz Chy, Dave Denis, Scott Dyreng, Isil Erel, Daniel W. Green, Sasha Indarte, Gazi Kabas, Inder Khurana, Hoyoun Kyung, Fang Lin, Fergal McCann, Gregory Nini, Manju Puri, Adriano Rampini, Carola Schenone, Vish Viswanathan, Yufeng Wu, David Zeke for helpful comments. All errors are our own. This paper is adapted from a chapter of Ahmet Degerli's dissertation completed at Duke University. The views expressed here are those of the authors and not necessarily those of the Federal Reserve Board or the Federal Reserve System.

1 Introduction

Commercial banks play a critical role in transmitting monetary policy to the real economy. A key mechanism is the bank lending channel: when the federal funds rate increases, banks' lending capacity contracts, leading to reduced lending to firms.[1] For example, during a typical 400-basis-point federal funds rate hiking cycle, banks cut commercial lending by as much as 10 percent (Drechsler et al., 2017).[2] Besides affecting applications for new loans, such a significant lending reduction may also affect existing loans (Jiménez et al., 2012). However, given that most commercial loans are long-term commitments, an important question remains: how do banks retain the flexibility to reduce existing loan commitments during monetary policy tightening?

In this paper, we examine the *ex ante* design of financial covenants in loan contracts to address this question. The loan contracting literature establishes that stricter financial covenants are associated with a higher likelihood of covenant violations, which grant lenders the right to modify loan terms—including reducing or terminating the loan commitment (Chava and Roberts, 2008; Nini et al., 2009; Murfin, 2012; Demerjian and Owens, 2016; Wang, 2017). Therefore, by enhancing banks' *ex post* control rights, stricter covenants give banks the flexibility to curtail existing loan commitments during periods of monetary policy tightening if a covenant is breached. Since banks differ in their exposure to monetary policy—those with greater exposure experience larger reductions in lending capacity as the federal funds rate rises and, consequently, reduce lending more (Drechsler et al., 2017)—our central prediction is that banks with greater exposure to monetary policy include stricter financial covenants in their loan contracts.

To test this prediction, we use deposit market concentration as a proxy for a bank's monetary policy exposure, motivated by evidence that banks' deposit market power determines

[1] See Blinder and Stiglitz (1983); Bernanke and Blinder (1988); Kashyap and Stein (1994); Van den Heuvel (2002).

[2] See Bernanke and Blinder (1992) for a similar magnitude of estimate.

the extent to which their lending contracts in response to monetary policy tightening (Drechsler et al., 2017; Wang et al., 2022; Xiao, 2020). In particular, Drechsler et al. (2017) show that the loan reductions attributable to bank deposit market power account for the entirety of the bank lending channel. For covenant strictness, we use the financial covenant strictness measure developed by Murfin (2012) and Demerjian and Owens (2016), which incorporates the number of covenants, the slackness of each covenant, and the variance–covariance structure of the financial variables underlying each covenant.

We start with an Ordinary Least Squares regression (OLS) model and document that banks with greater monetary policy exposure include stricter covenants in loan contracts, controlling for various borrower, lender, and loan characteristics, and including borrower, lender, and year fixed effects. Importantly, these findings remain robust even when controlling for various measures of banks' loan market power. Our findings are economically significant as a one-standard-deviation increase in banks' monetary policy exposure increases loan contract strictness by as much as 19 percent.

However, to establish causality, the identification challenge is the endogenous matching between firms and banks driven by unobserved firm characteristics. For example, if firms with certain uncontrolled risk factors tend to borrow from banks with greater monetary policy exposure, stricter covenants could reflect the firms' risk profile rather than the banks' monetary policy exposure. We employ two identification strategies to address this concern. First, following Khwaja and Mian (2008), we focus on firms that borrow multiple loans within the same year and estimate a within-firm specification that compares the covenant strictness of loan contracts originated by banks with different levels of monetary policy exposure to the same firm in the same year. Second, following Garmaise and Moskowitz (2006)[3], we exploit bank–merger–induced variation in banks' monetary policy exposure in an instrumental variable (IV) framework. Both identification strategies produce results consistent with our main findings, providing support for a causal interpretation of the relationship between banks'

[3]See also Scharfstein and Sunderam (2016), Favara and Giannetti (2017)

monetary policy exposure and covenant strictness.

For our interpretation of the above results to hold—that banks write strict covenants to preserve flexibility in reducing loan commitments when monetary policy tightens in the future—we should observe that, conditional on a covenant breach during tightening cycles, banks with greater monetary policy exposure reduce commitments more. We find evidence consistent with this conjecture. Specifically, using proprietary data on loan modification and covenant compliance from the Shared National Credit Program (SNC), we document that during federal funds rate hiking cycles, banks with greater monetary policy exposure are more likely to cut loan commitments following a covenant breach, compared to banks with lower monetary policy exposure. A back-of-the-envelope calculation suggests that this channel of credit reduction accounts for over one-third of the total credit reduction during the examined federal funds rate hiking cycles. This evidence highlights the role of covenants in the bank lending channel of monetary policy transmission.

We conduct several additional analyses that corroborate our main findings. First, we explore whether our main findings vary with the type of financial covenants. Specifically, we examine the distinct roles of capital covenants—those based on balance sheet information (such as leverage ratio covenants)—and performance covenants—those based on income statement information (such as interest coverage ratio covenants). Prior literature shows that capital covenants primarily align shareholder-creditor interests *ex ante*, while performance covenants function as *ex post* tripwires that trigger covenant violations when a borrower's financial condition deteriorates (Christensen and Nikolaev, 2012; Wang, 2017). As such, the strictness of performance covenants should be more relevant for banks' *ex post* flexibility to reduce existing loan commitments during monetary policy tightening. Consistent with this view, we find that the effect of banks' monetary policy exposure on covenant strictness is driven entirely by performance covenants. This result also helps mitigate concerns about omitted borrower characteristics driving our findings—if that were the case, we would expect a similar effect for capital covenants.

Next, we examine whether banks' monetary policy exposure influences another key aspect of loan contracts—maturity. One potential alternative mechanism for banks to preserve flexibility in reducing credit during future monetary policy tightening is to offer shorter-maturity loans. Shorter maturities would give banks more frequent opportunities to reduce lending by choosing not to renew maturing loans when their lending capacity is constrained by the rising federal funds rate. However, we find no evidence supporting this alternative. This finding is consistent with both firms' strong preference for long-term loans (Graham and Harvey, 2001) and the significant underwriting and syndication costs that make short-term loans less attractive for banks (Blickle et al., 2020; Bruche et al., 2020).

We continue by examining whether our main findings vary with the level of uncertainty about future monetary policy at the time of loan origination. Because strict covenants help banks reserve the option to cut existing loan commitments after the lending relationship is underway, the value of this option should be more valuable if there is greater uncertainty about the future path of monetary policy. Accordingly, the effect of banks' monetary policy exposure on covenant strictness should be stronger for loans originated during periods of high monetary policy uncertainty. We find results consistent with this prediction. This finding further supports our interpretation that banks use strict covenants as a hedging tool against their monetary policy exposure.

We also show that loan maturity and loan type influence the effect of banks' monetary policy exposure on covenant strictness. Because the option value of strict covenants is higher for longer-term loans, and longer-term loans are more likely to span a contractionary monetary policy cycle (all else equal), we expect the effect of banks' monetary policy exposure on covenant strictness to be more pronounced for these loans. Furthermore, because credit lines typically remain on banks' balance sheets——unlike term loans, which are often distributed to institutional investors——and expose banks to higher liquidity risk (Drucker and Puri, 2008; Gatev and Strahan, 2009; Irani and Meisenzahl, 2017; Balasubramanyan et al., 2019), we expect our result to be stronger for longer-term credit lines. We find results consistent

with these expectations.

Finally, we investigate why firms accept stricter loan covenants rather than switching to banks with lower monetary policy exposure that might offer less restrictive covenants. Although banks with greater monetary policy exposure include stricter covenants, we find no evidence that they compensate borrowers with lower loan spreads. This suggests that firms do not accept stricter covenants in exchange for lower interest rates. We interpret this finding as consistent with prior research showing that lending relationships are sticky and switching banks is costly. As a result, firms may tolerate stricter covenants imposed by banks that are more exposed to monetary policy tightening, without being compensated by lower interest rates. Because switching costs are particularly high for informationally opaque and financially distressed firms (Fama, 1985; Diamond, 1991; Petersen and Rajan, 1994; Drucker and Puri, 2008), we predict—and find—that the effect of bank monetary policy exposure on covenant strictness is stronger for these firms. Overall, the results suggest that firms facing greater frictions in changing lenders are more susceptible to the influence of banks' monetary policy exposure on covenant strictness.

Our findings contribute to several strands of the literature. First, we extend the literature on the bank lending channel of monetary policy transmission. While prior work focuses on how banks adjust their lending behavior after changes in the federal funds rate,[4] they are largely silent on how banks gain the flexibility to do so for existing loan commitments. We contribute by identifying a specific channel—covenant design—through which banks prepare for future monetary policy tightening. We also show that the *ex ante* design of covenant strictness helps banks respond to future monetary policy tightening by reducing existing loan commitments to borrowers that violate a covenant. Furthermore, although firms often rely on long-term loans to avoid refinancing risk, our findings reveal that they remain exposed to credit contractions induced by monetary policy tightening through covenant enforcement.

[4]Please see Blinder and Stiglitz (1983), Bernanke and Blinder (1988), Bernanke and Blinder (1992), Kashyap and Stein (1995), Kashyap and Stein (2000), Kishan and Opiela (2000), Campello (2002), Peek et al. (2003), Peek and Rosengren (2010), Drechsler et al. (2017), English et al. (2018), Temesvary et al. (2018), and Bräuning and Ivashina (2020) for example.

Second, we contribute to the literature on the supply-side determinants of covenant strictness. Murfin (2012) shows that lenders' *ex ante* screening ability—proxied by payment defaults in their loan portfolios—affects covenant strictness. Wang and Xia (2014) find that banks more active in the loan securitization market originate loans with looser covenants. Christensen et al. (2022) show that financial shocks to lenders lead to more restrictive performance covenants. Demerjian et al. (2023) document that banks with lower regulatory capital issue loans with less restrictive covenants to avoid loan downgrades that would further erode their capital. This literature also highlights the role of individual loan officers in shaping loan covenants (Bushman et al., 2021; Herpfer, 2021; Cheong et al., 2025). We extend this body of work by identifying a new supply-side determinant of covenant strictness: banks' exposure to monetary policy. Unlike prior supply-side determinants that focus largely on characteristics related to banks' lending operations, our evidence shows that banks' deposit characteristics also play a significant role in shaping covenant strictness.

