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Lender Capital Management and Financial Covenant Strictness

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ABSTRACT: We provide evidence that lenders with lower regulatory capital issue loans with lower financial covenant strictness, consistent with such lenders viewing borrower covenant violations as costlier. This is because a borrower covenant violation may lead the lender to downgrade the loan, which triggers accounting that further reduces regulatory capital. Because of regulatory scrutiny, this is true even if the lender waives the violation. We find that this association is concentrated in performance covenants rather than capital covenants. We also find that lenders with relatively low capital issue loans with lower amounts and shorter maturities, consistent with such lenders replacing covenant protection