Third, our paper relates to, but differs from, the literature that studies how financially unhealthy banks use covenant violations to reduce lending *ex post* (Ippolito et al., 2019; Chodorow-Reich and Falato, 2022). This literature focuses on bank health shocks and lending responses conditional on a covenant violation. We instead examine a different driver—banks' exposure to monetary policy—and a different margin—ex-ante covenant design. We show that more exposed banks write stricter covenants, increasing the likelihood that a covenant violation occurs later and thereby providing banks with flexibility to contract credit when policy tightens. Our findings, therefore, shift the focus from *ex post* enforcement by unhealthy banks to *ex ante* contract design by banks anticipating monetary policy cycles.

The remainder of this paper is organized as follows. Section 2 reviews the related literature and develops our main hypothesis. Section 3 describes our data and sample, and presents summary statistics. Section 4 reports the results of the main empirical analyses. Section 5 provides evidence from corroborative analyses. Section 6 concludes.

2 Related Literature and Hypothesis Development

Our research is motivated by two strands of literature. The first emphasizes the importance of covenant design in an incomplete contracting environment. The second highlights how deposit market power determines banks' exposure to monetary policy.

Debt contracts are inherently incomplete and are designed with the consideration of future renegotiation (Hart and Moore, 1988; Aghion and Bolton, 1992). Prior studies show that financial covenants, which specify minimum or maximum thresholds for financial ratios that borrowers must comply with during the life of the loan, play a crucial role in facilitating contract renegotiation. These covenants transfer control rights from shareholders to creditors when they are breached or expected to be breached. For example, an interest coverage ratio covenant sets a minimum ratio of EBITDA to interest expenses; if the borrower's interest coverage ratio falls below this minimum threshold, this covenant is breached, granting lenders the right to modify the loan terms. The literature documents that covenant violations and renegotiations are common (Chava and Roberts, 2008; Nini et al., 2012; Denis and Wang, 2014; Roberts, 2015; Chodorow-Reich and Falato, 2022). Since payment defaults occur less frequently, these covenant-triggered debt contract renegotiations are essential in providing lenders the opportunity to adjust loan terms, including loan amount, during the course of the lending relationship.

Following the incomplete contracting theory, lenders who are more likely to revise loan agreements based on future information—such as monetary policy tightening—should design covenants to be more likely to become binding. This would provide them the opportunity to reassess and adjust the loan agreements as new information emerges. Because the initial design of loan covenants is closely tied to the likelihood of them becoming binding—stricter covenants being more likely to trigger covenant violations or renegotiation—banks that are more likely to reassess lending decisions in the future should include stricter covenants in their loan contracts.

Regarding banks' exposure to monetary policy, the literature has long established that banks play a central role in transmitting monetary policy (Blinder and Stiglitz, 1983; Bernanke and Blinder, 1988; Kashyap and Stein, 1994; Van den Heuvel, 2002). Recent literature highlights that banks differ in their exposure to monetary policy—some experience a larger contraction in lending capacity than others during periods of monetary policy tightening. Importantly, this literature provides evidence that banks' deposit market power is a key determinant of their exposure to monetary policy, shaping the extent to which their lending contracts in response to increases in the federal funds rate.

Specifically, Drechsler et al. (2017) present a model showing that when the federal funds rate increases, banks that collect deposits in concentrated markets widen their deposit spread—the difference between the federal funds rate and the bank deposits rate, making deposits less attractive to depositors and, therefore, making deposits flow out of these banks; because deposits are the largest and most stable funding source for banks, those experiencing deposit outflows reduce their loan supply. Drechsler et al. (2017) provide evidence that, in response to monetary policy tightening, banks that collect deposits in more concentrated markets increase deposit spreads more, experience larger deposit outflows, and ultimately reduce lending more, indicating greater exposure to monetary policy. These authors further demonstrate that this channel accounts for the entire transmission of monetary policy through bank balance sheets. Using structural estimations, Wang et al. (2022) and Xiao (2020) also document findings supporting the importance of deposit market power in monetary policy transmission by banks.

Based on the above discussion, banks with greater monetary policy exposure—due to their deposit market concentration—are more likely to need to revise their lending decisions during contractionary monetary policy cycles. Anticipating such a need, these banks have a stronger incentive to include stricter covenants, which give them the necessary contractual rights to reduce loan commitments *ex post* when monetary policy tightens and a covenant is breached. Therefore, our central prediction is that banks with greater monetary policy

exposure include stricter financial covenants in their loan contracts.

3 Data

In this section, we define the variables used in our analysis, discuss our sample construction, and present summary statistics.

3.1 Main Variables

Our main outcome variable is loan-level covenant strictness, which captures the probability that a borrower will breach a financial covenant in a loan contract (Murfin, 2012; Demerjian and Owens, 2016). We obtain the covenant strictness measure from Peter Demerjian's website. This measure combines information on the number of financial covenants, the slackness of each covenant[5], and the variance-covariance structure of the underlying financial variables across all covenants included in a loan contract, providing a comprehensive assessment of the overall strictness of financial covenants in the contract.

Our main independent variable of interest is bank-year-level monetary policy exposure. As discussed in section 2, prior literature shows that banks' deposit market power, proxied by their deposit market concentration, substantially shapes their response to monetary policy. We follow Drechsler et al. (2017) and use the Federal Deposit Insurance Corporation's (FDIC) Summary of Deposits (SOD) data to calculate a bank's deposit market concentration as a proxy for its monetary policy exposure. Specifically, we first calculate county deposit Herfindahl-Hirschman Index (county deposit HHI) using the following equation:

$$County\ Deposit\ HHI_{c,t} = \sum_{b=1}^{N} (Deposit\ share_{c,b,t})^2, \tag{1}$$

where $Deposit\ share_{c,b,t}$ is the deposit market share of bank b in county c in year t. *County Deposit HHI* reflects the deposit market concentration at the county-year level. Drechsler et al.

[5]The slackness of a covenant refers to the distance between the actual value of the underlying financial variable and the threshold value set by the covenant

(2017) show that county deposit HHI captures the sensitivity of a bank's total deposits in the county to the changes in the federal funds rate.

Because many banks in the US collect deposits in more than one county, a bank's overall deposit market concentration is determined by the deposit market concentration of all the counties in which the bank collects deposits. Therefore, our main independent variable of interest—bank-year-level monetary policy exposure (MPE)—is calculated as follows:

$$MPE_{b,t} = \sum_{c=1}^{M} Deposit\,weight_{c,b,t} \times County\,Deposit\,HHI_{c,t}, \tag{2}$$

where $Deposit\,weight_{c,b,t}$ is bank b's deposits in county c as a percentage of the bank's total deposits. Drechsler et al. (2017) show that this variable captures the sensitivity of a bank's total deposits—the primary source of funding for loans—and, therefore, its lending capacity to changes in the federal funds rate.

3.2 Sample Construction

We begin with the sample of loans with available covenant strictness measure. We then merge this data with other syndicated loan information—such as loan terms, loan type, loan purpose, borrower identity, and lender identity—from LSEG Data & Analytics' Loan Connector DealScan database (DealScan) obtained through WRDS. Our analysis focuses on lead banks, as they are primarily responsible for setting loan covenants and monitoring borrowers. To directly link lenders' monetary policy exposure to the design of covenants, we restrict our sample to loans with one lead lender.

We obtain bank-branch-level deposit information from the SOD. We obtain bank financial information from U.S. Consolidated Reports of Condition and Income Filings (Call Reports, obtained through WRDS), submitted by banks regulated by the Federal Reserve, the FDIC, and the Office of the Comptroller of the Currency (OCC). We manually match lead lenders in DealScan to bank holding companies in the SOD and Call Reports using names and

locations. To obtain borrower financial data, we use the link table from WRDS (Chava and Roberts, 2008) to match DealScan borrowers to firms in Compustat.

Our final sample consists of 9,354 loans originated between 1995 and 2019 by 85 unique banks as the lead lenders to 2,110 unique borrowers.

3.3 Other Data and Variables

We obtain borrower financial information from Compustat, obtained through WRDS, and construct borrower characteristics, including $Firm\,Size$ (log of total assets), $Market\text{-}to\text{-}Book$ (market value divided by book value), and $Leverage$ (long-term debt divided by total assets). Additionally, we create two dummy variables: $Has\,Rating$ equal to one if a borrower has an S&P credit rating, and $Has\,IG\,Rating$ equal to one if the borrower has an investment-grade rating.

We use bank balance sheet and income statement information from the Call Reports to construct bank characteristics, including $Bank\,Size$ (log of total assets), $Equity\,Ratio$ (equity divided by bank assets), $Liquidity\,Ratio$ (cash and securities divided by total assets), $Loan\,Share$ (loans divided by bank assets), and $Deposit\,Share$ (deposits divided by bank assets).

We obtain loan characteristics from Dealscan. $Amount$ is the total loan commitment across all facilities within a loan package. $Maturity$ is the longest maturity among those facilities. $Spread$ is the weighted average loan spread across facilities, weighted by facility amount. $Loan\,Type$: $Credit\,Line$ is an indicator equal to one if the loan package contains lines of credit. $Loan\,Purpose$: $Acquisition$ is an indicator equal to one if the loan is used for acquisition.

For our IV analysis, we obtain information on bank mergers from the Federal Reserve Bank of Chicago. To examine banks' response to covenant violations during periods of monetary policy tightening, we obtain covenant violation and outstanding loan commitment information from SNC, and use the quarter-end federal funds target rate from Federal Reserve

Economic Data (FRED) to identify monetary policy tightening periods.

3.4 Summary Statistics

Figure 1 illustrates the time-series and cross-sectional variation in covenant strictness. The average level of covenant strictness remains relatively high and stable through the early 2000s but starts to decline in the years leading up to the Global Financial Crisis (GFC). During the GFC, covenant strictness increases temporarily, reflecting a tightening of lending standards during the crisis period. However, in the post-GFC period, covenant strictness falls to its lowest levels and remains subdued thereafter. The average covenant strictness over our sample period is 0.32. Substantial cross-sectional variation persists throughout the sample, with a standard deviation of 0.40.

Table 1 reports summary statistics. Because our sample is constructed by merging several datasets, we present summary statistics for both our sample and the universe of the relevant dataset. Panel A presents summary statistics for loan characteristics, where each observation is at the loan package level. Compared to the DealScan universe, loans in our sample tend to be larger in size and have lower spreads, consistent with the fact that the covenant strictness measure is available only for loans to public firms with available accounting information in Compustat. Additionally, 87% of the loans in our sample contain lines of credit, compared to 66% in the DealScan universe.

Panel B reports summary statistics for borrower characteristics. Consistent with the larger loan size and lower loan spread shown in Panel A, firms in our sample are, on average, larger than those in the Compustat universe. Reflecting their borrowing activities in the syndicated loan market, sample firms also have higher leverage and are more likely to have an S&P credit rating and an investment-grade ratings compared to the Compustat universe.

Panel C presents summary statistics for bank characteristics. Lead banks in the syndicated loan markets are large banks with an average size of $83 billion in total assets. Compared to the Call Report universe, these syndicated loan lead lenders raise deposits

in less concentrated deposit markets, as reflected by a lower average *MPE* of 0.18 versus 0.22. While the sample banks rely less on deposits than the broader Call Report universe, deposits still represent a sizable 66% of total assets and constitute the largest funding source for sample banks. As a result, deposit outflows triggered by increases in the federal funds rate are expected to lead to substantial loan contractions for these large banks, as shown in Drechsler et al. (2017).

4 Main Results

In this section, we test our main prediction: banks with greater monetary policy exposure include stricter financial covenants in loan contracts. We start with an OLS specification, followed by a within-firm specification and an IV analysis to address potential endogeneity concerns. Next, using SNC data, we investigate whether banks with greater monetary policy exposure are more likely to reduce existing loan commitments following a covenant violation during periods of monetary policy tightening.

4.1 *Ex ante* Loan Contracting

To determine whether banks with greater monetary policy exposure include stricter covenants in loan contracts, we estimate the following regression model:

$$Strictness_{\ell,f,b,t} = \beta MPE_{b,t-1} + \alpha_f + \eta_b + \delta_t + \Lambda \mathbf{F}_{f,t-1} + \Gamma \mathbf{B}_{b,t-1} + \Theta \mathbf{L}_{\ell,f,b,t} + \epsilon_{\ell,f,b,t}, \quad (3)$$

where $Strictness_{\ell,f,b,t}$ is the covenant strictness of loan contract l originated by bank b to borrower f in year t. $MPE_{b,t-1}$ is the lagged monetary policy exposure of bank b. α_f, η_b, and δ_t are borrower, bank, and year fixed effects, respectively. $\mathbf{F}_{f,t-1}$, $\mathbf{B}_{b,t-1}$, and $\mathbf{L}_{\ell,f,b,t}$ are borrower, bank, and loan control variables, respectively.

The coefficient of interest is β, which is expected to be positive. For ease of interpretation,

all regressors are standardized, i.e., β shows the effect of a one-standard-deviation increase in bank *MPE* on covenant *Strictness*. Because loan contracting practices may be correlated across loans by the same lender and across loans to the same borrower, we cluster standard errors at both the bank and borrower levels.

Table 2 presents the regression results. Column (1) includes year, firm, and bank fixed effects. The coefficient on *MPE* is positive and significant. The economic meaning of this coefficient is that a one-standard-deviation increase in bank monetary policy exposure increases loan contract strictness by 13 percent at the mean value of the strictness measure.[6]

In column (2), we saturate the model with time-varying firm characteristics. The coefficients on these controls all carry signs consistent with the prior literature (Demiroglu and James, 2010): borrowers with larger size, better investment opportunities, lower leverage, and investment-grade credit ratings obtain loan contracts with less restrictive covenants. In column (3), we add as control variables time-varying bank characteristics. In column (4), we further control for loan characteristics. The coefficient on *MPE* becomes larger and remains significant: a one-standard-deviation increase in bank monetary policy exposure increases covenant strictness by 19 percent.[7] As a robustness check, in Appendix A.1 we include additional firm, bank, and loan characteristics as control variables. The inclusion of these additional controls reduces our sample size, but the results are similar to those reported in Table 2.

Note that the inclusion of time-varying firm and bank characteristics either has little impact on the coefficient of our main variable of interest or increases its magnitude. This pattern suggests that any potential omitted firm or bank characteristics that may be correlated with covenant strictness and bank monetary policy exposure are likely time-invariant or would bias the estimates downward, thus working against us finding any significant effects. This mitigates the concern that our results are driven by the endogenous borrower–lender matching, particularly along dimensions of borrower credit risk, and suggests that estimates

[6] $0.04/0.32 = 13\%$
[7] $0.06/0.32 = 19\%$

from Table 2 may be interpreted as a lower bound for the effect of bank monetary policy exposure on covenant strictness. Nonetheless, in Section 4.2, we conduct two sets of tests to formally address endogeneity concerns regarding omitted time-varying firm characteristics. In those tests, we find larger coefficients on *MPE*, supporting our conjecture that any remaining endogeneity, if any, likely biases our results toward zero.

Our measure of banks' monetary policy exposure is based on their deposit market concentration, which reflects their deposit market power. One potential concern is that if a bank's deposit market power is highly correlated with its loan market power, then the inclusion of stricter covenants may reflect the bank's stronger bargaining position in the loan market rather than its exposure to monetary policy. To evaluate this alternative explanation, we first examine the correlation between banks' deposit and loan market concentrations. We find that this correlation is low at 13 percent.[8] Moreover, we conduct additional tests that explicitly control for banks' loan market power (due to their industry expertise, their long-term relationship with borrowers, and local lending conditions), and our main findings remain robust. These results are discussed and reported in Appendix A.2. These tests also mitigate any concerns that time-varying industry-level shocks or local economic conditions might drive our results.

4.2 Identification

While the OLS estimates are robust to various controls and fixed effects, the remaining identification challenge is the endogenous matching between borrowers and banks based on unobserved time-varying borrower characteristics. To obtain a causal interpretation of the coefficients, the matching between borrowers and banks should be effectively random with respect to factors——such as borrowers' credit risk——that may influence covenant strictness. For example, if risky firms disproportionately borrow from banks with greater monetary pol-

[8]This number is based on the correlation between our main measure, MPE, and Loan Industry HHI, which is the loan market concentration in the borrower's industry calculated using banks' syndicated loan market share in the industry. The correlation is 13 percent and 9 percent based on Fama-French 10 industries and Fama-French 48 industries, respectively.

icy exposure, then the selection of stricter covenants may reflect banks' response to borrower credit risk rather than their own monetary policy exposure. To address this endogeneity concern, in this section, we estimate a within-firm specification that compares the covenant strictness of loan contracts originated by different banks to the same firm in the same year, and conduct an IV analysis exploiting bank mergers.

4.2.1 Within-Firm Estimation

Our first approach to addressing endogeneity is a within-firm estimation that includes borrower-year fixed effects, following Khwaja and Mian (2008). This approach mitigates concerns about endogenous borrower-lender matching by comparing the covenant strictness of loans originated to the same borrower in the same year by banks with different levels of monetary policy exposure. By fully absorbing time-varying borrower characteristics—both observed and unobserved—at the borrower-year level, this specification allows us to attribute differences in covenant strictness to variation in banks' monetary policy exposure. The within-firm estimation model is specified as follows:

$$Strictness_{\ell,f,b,t} = \beta MPE_{b,t-1} + \xi_{f,t} + \eta_b + \Gamma \mathbf{B}_{b,t-1} + \Theta \mathbf{L}_{\ell,f,b,t} + \epsilon_{\ell,f,b,t}. \tag{4}$$

Different from equation 3, equation 4 uses borrower-year fixed effects $\xi_{f,t}$ instead of separate borrower fixed effects α_f and year fixed effects δ_t. As a result, equation 4 drops borrower characteristics as control variables because these variables are no longer identified in a regression with borrower-year fixed effects. The variation in *MPE* in the within-firm estimation comes solely from borrowers who have at least two new loans from different banks in a given year. Consequently, borrowers with only one loan in a given year are excluded from this exercise, reducing the sample size considerably to 1,426 observations.

Table 3 reports the regression results. Because the within-firm specification relies on a subset of our full sample, in column (1) we first confirm that our main result holds within this restricted sample using the same OLS specification as in column (4) of Table 2. Columns

(2) to (4) report estimates from the within-firm specification. In support of a causal interpretation of our main findings, we find that the coefficient on *MPE* remains positive and significant in each column. This result indicates that, for loans originated to the same firm in the same year, banks with greater monetary policy exposure include stricter financial covenants.

4.2.2 Bank Mergers

Our second approach to addressing endogeneity is an IV estimation that exploits bank–merger–induced variation in banks' monetary policy exposure. We construct the IV in two steps, following prior literature (Garmaise and Moskowitz, 2006; Favara and Giannetti, 2017; Scharfstein and Sunderam, 2016).

First, we recompute equation 1 to calculate a merger-induced *County Deposit HHI*, using only the pre-merger deposit market shares of the merging banks in the county; the deposit market shares of non-merging banks in those counties are set to zero in this calculation. This measure captures the hypothetical variation in county deposit market concentration entirely due to the bank mergers. Second, we plug the merger-induced *County Deposit HHI* into equation 2. This produces a merger-induced *MPE* (i.e, *Merger-induced MPE*), which is our IV.

For the instrument to satisfy the relevance restriction, *County Deposit HHI* must increase following a merger, thereby raising the monetary policy exposure of all banks in the affected county. To ensure this, we follow prior literature (Garmaise and Moskowitz, 2006; Favara and Giannetti, 2017; Scharfstein and Sunderam, 2016) and restrict the sample to counties experiencing mergers between banks that each hold an above-mean share of county deposits (i.e., greater than 12.6%).[9]

The exclusion restriction requires that bank mergers affect covenant strictness only through their impact on banks' monetary policy exposure. Because our IV estimation in-

[9]Following this literature, we also exclude mergers that involve FDIC assistance.

cludes bank fixed effects, the identifying variation comes from within-bank changes in monetary policy exposure, which should be orthogonal to borrower characteristics. A potential concern, however, is that bank mergers are not random events: for instance, they may alter the composition of borrowers served by a bank. In this case, changes in covenant strictness could reflect shifts in borrower composition rather than monetary policy exposure. To assess this concern, Table A5 reports correlations between observed borrower characteristics and our IV. We find no evidence of any significant correlation. Although the exclusion restriction cannot be directly tested, these results provide suggestive support for its validity.

Table 4 presents the results of the IV regression. Column (1) reports the first-stage results, where the coefficient on *Merger-induced MPE* is positive and significant, indicating a strong positive association between the IV and *MPE*. The first stage F-statistic is above 10, suggesting that the instrument is not weak. Column (2) reports the second-stage IV estimation results. Consistent with the OLS results, the coefficient on the instrumented *MPE* remains positive and significant. Its magnitude exceeds that of the OLS estimate but aligns closely with the within-firm specification. As discussed earlier, this pattern suggests that any endogeneity in the OLS estimates would likely bias the effect toward zero, demonstrating the robustness of the causal impact of bank monetary policy exposure on covenant strictness.

Taken together, the two identification strategies produce results consistent with our main findings, supporting a causal interpretation of the effect of banks' monetary policy exposure on covenant strictness.

4.3 *Ex post* Lending Response

The results from the previous subsections establish that banks with greater monetary policy exposure include stricter financial covenants in their loan contracts. To interpret this as evidence that banks, in consideration of their own monetary policy exposure, seek flexibility to reduce credit supply to existing borrowers in the future, we should observe that banks with greater monetary policy exposure use covenant violations as an opportunity to

decrease existing loan commitments during times of monetary policy tightening.

To shed light on this issue, we use the data on loan modification and covenant compliance from SNC to examine banks' lending responses during the two most recent episodes of monetary policy tightening—namely, the 2016-2019 and 2022-2024 tightening cycles.[10,11] DealScan data is not suitable for this analysis for two reasons. First, Dealscan does not report information on covenant violations, and the text-scraping methods applied to SEC filings in prior studies (e.g., Dichev and Skinner (2002); Nini et al. (2012)) tend to understate the frequency of covenant violations (Chodorow-Reich and Falato, 2022). Second, information on changes in loan commitment during the life of a loan cannot be reliably tracked in DealScan.

SNC is jointly administered by the Federal Reserve, the FDIC, and the OCC. It reviews and collects information on loans of $20 million ($100 million since 2018) or more that are shared by three or more financial institutions that are regulated by one of the aforementioned regulators. In addition to loan characteristics and the identities of borrowers and lenders, SNC reports whether a borrower breached a financial covenant during the reporting period and the loan commitment amount for the reporting period, allowing us to track changes in loan commitment over time. SNC also includes a measure of loan credit rating, categorized from the highest to the lowest credit quality as follows: investment grade, non-investment grade, lowest-rated pass, special-mention, substandard, doubtful, and loss. Chodorow-Reich and Falato (2022) show that loans in the SNC universe are representative of loans in the US syndicated loan market. We supplement the SNC data with annual bank *MPE* of the lead lender.

To test whether banks with greater monetary policy exposure are more likely to reduce existing loan commitments in response to covenant violations during monetary policy tightening, we follow the empirical approach used in Chodorow-Reich and Falato (2022) and

[10]We define episodes of monetary policy tightening as quarters in which the quarter-end federal funds rate exceeds its level from the same quarter one year earlier. Because covenant compliance data in SNC are available only after 2006, our empirical tests focus on the two subsequent tightening cycles.

[11]We focus our analysis on episodes of monetary policy tightening rather than monetary policy shocks, because Drechsler et al. (2017) show that the effect of monetary policy on bank lending due to deposit market power is predominantly driven by actual changes in the federal funds rate, not monetary policy shocks.

estimate the following regression model:

$$\begin{aligned}\text{Loan outcome}_{l,b,f,t} = \beta Violation_{l,b,f,t-1} + \mu High\,MPE_{b,t-1} \\ + \theta\left(Violation_{l,b,f,t-1} \times High\,MPE_{b,t-1}\right) + \eta \mathbf{X}_{l,b,f,t} + \epsilon_{l,b,f,t}.\end{aligned} \tag{5}$$

The dependent variable is either *Loan reduction*, an indicator variable equal to one if there is a reduction in the commitment amount for loan l between bank b and borrower f in reporting period t, and 0 otherwise, or $\%\Delta$ *Loan amount*, a continuous variable that measures the percentage change in loan commitment amount. *Violation* is an indicator variable equal to one if there is a reported covenant violation for loan l between bank b and borrower f either in the current reporting period or any of the previous four calendar quarters. $High\,MPE_{b,t-1}$ is an indicator variable equal to one if bank b's monetary policy exposure in year $t-1$ is above the sample median. Our coefficient of interest is θ, on the interaction term $Violation \times High\,MPE$. $\mathbf{X}$ includes a rich set of fixed effects, including loan origination year, reporting date, reporting date-industry, loan purpose, and loan credit rating fixed effects. Following Chodorow-Reich and Falato (2022), we also control for the interaction between loan credit rating and $High\,MPE$, which isolate the impact of $High\,MPE \times Violation$ from the impact of $High\,MPE \times Credit\,Rating$. We double cluster standard errors at the bank and borrower levels.

Table 5 presents the results. Columns (1) to (3) report estimates using the loan reduction indicator as the dependent variable. As expected, banks are more likely to reduce loan commitments following a covenant violation, as the coefficients on $Violation$ are positive and significant. More importantly, we find that the coefficient on the interaction term is also positive and significant, indicating that during monetary policy tightening, banks with high monetary policy exposure are more likely to reduce existing loan commitments following covenant violations. In terms of economic significance, the coefficient in column (3) implies that, relative to banks with below-median monetary policy exposure, those with above-median exposure are 6 percentage points more likely to reduce existing loan com-

mitments following a covenant violation. Considering that the unconditional likelihood of loan commitment reduction is 39 percent during the examined monetary policy tightening periods, this result represents an economically significant increase in this likelihood (i.e., 15 percent at the mean value).

Columns (4) to (6) report the estimates using the percentage change in loan commitment amount as the dependent variable. The coefficients on $Violation \times High\,MPE$ are negative and significant, indicating that during monetary policy tightening, banks with high monetary policy exposure reduce existing loan commitments more aggressively after a covenant violation. In terms of economic significance, the coefficient in column (6) implies that banks with above-median monetary policy exposure reduce existing loan commitments by 2 percentage points more following a covenant violation, relative to those with below-median exposure.

To assess the economic significance of the loan reductions associated with covenant violations in the bank lending channel of monetary policy transmission (i.e., their contribution to the overall decline in lending during monetary policy tightening), we perform a back-of-the-envelope calculation similar to Chodorow-Reich and Falato (2022), using the estimates reported in column (6). For each loan, we estimate the credit reduction by multiplying the previous period's loan commitment by 2 percent—the magnitude implied by the coefficient on the interaction term—if the loan is issued by a $High\,MPE$ bank and the borrower has violated a covenant, and by zero otherwise. To calculate the total loan reduction for each reporting period, we sum the estimated loan reductions across all loans and divide this amount by the beginning-of-period total commitment amount. Our calculation implies an overall credit reduction of 3.82 percent during a typical 400-basis-point tightening cycle.[12] In comparison with the approximately 10 percent reduction in commercial lending documented in Drechsler et al. (2017) for such cycles, our estimation suggests that loan reductions due to covenant violations account for over one-third of the total contraction in credit supply

[12]The SNC data are semiannual, covering the first and third quarters. Over a six-month period, the average increase in the federal funds rate during the two most recent tightening cycles is approximately 60 basis points. We annualize the semiannual effect and scale it to a typical 400-basis-point cycle by multiplying the semiannual loan reduction by 2 x (400/60).

during monetary policy tightening, underscoring the importance of covenant design in the transmission of monetary policy to outstanding credit.

The evidence on the *ex post* loan reduction presented in this section supports the main argument of this paper: because stricter covenants are more likely to result in covenant violations, banks with greater monetary policy exposure design loans with stricter financial covenants, positioning themselves to reduce loan supply to existing borrowers following an increase in the federal funds rate if borrowers violate a covenant.

5 Additional Analyses

In this section, we conduct five sets of analyses and provide evidence that corroborates our main findings. First, we examine how the effect of bank monetary policy exposure on covenant strictness varies by the type of financial covenants. Second, we assess whether banks with greater monetary policy exposure prepare for future monetary policy tightening by issuing loans with shorter maturities. Third, we evaluate whether our main findings are stronger for loans originated during periods of elevated uncertainty about future monetary policy. Fourth, we investigate whether loan maturity and loan type influence the effect of bank monetary policy exposure on covenant strictness. Lastly, we explore why borrowers accept loans with stricter covenants.

5.1 Capital vs. Performance Covenants

Building on classic contracting theory, Christensen and Nikolaev (2012) classify financial covenants into capital covenants and performance covenants, both of which help creditors exercise control rights, albeit through different mechanisms. Specifically, capital covenants set restrictions on financial ratios based on balance sheet information (such as leverage ratio covenants); these covenants alleviate adverse selection concerns by limiting certain firm behavior (such as taking on additional debt), aligning shareholder-creditor interests *ex ante*.

Performance covenants set restrictions on financial ratios based on income statement information (such as interest coverage ratio covenants); these covenants mitigate moral hazard problems by signaling the deterioration of borrower financial condition (such as reduced earnings) in a timely manner through covenant violations, allowing creditor intervention *ex post*.

For banks with greater monetary policy exposure, the tripwire role of performance covenants is critical in enabling them to reduce credit supply to borrowers after the lending relationship is underway. Covenant violations provide banks with both the opportunity and bargaining power to reduce loan commitments during contract renegotiation, particularly when their lending capacity is constrained by contractionary monetary policy. Moreover, because these violations often coincide with a deterioration in firm financial condition, borrowers with performance covenant violations are usually the ones to whom banks are most inclined to cut credit when facing worsened funding conditions. Taken together, we expect the relation between bank monetary policy exposure and covenant strictness to be more relevant for performance covenants.

Table 6 reports the regression results. Contract strictness in columns (1) and (2) is based only on capital covenants, and that in columns (3) and (4) is based only on performance covenants. We find that bank monetary policy exposure significantly affects covenant strictness only when measured using performance covenants. This finding supports the interpretation that banks with greater monetary policy exposure include stricter financial covenants to enhance their *ex post* control over borrowers through covenant violations. Also, the lack of a significant effect for capital covenants helps alleviate the concern that our main findings are driven by endogenous borrower-bank matching along borrower characteristics that are potentially correlated with both covenant strictness and bank *MPE*. If such endogenous matching were driving our results, we would expect to see a similar positive association between bank *MPE* and the strictness of capital covenants.

5.2 Bank Monetary Policy Exposure and Loan Maturity

An alternative channel through which banks may gain flexibility in preparation for future monetary policy tightening would be to originate loans with shorter maturities. Shorter maturities, similar to stricter covenants, would allow banks to reevaluate lending decisions more frequently in response to future monetary policy stance. This implies a negative association between bank monetary policy exposure and loan maturity. However, banks may prefer using stricter covenants to originating shorter-maturity loans, because conducting frequent reviews of *all* borrowers can be costly. In contrast, stricter covenants allow banks to selectively reevaluate only those borrowers who trigger a violation—precisely the types of borrowers to whom banks may want to reduce credit supply when their lending capacity contracts following monetary policy tightening (Gertler and Gilchrist, 1994; Chodorow-Reich and Falato, 2022). Therefore, whether banks with greater monetary policy exposure tend to originate loans with shorter maturities is ultimately an empirical question.

Table 7 reports the results, using the same regression specification as equation 3 but with loan maturity as the dependent variable. We find no evidence that banks with greater monetary policy exposure originate loans with shorter maturities: the coefficients on *MPE* are positive but insignificant across all specifications.[13] This finding suggests that banks with high monetary policy exposure predominantly rely on strict financial covenants to retain the necessary contractual right to reduce loan commitments after the lending relationship is underway. This evidence is consistent with the survey evidence that firms have a strong preference for long-term loans due to operational needs and balance sheet structure (Graham and Harvey, 2001). Moreover, loan underwriting is costly for not only borrowers but banks, especially in the syndicated loan market (Blickle et al., 2020; Bruche et al., 2020). Banks may, therefore, prefer long-maturity loans combined with strict covenants to short-maturity loans: rather than evaluating all borrowers with short-maturity loans on a frequent basis, it

[13]Focusing on a different sample of loans (i.e., commercial and industrial term loans from the 1997–2017 Survey of the Terms of Business Lending (STBL)), Li et al. (2023) document that deposit market power allows banks to extend loans with longer maturity.

is more cost-efficient to evaluate only firms that have violated a covenant.

5.3 Monetary Policy Uncertainty

We interpret our main findings as evidence that strict covenants help banks reserve the option to reduce existing loan commitments in the future. Such an option should be more valuable if there is greater uncertainty about the future path of monetary policy. This implies that the effect of bank monetary policy exposure on covenant strictness should be stronger for loans originated during periods of elevated monetary policy uncertainty.

To investigate how monetary policy uncertainty impacts the effect of bank monetary policy exposure on covenant strictness, we use two measures of monetary policy uncertainty. The first measure is *MPU index*, a widely used measure based on the frequency of newspaper coverage of monetary policy uncertainty (Baker et al., 2016; Husted et al., 2017). A higher *MPU index* indicates greater uncertainty about the future path of the federal funds rate. The second measure is *MP shocks*, which is the average absolute value of monetary policy shocks over the past year, obtained from Kuttner (2001). Larger *MP shocks* indicate larger recent monetary policy shocks, potentially implying increased uncertainty about its future course. We estimate our baseline specification as shown in equation 3 for subsamples of loans originated during periods of high versus low monetary policy uncertainty, i.e., periods with above or below median *MPU index* or *MP shocks*.

Columns (1) and (2) in Table 8 report the results based on *MPU index*. Column (1) shows that the coefficient on *MPE* is positive and significant for the subsample of loans originated during periods with high *MPE index*. In contrast, the coefficient in column (2), which corresponds to loans from periods of low uncertainty, is much smaller and has lower statistical significance. Although not reported here, we confirm that the difference between these two coefficients is statistically significant. Columns (3) and (4) report the results based on *MP shocks*. Similar to the first two columns, the coefficient on *MPE* is larger for periods with high *MP shocks* relative to periods with low *MP shocks*; however, the difference across

these two subsamples is not statistically significant. Together, these results imply that the effect of bank monetary policy exposure on covenant strictness is more pronounced for periods of heightened uncertainty about future monetary policy.

5.4 Loan Features: Maturity and Type

Absent a covenant violation, a bank can only reduce lending to an existing borrower by choosing not to renew a loan at maturity. As a result, the option value of strict covenants increases with loan maturity. Moreover, longer-term loans are more likely to span periods of monetary policy tightening, all else equal. Taken together, these considerations imply that banks should have a stronger incentive to impose stricter covenants on longer-term loans, suggesting that the effect of bank monetary policy exposure on covenant strictness should be more pronounced for longer-term loans.

Loan types may also influence the effect of bank monetary policy exposure on covenant strictness. The two primary loan types—lines of credit and term loans—differ substantially in the risks they pose to banks. Lines of credit are revolving facilities that allow borrowers to draw funds on demand. In contrast, term loans are lump-sum loans disbursed to borrowers in full at closing and repaid over time. We expect the effect of bank monetary policy exposure on covenant strictness to be stronger for lines of credit, for two reasons. First, term loans are sold primarily to institutional investors, such as hedge funds, mutual funds, and collateralized loan obligations (CLOs), while lines of credit are typically held on banks' balance sheets (Drucker and Puri, 2008; Gatev and Strahan, 2009; Irani and Meisenzahl, 2017). As a result, banks' monetary policy exposure is less relevant for the covenant strictness of term loans. Second, the on-demand nature of lines of credit exposes banks to significant liquidity risk, as the timing of drawdowns is uncertain (Gatev and Strahan, 2009; Balasubramanyan et al., 2019).

To examine whether loan maturity influences our main findings, we create two dummy variables: $Maturity \geq 1\ year$ and $Maturity \geq 2\,years$, which equal one if the loan maturity

is at least one and two years, respectively. We modify our baseline specification as shown in equation 3 by interacting one of these two dummy variables with bank *MPE*. Columns (1) and (2) in Table 9 report the results. We find that the coefficient on the interaction term is significantly positive in both columns, indicating that the effect of bank monetary policy exposure on covenant strictness is stronger for loans with longer maturity.

To understand the role of loan types, we further interact our variables of interest with a credit line indicator. For this exercise, we restrict our sample to loan packages consisting exclusively of either lines of credit or term loans. We report the results in columns (3) and (4). The triple interaction term in both columns is positive and significant, indicating that the effect of bank monetary policy exposure on covenant strictness is stronger for longer-term lines of credit.

These results are also consistent with banks' incentive to reduce loan commitments following covenant violations. When a term loan is reduced, the borrower is required to repay funds already disbursed—an outcome that imposes significant costs and can strain the borrower-lender relationship. In contrast, when a credit line is reduced, the borrower merely loses access to future funds, which is far less disruptive. Given the importance of maintaining relationship with borrowers, banks should have less incentive to include strict covenants in loan packages that consist solely of term loans. Confirming this conjecture, in Appendix A.4 we show that during monetary policy tightening, banks with greater monetary policy exposure are more likely to reduce loan commitments only for lines of credit following a covenant violation.[14]

5.5 Borrowers' Choice

Our results so far indicate that banks' exposure to monetary policy significantly impacts how they design covenant strictness. In this section, we examine why borrowers accept

[14]This finding is also consistent with the findings in Chodorow-Reich and Falato (2022) that during the financial crisis, in response to covenant violations, banks tend to reduce loan commitments for lines of credit more than term loans.

loan contracts with stricter covenants, rather than obtaining loans from banks with lower monetary policy exposure—those that are presumably more willing to offer loans with more lenient covenant terms.

One potential explanation is that borrowers may accept stricter covenants in exchange for lower interest rates. To test this hypothesis, we estimate the same regression specification as equation 3 but use loan spread as the dependent variable. We report the results in Table 10. The coefficients on *MPE* are positive and significant in columns (1) and (2), but they become insignificant in columns (3) and (4) once we include bank and loan characteristics as control variables. Therefore, these results offer no support for the notion that banks with greater monetary policy exposure compensate borrowers for stricter covenants by offering lower interest rates.

We interpret the absence of a tradeoff between covenant strictness and loan spreads as consistent with prior evidence on the stickiness of lending relationships. Borrower–lender relationships are usually path dependent—as they evolve over time through repeated interactions and past financing arrangements—and high switching costs may discourage firms from changing lenders. As a result, firms may accept the stricter covenants set by banks that are more exposed to monetary policy tightening, without receiving compensation in the form of lower interest rates.

Following this reasoning, borrowers with higher switching costs should be more susceptible to the effect of banks' monetary policy exposure on covenant strictness. We test this prediction by examining whether our main findings are stronger for firms characterized by greater information asymmetry or financial distress. These firms are often limited to borrowing from their relationship banks, which accumulate proprietary and soft information over the course of the lending relationship (Fama, 1985; Diamond, 1991; Petersen and Rajan, 1994; Drucker and Puri, 2008; Ferreira and Matos, 2012; Bolton et al., 2016). Consequently, for such firms, switching to a new bank can be prohibitively costly, giving relationship banks bargaining power to set stricter covenants without risking the loss of business.

As proxies for borrowers' information asymmetry, we use firm size and SA index (Hadlock and Pierce, 2010a), which combines information on firm size and age. Smaller and younger borrowers are usually subject to more severe information asymmetry and have fewer assets that can be pledged as collateral, limiting their external financing options (Hadlock and Pierce, 2010b). As proxies for borrowers' financial distress, we use leverage and Altman's Z score. Firms with high leverage and low Altman's Z scores are more likely to be in financial distress or face bankruptcy risk, leaving them with fewer financing alternatives.

Table 11 presents the results. Columns (1) and (2) focus on the two proxies for information asymmetry, where firms with the bottom quartile asset size or the top quartile SA index in our sample are considered informationally opaque firms. Columns (3) and (4) focus on the two proxies for financial distress, where firms with the top quartile leverage or the bottom quartile Altman's Z score in our sample are considered financially distressed firms. Consistent with our discussion above, we find that although banks with higher monetary policy exposure on average use stricter financial covenants, the effect of bank monetary policy exposure on covenant strictness is stronger for more informationally opaque and more financially distressed firms. These findings indicate that firms with limited alternative borrowing options due to higher financing frictions are more susceptible to the influence of banks' monetary policy exposure on covenant strictness.

6 Conclusion

There is extensive literature on the bank lending channel of monetary policy transmission. This literature documents that monetary policy tightening lowers real economic activity by reducing the loan supply of banks to non-financial firms. However, the mechanisms through which banks reduce existing loan commitments remain less understood.

In this paper, we examine the design of financial covenants in loan contracts to shed light on this issue. We show that banks with greater monetary policy exposure—those that

experience larger deposit outflows and, consequently, greater reductions in lending capacity during monetary policy contractions—include stricter covenants in their loan contracts. Since stricter covenants are associated with a higher likelihood of violation, they provide banks with an opportunity to reduce existing loan commitments following future increases in the federal funds rate, if the borrower breaches a covenant. We further document that banks that are more exposed to monetary policy actively leverage covenant violations to curtail lending during periods of monetary policy tightening. Together, our findings suggest that the design of loan covenant strictness facilitates the transmission of monetary policy to the real economy by affording banks the flexibility to adjust credit commitments to existing borrowers in response to monetary policy tightening.

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Figure 1: **Average Loan Strictness**

This figure plots the average covenant strictness along with a one standard deviation band for the period between 1995 and 2019. The average and standard deviation are calculated over a 1-year horizon.

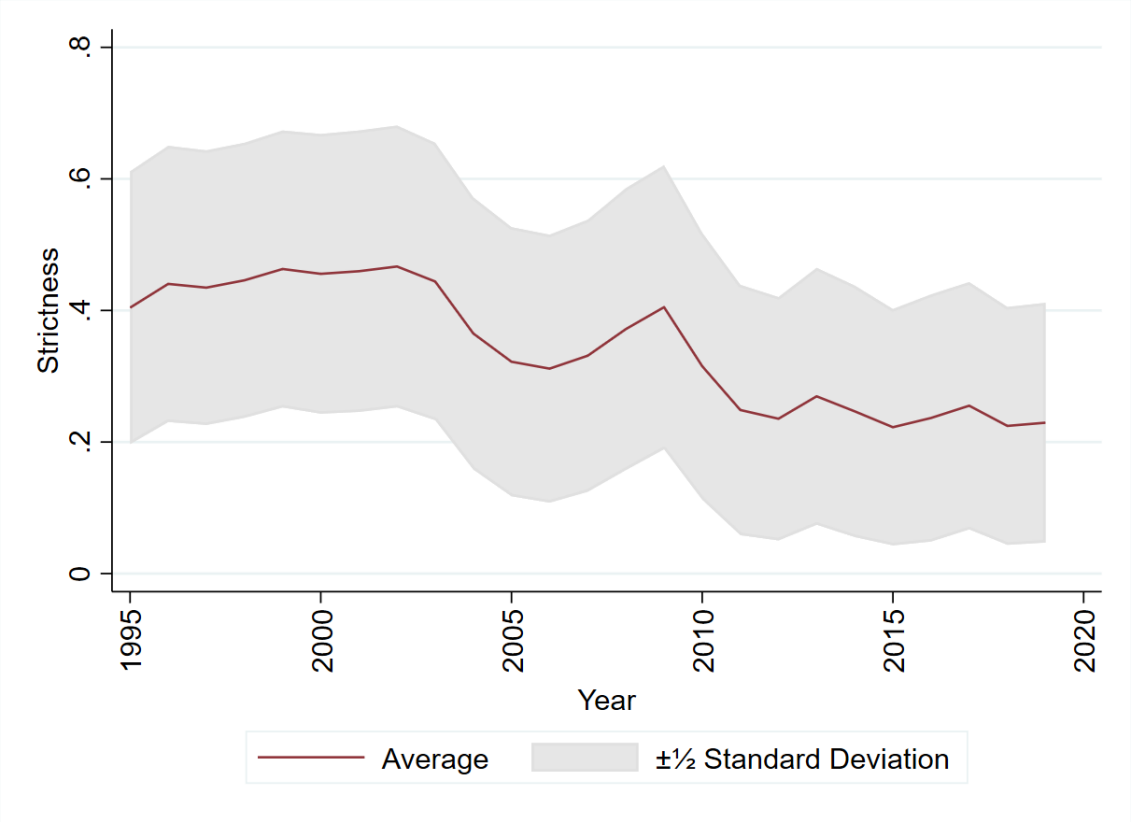

Table 1: **Summary Statistics**

This table reports summary statistics for loan characteristics from DealScan (Panel A), firm characteristics from Compustat (Panel B), and bank characteristics from Call Reports (Panel C). In each panel, columns (1) to (3) present summary statistics for our sample, while columns (4) to (6) present summary statistics for the universe of the corresponding dataset.

Panel A: Loan Characteristics

	Sample Loans			DealScan Loans		
	(1) Mean	(2) Median	(3) SD	(4) Mean	(5) Median	(6) SD
Amount (mill. $)	487.28	300.00	480.95	287.66	150.00	314.57
Maturity (years)	4.01	5.00	1.46	4.07	4.92	1.91
Spread (bps)	164.74	150.00	81.80	217.29	200.00	125.59
Loan Type: Credit Line	0.87	1.00	0.34	0.66	1.00	0.47
Loan Purpose: Acquisition	0.13	0.00	0.33	0.15	0.00	0.36
Strictness	0.32	0.07	0.40	-	-	-
Obs. (Loan)	9,354			94,993		

Panel B: Firm Characteristics

	Sample Firms			Compustat Firms		
	(1) Mean	(2) Median	(3) SD	(4) Mean	(5) Median	(6) SD
Firm Size (bill. $)	2.44	0.91	3.20	1.28	0.21	2.12
Market-to-Book	1.59	1.39	0.63	1.98	1.35	1.38
Leverage	0.23	0.23	0.17	0.15	0.08	0.17
Has Rating	0.37	0.00	0.48	0.17	0.00	0.37
Has IG Rating	0.18	0.00	0.38	0.09	0.00	0.29
Obs. (Firm x Year)	41,358			218,804		

Panel C: Bank Characteristics

	Sample Banks			Call Report Banks		
	(1) Mean	(2) Median	(3) SD	(4) Mean	(5) Median	(6) SD
MPE	0.18	0.18	0.05	0.22	0.19	0.13
Bank Size (bill. $)	83.09	43.03	93.87	0.20	0.11	0.21
Equity Ratio	0.09	0.09	0.02	0.10	0.10	0.02
Liquidity Ratio	0.28	0.25	0.10	0.31	0.29	0.13
Loan Share	0.59	0.63	0.12	0.61	0.62	0.13
Deposits Share	0.66	0.69	0.13	0.85	0.86	0.05
Obs. (Bank x Year)	1,218			157,419		

Table 2: **Monetary Policy Exposure and Covenant Strictness: Baseline Specification**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness. The sample period is between 1995 and 2019. All variables are standardized, i.e., each coefficient shows the impact of a one-standard-deviation increase in the corresponding variable on covenant strictness. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)
MPE	0.04***	0.04***	0.06***	0.06***
	(0.01)	(0.01)	(0.01)	(0.01)
Firm Size		-0.03*	-0.03*	-0.03
		(0.02)	(0.02)	(0.02)
Market-to-Book		-0.07***	-0.07***	-0.05***
		(0.01)	(0.01)	(0.01)
Leverage		0.06***	0.06***	0.05***
		(0.01)	(0.01)	(0.01)
Has Rating		0.03	0.03	0.02
		(0.02)	(0.02)	(0.02)
Has IG Rating		-0.09***	-0.10***	-0.07***
		(0.02)	(0.02)	(0.02)
Bank Size			0.06*	0.06
			(0.04)	(0.04)
Equity Ratio			-0.01	-0.01
			(0.01)	(0.01)
Liquidity Ratio			0.00	0.00
			(0.01)	(0.01)
Loan Share			0.02	0.02
			(0.02)	(0.02)
Deposits Share			-0.01	-0.02
			(0.02)	(0.02)
Spread				0.07***
				(0.01)
Maturity				-0.00
				(0.00)
Amount				-0.02**
				(0.01)
Loan Type: Credit Line				0.04***
				(0.01)
Loan Purpose: Acquisition				-0.06***
				(0.02)
Fixed Effects:				
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Obs.	9,354	9,354	9,354	9,354
R^2(Adj.)	0.438	0.460	0.461	0.475

Table 3: **Monetary Policy Exposure and Covenant Strictness: Within-firm Estimation**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness using a sample of firms that obtain multiple loans within the same year. Bank and loan control variables are the same as those in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Baseline Estimation	Within-firm Estimation		
	(1)	(2)	(3)	(4)
MPE	0.10*	0.11*	0.15**	0.14**
	(0.05)	(0.06)	(0.08)	(0.07)
Controls and Fixed Effects:				
Firm Controls	Yes	No	No	No
Bank Controls	Yes	No	Yes	Yes
Loan Controls	Yes	No	No	Yes
Year FE	Yes	No	No	No
Firm FE	Yes	No	No	No
Firm x Year FE	No	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Obs.	1,426	1,426	1,426	1,426
R^2(Adj.)	0.588	0.642	0.644	0.651

Table 4: **Monetary Policy Exposure and Covenant Strictness: Bank Mergers as an IV**

This table presents results from an IV estimation on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness. The dependent variable is *MPE* in column (1) and covenant strictness in column (2). *Merger-induced MPE* is the instrument, which is the *MPE* calculated using only the deposit market shares of merging banks in a county. All control variables are the same as those in Table 2. The sample period is between 1995 and 2015. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	First Stage	IV
	(1) Dependent Variable: MPE	(2) Dependent Variable: Strictness
Merger-induced MPE	0.10***	
	(0.03)	
MPE		0.16*
		(0.09)
Controls and Fixed Effects:		
Firm Controls	Yes	Yes
Bank Controls	Yes	Yes
Loan Controls	Yes	Yes
Year FE	Yes	Yes
Firm FE	Yes	Yes
Bank FE	Yes	Yes
Obs.	8,042	8,042
F-stat	10.71	47.46

Table 5: **Lending Response During Monetary Policy Tightening**

This table presents regression results on the effect of a covenant violation on credit reduction during monetary policy tightening periods, conditional on bank monetary policy exposure (i.e., *MPE*). In columns (1) to (3), the dependent variable is a dummy variable equal to one if there is a reduction in loan commitment in the reporting period; in columns (4) to (6), the dependent variable is the percentage change in loan commitment in the reporting period. *Violation* is a dummy variable equal to one if the borrower breaches a covenant in the current reporting period or during the previous four calendar quarters. *High MPE* is a dummy variable equal to one if the bank's monetary policy exposure is above the sample median. The sample includes reporting periods between 2016 and 2019, and those between 2022 and 2024. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Credit Reduction Dummy			Credit Percentage Change		
	(1)	(2)	(3)	(4)	(5)	(6)
Violation	0.06***	0.03**	0.03*	-0.70	0.68	0.96
	(0.02)	(0.01)	(0.02)	(0.56)	(0.57)	(0.60)
High MPE	-0.04*	-0.05	-0.06	2.85**	3.40	3.84
	(0.02)	(0.06)	(0.06)	(1.20)	(2.70)	(2.94)
Violation x High MPE	0.07**	0.06**	0.06**	-1.76*	-1.92**	-2.00**
	(0.03)	(0.03)	(0.03)	(0.92)	(0.90)	(0.94)
Controls and Fixed Effects:						
Loan Origination Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Reporting Date FE	Yes	Yes	No	Yes	Yes	No
Reporting Date × Industry FE	No	No	Yes	No	No	Yes
Loan Purpose FE	Yes	Yes	Yes	Yes	Yes	Yes
Credit Rating FE	No	Yes	Yes	No	Yes	Yes
Credit Rating x High MPE	No	Yes	Yes	No	Yes	Yes
Obs.	7,490	7,490	7,490	7,490	7,490	7,490
R^2(Adj.)	0.095	0.108	0.110	0.020	0.039	0.051

Table 6: **Covenant Types: Capital vs. Performance**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness, conditional on the type of financial covenants. The dependent variable is the strictness of capital covenants in columns (1) and (2), and the strictness of performance covenants in columns (3) and (4). All control variables are the same as those in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Capital Covenants		Performance Covenants	
	(1)	(2)	(3)	(4)
MPE	0.00	-0.01	0.03**	0.06***
	(0.01)	(0.01)	(0.02)	(0.02)
Controls and Fixed Effects:				
Firm Controls	No	Yes	No	Yes
Bank Controls	No	Yes	No	Yes
Loan Controls	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Obs.	9,354	9,354	9,354	9,354
R^2(Adj.)	0.380	0.384	0.434	0.475

Table 7: **Monetary Policy Exposure and Loan Maturity**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on loan maturity, measured as the longest maturity among all facilities in a loan package. All control variables are the same as those in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)
MPE	0.08	0.08	0.16	0.14
	(0.12)	(0.11)	(0.13)	(0.12)
Controls and Fixed Effects:				
Firm Controls	No	Yes	Yes	Yes
Bank Controls	No	No	Yes	Yes
Loan Controls	No	No	No	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Obs.	9,354	9,354	9,354	9,354
R^2(Adj.)	0.371	0.372	0.372	0.500

Table 8: **Monetary Policy Uncertainty**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness, estimated separately for loans originated during periods of high versus low monetary policy uncertainty. Columns (1) and (2) split the sample by the sample median value of the monetary policy uncertainty index; columns (3) and (4) split the sample by the sample median absolute value of the monetary policy shocks over the last 1-year period. All control variables are the same as those in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	MPU Index		MP Shocks	
	(1) High	(2) Low	(3) High	(4) Low
MPE	0.11***	0.04*	0.08**	0.06***
	(0.03)	(0.02)	(0.04)	(0.02)
Controls and Fixed Effects:				
Firm Controls	Yes	Yes	Yes	Yes
Bank Controls	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Obs.	4,026	4,067	4,215	4,233
R^2(Adj.)	0.506	0.486	0.430	0.563

Table 9: **Loan Maturity and Loan Types**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness, conditional on loan maturity and loan types. $Maturity \geq 1\,year\,(2\,years)$ indicates whether the time to loan maturity is greater than 1 year (2 years). *CL* indicates whether the loan package contains only lines of credit. Columns (3) and (4) restrict the sample to single-type loans, i.e., loan packages with only term loans and those with only lines of credit. All control variables are the same as those in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)
MPE	0.04***	0.04**	0.04	0.03
	(0.01)	(0.02)	(0.05)	(0.05)
MPE × Maturity≥1 year	0.02**		-0.04*	
	(0.01)		(0.02)	
MPE × Maturity≥2 years		0.02*		-0.03
		(0.01)		(0.02)
MPE × CL			-0.04	0.01
			(0.05)	(0.05)
MPE × Maturity≥1 year × CL			0.11***	
			(0.02)	
MPE × Maturity≥2 years × CL				0.06***
				(0.02)
Controls and Fixed Effects:				
Firm Controls	Yes	Yes	Yes	Yes
Bank Controls	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Obs.	9,354	9,354	6,314	6,314
R^2(Adj.)	0.475	0.476	0.490	0.490

Table 10: **Borrowers' Choice: Loan Spread**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on loan spread. The dependent variable is the weighted average loan spread across all facilities in a loan package, using facility amounts as weights. All control variables are the same as those in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)
MPE	7.17**	7.55*	5.38	2.36
	(3.50)	(4.02)	(5.16)	(5.29)
Controls and Fixed Effects:				
Firm Controls	No	Yes	Yes	Yes
Bank Controls	No	No	Yes	Yes
Loan Controls	No	No	No	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Obs.	9,354	9,354	9,354	9,354
R^2(Adj.)	0.557	0.584	0.584	0.600

Table 11: **Borrowers' Choice: Switching Costs**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness, conditional on borrower switching costs. *Small* equals one if the firm's size is in the bottom quartile of the sample; *High SA Index* equals one if the firm's SA index is in the top quartile of the sample; *High Leverage* equals one if the firm's leverage ratio is in the top quartile of the sample; *Low Altman's Z* equals one if the firm's Altman's Z score is in the bottom quartile of the sample. All control variables are the same as in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)
MPE	0.05***	0.05***	0.05***	0.04***
	(0.01)	(0.01)	(0.02)	(0.02)
MPE × Small	0.03**			
	(0.01)			
MPE × High SA Index		0.02*		
		(0.01)		
MPE × High Leverage			0.03***	
			(0.01)	
MPE × Low Altman's Z				0.04***
				(0.01)
Controls and Fixed Effects:				
Firm Controls	Yes	Yes	Yes	Yes
Bank Controls	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Obs.	9,354	9,354	9,354	8,729
R^2(Adj.)	0.476	0.476	0.476	0.486

A Appendix

A.1 Monetary Policy Exposure and Covenant Strictness: Additional Controls

We re-estimate equation 3 by including additional firm, bank, and loan characteristics as control variables. The additional firm characteristics are $Profitability$ (operating income before depreciation divided by total assets), $Tangibility$ (total property, plant and equipment divided by total assets), $Fixed\,Coverage\,Ratio$ (operating income before depreciation divided by sum of interest expenses and current debt), and $Altman's\,Z$ (as defined in Altman (1968)). The additional bank characteristics are $Net\,Income$ (net income divided by total assets), $Net\,Interest\,Income$ (net interest income divided by total assets), $Non\text{-}interest\,Income$ (non-interest income divided by total assets), $Average\,Deposit\,Rate$ (interest expenses on deposits divided by total deposits), and $Total\,Hedging$ (total gross notional amount of interest rate derivatives divided by total assets). The additional loan characteristics are $Secured$, which is an indicator of whether the loan is secured, and $\#\,of\,Lenders$, which is the number of lenders in the syndicate. In Table A1, column (1) reports the results after including additional firm characteristics as controls; column (2) reports the results after including additional bank characteristics as controls; column (3) reports the results after including additional loan characteristics as controls; column (4) reports the results after including all additional firm, bank, and loan characteristics as controls. The inclusion of additional control variables reduces our sample size, but the results remain similar to Table 2.

A.2 Loan Market Power

Following Drechsler et al. (2017), this paper proxy banks' monetary policy exposure using the weighted average deposit market concentration across all the counties in which a

bank raises deposits. Since a bank's market power in deposit and lending markets may be correlated, *MPE* may also capture variation in loan market power, thereby reflecting lending conditions in addition to deposit market conditions.[15] In this section, we control for three potential sources of banks' loan market power when examining the effect of banks' monetary policy exposure on covenant strictness.

First, a bank may gain loan market power in a specific industry due to its past experience or informational advantage in that industry (Paravisini et al., 2023). To account for this, the specifications in Table A2 control for banks' industry-specific loan market power. In columns (1) and (2), we include the loan market HHI of the borrower's industry, calculated using banks' syndicated loan market share, where industries are defined using either Fama-French 10 or 48 industries. In columns (3) and (4), we drop year fixed effects and instead use industry-year fixed effects, effectively comparing loan contracts to firms that operate in the same industry in the same year. This specification controls for any time-varying industry characteristics or industry specific time trends, including changes in the industry's loan market concentration. In these two columns, we also add the loan market share of the lead lenders in the borrower's industry as an additional control variable. The coefficient of interest remains positive and significant across all specifications.

Second, a bank may gain loan market power through the informational advantage accumulated through its long-term relationships with its borrowers (Berger et al., 2020; Schenone, 2009). This advantage may give banks quasi-monopoly power in their lending practices, enabling them to include stricter financial covenants in loan contracts. To control for this source of loan market power, we replace firm and bank fixed effects with firm-bank fixed effects in column (1) of Table A3. This specification controls for time-invariant unobserved factors that are specific to a given borrower-bank lending relationship, such as the bank's private information on its borrowers or non-random borrower-bank matching, allowing us to

[15] In our sample, the correlation between *MPE* and Loan Industry HHI, which is the loan market concentration in the borrower's industry calculated using banks' syndicated loan market share in the industry, is 13 percent (9 percent) based on Fama-French 10 industries (Fama-French 48 industries).

identify the effect of changes in bank monetary policy exposure on loan contract strictness. In subsequent columns, we include additional time-varying measures to further control for banks' relationship-driven loan market power. Column (2) includes *Relationship Intensity*, calculated as the total amount of loans a firm has borrowed from the lender divided by the total amount of loans the firm has received from all lenders to date in DealScan (Schenone, 2009). This measure reflects how dependent a firm is on this lender. In column (3), we include *Relationship Duration*, defined as the number of years the borrower has had a lending relationship with the lender (Ongena and Smith, 2001). In column (4), we include several additional relationship indicators: *Switched Lender* is a dummy variable equal to one if the loan is the first between the firm and the lead lender; *Immediate Prior Lender* is a dummy variable equal to one if the lead lender also issued the borrower's most recent prior loan; *First Loan* is a dummy variable equal to one if a loan is the first recorded loan for the borrower in DealScan. The coefficient on *MPE* is robust to the inclusion of these additional controls.

Third, a bank may gain loan market power due to local lending conditions. However, our results in Table 2 are unlikely to be driven by such conditions because we measure monetary policy exposure at the bank-year level, rather than the branch-year level. We do not use branch-level monetary policy exposure because banks can reallocate deposits from one branch to another when exploiting lending opportunities. Therefore, the lending conditions of the borrower's county may have limited influence on a bank's monetary policy exposure, particularly when the bank collects deposits from multiple counties. Nonetheless, in Table A4 we apply two empirical strategies to more directly account for local lending and economic conditions. First, in columns (1) and (2), we include state-year and county-year fixed effects, respectively, so that we can compare contract strictness of borrowers located in the same state or the same county but who borrow from banks with different levels of monetary policy exposure. The coefficient on *MPE* remains positive and significant. Second, in columns (3) through (5), we exploit the source of variation in *MPE*. In column (3), we

create a bank-county-year level bank monetary policy exposure that excludes the borrower's own county. This specification isolates variation in MPE that originates from counties other than the borrower's and again finds a positive and significant coefficient. To further isolate the effect from local conditions, in columns (4) and (5), we restrict the sample to banks with minimal presence in their borrowers' counties. Specifically, in column (4), we exclude observations if bank deposits in the borrower's county constitute more than 1 percent of the bank's total deposits. In column (5), we exclude observations if the bank has any presence in the deposit market of the county where the borrower is located. Although these two criteria considerably reduce the sample size, the coefficient on *MPE* remains positive and significant, reinforcing the conclusion that our findings are not driven by local lending conditions.

A.3 Borrower Characteristics and Bank Mergers

Following our discussion on the exclusion restriction of the IV in Section 4.2.2 in the main paper, although this restriction cannot be directly tested, we examine the correlation between observed borrower characteristics and merger-induced *MPE*. The results, reported in Table A5, show no significant correlation between these borrower characteristics and merger-induced *MPE*, providing suggestive evidence supporting the validity of our IV.

A.4 *Ex post* Lending Response: Credit Lines

As argued in Section 5.4 in our main paper, since a reduction in loan amount is generally more detrimental to term loan borrowers than to line-of-credit borrowers, we hypothesize that during periods of monetary policy tightening, banks with greater monetary policy exposure are more likely to reduce loan commitments only for lines of credit following a covenant violation. To test this, we create a dummy variable indicating whether a loan is a line of credit and interact it with other variables of interest in equation 5. The results in Table A6 support our hypothesis.

Table A1: **Monetary Policy Exposure and Covenant Strictness: Additional Controls**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness with additional control variables. All specifications include firm, bank, and loan controls as those in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)
MPE	0.06***	0.06***	0.05***	0.05***
	(0.01)	(0.01)	(0.02)	(0.02)
Additional Firm Controls:				
Profitability	-0.10***			-0.10***
	(0.01)			(0.01)
Tangibility	-0.00			-0.01
	(0.02)			(0.02)
Fixed Coverage Ratio	-0.00*			-0.01
	(0.00)			(0.00)
Altman's Z	-0.05***			-0.04**
	(0.02)			(0.02)
Additional Bank Controls:				
Net Income		0.00		0.00
		(0.01)		(0.01)
Net Interest Income		-0.02*		-0.02
		(0.01)		(0.01)
Non-interest Income		0.02**		0.01
		(0.01)		(0.01)
Average Deposit Rate		-0.02**		-0.01
		(0.01)		(0.01)
Total Hedging		0.01		0.00
		(0.00)		(0.00)
Additional Loan Controls:				
Secured			0.04***	0.04***
			(0.01)	(0.02)
# of Lenders			0.00	-0.00
			(0.00)	(0.00)
Controls and Fixed Effects:				
Firm Controls	Yes	Yes	Yes	Yes
Bank Controls	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Obs.	8,613	9,107	8,268	7,433
R^2(Adj.)	0.501	0.479	0.472	0.501

Table A2: **Monetary Policy Exposure and Covenant Strictness: Controlling for Industry-specific Loan Market Power**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness, controlling for industry-specific loan market power. *Loan Industry HHI* is loan market concentration within the borrower's industry, calculated using banks' syndicated loan market share. Industries are defined based on either Fama-French 10 industries or Fama-French 48 industries. *Loan Market Share* is a bank's share of the syndicated loan market in the borrower's industry. All control variables are the same as those in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)
MPE	0.06***	0.06***	0.07***	0.07***
	(0.01)	(0.01)	(0.01)	(0.02)
Loan Industry HHI (FF-10)	0.00			
	(0.01)			
Loan Industry HHI (FF-48)		-0.00		
		(0.00)		
Loan Market Share (FF-10)			0.02*	
			(0.01)	
Loan Market Share (FF-48)				0.01
				(0.01)
Controls and Fixed Effects:				
Firm Controls	Yes	Yes	Yes	Yes
Bank Controls	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	No	No
Year x Industry (FF-10) FE	No	No	Yes	No
Year x Industry (FF-48) FE	No	No	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Obs.	9,354	9,292	9,266	8,813
R^2(Adj.)	0.475	0.474	0.478	0.483

Table A3: **Monetary Policy Exposure and Covenant Strictness: Controlling for Relationship-specific Loan Market Power**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness, controlling for relationship-specific loan market power. *Relationship Intensity* is the total amount of loans that a firm has borrowed from a given lender divided by the total amount of loans that the firm has received from all lenders to date in DealScan; *Relationship Duration* is the number of years the firm has had a lending relationship with the lender; *Switched Lender* is a dummy variable equal to one if the loan is the first between the firm and the lender; *Immediate Prior Lender* is a dummy variable equal to one if the lender also provided the firm's immediately preceding loan; *First Loan* is a dummy variable equal to one if the loan is the first recorded loan for the borrower in DealScan. All control variables are the same as those in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)
MPE	0.06***	0.06***	0.06***	0.07***
	(0.01)	(0.01)	(0.01)	(0.01)
Relationship Intensity		0.00	0.01	0.01**
		(0.00)	(0.01)	(0.01)
Relationship Duration			-0.01	-0.01**
			(0.00)	(0.01)
Switched Lender				-0.02
				(0.02)
Immediate Prior Lender				-0.02*
				(0.01)
First Loan				0.05***
				(0.01)
Controls and Fixed Effects:				
Firm Controls	Yes	Yes	Yes	Yes
Bank Controls	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm x Bank FE	Yes	Yes	Yes	Yes
Obs.	7,776	7,776	7,776	7,776
R^2(Adj.)	0.527	0.527	0.527	0.528

Table A4: **Monetary Policy Exposure and Covenant Strictness: Controlling for Local Loan Market Power**

This table presents regression results on the effect of bank monetary policy exposure (i.e., *MPE*) on covenant strictness, controlling for potential local loan market power. *Other MPE* is bank monetary policy exposure calculated using counties other than the borrower's county. Columns (4) and (5) exclude observations where: (i) the bank's deposits in the borrower's county constitute more than 1 percent of the bank's total deposits, and (ii) the bank has any presence in the deposit market of the borrower's county, respectively. All control variables are the same as in Table 2. The sample period is between 1995 and 2019. All variables are standardized as in Table 2. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Within-Location Estimation		Source of Variation		
	(1) Within State	(2) Within County	(3) Exclude Own County	(4) Low Share	(5) No Share
MPE	0.06***	0.07***		0.08***	0.07*
	(0.02)	(0.02)		(0.02)	(0.04)
Other MPE			0.05***		
			(0.02)		
Controls and Fixed Effects:					
Firm Controls	Yes	Yes	Yes	Yes	Yes
Bank Controls	Yes	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes	Yes
State x Year FE	Yes	No	Yes	Yes	Yes
County x Year FE	No	Yes	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Obs.	9,131	7,005	9,131	5,760	3,063
R^2(Adj.)	0.472	0.473	0.471	0.481	0.487

Table A5: **Borrower Characteristics and Merger-induced Bank Monetary Policy Exposure**

This table reports the coefficient on *MPE* from the second stage of an IV estimation where a given borrower characteristic is regressed on bank *MPE* instrumented by merger-induced *MPE*. The sample is collapsed at the borrower-bank-year level. Bank control variables are the same as in Table 2. The sample period is between 1995 and 2015. All variables are standardized as in Table 2. Standard errors are clustered at the bank level and are reported in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Firm Size	Market -to-Book	Has Rating	Has IG Rating	Leverage	Profitability	Tangibility	Fixed Coverage Ratio	Altman's Z
MPE	0.82	0.48	-0.04	0.14	0.24	0.29	-0.52	-0.26	0.05
	(0.55)	(0.31)	(0.12)	(0.10)	(0.18)	(0.23)	(0.42)	(0.17)	(0.25)
Controls and FEs:									
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	7,660	7,660	7,660	7,660	7,660	7,654	7,642	7,569	7,176

Table A6: **Lending Response During Monetary Policy Tightening: Credit Lines**

This table presents regression results on the effect of a covenant violation on credit reduction during periods of monetary policy tightening, conditional on bank monetary policy exposure (i.e., *MPE*) and loan type. In columns (1) and (2), the dependent variable is a dummy variable equal to one if there is a reduction in loan commitment in the reporting period; in columns (3) and (4), the dependent variable is the percentage change in loan commitment in the reporting period. $Violation$ is a dummy variable equal to one if the borrower breaches a covenant in the current reporting period or during the previous four calendar quarters. $High\,MPE$ is a dummy variable equal to one if the bank's monetary policy exposure is above the sample median. CL is a dummy variable equal to one if the loan is a line of credit. The sample includes reporting periods between 2016 and 2019, and those between 2022 and 2024. Standard errors are two-way clustered at the firm and bank levels and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Credit Reduction Dummy		Credit Percentage Change	
	(1)	(2)	(3)	(4)
Violation	0.05	0.01	-0.76	0.98
	(0.03)	(0.03)	(0.74)	(0.78)
High MPE	0.00	0.00	1.64	2.53
	(0.03)	(0.05)	(1.89)	(3.67)
CL	-0.52***	-0.53***	3.53***	3.55***
	(0.03)	(0.03)	(0.92)	(0.81)
Violation x High MPE	-0.03	-0.03	0.69	0.29
	(0.05)	(0.06)	(1.32)	(1.59)
Violation x CL	0.01	0.01	0.17	0.09
	(0.03)	(0.04)	(0.81)	(0.84)
High MPE x CL	-0.05*	-0.05*	1.63	1.62
	(0.03)	(0.03)	(1.74)	(1.65)
Violation x High MPE x CL	0.10*	0.10*	-3.37**	-3.11**
	(0.06)	(0.06)	(1.58)	(1.53)
Controls and Fixed Effects:				
Loan Origination Year FE	Yes	Yes	Yes	Yes
Reporting Date FE	Yes	No	Yes	No
Reporting Date × Industry FE	No	Yes	No	Yes
Loan Purpose FE	Yes	Yes	Yes	Yes
Credit Rating FE	No	Yes	No	Yes
Credit Rating x High MPE	No	Yes	No	Yes
Obs.	7,490	7,490	7,490	7,490
R^2(Adj.)	0.291	0.310	0.027	0.057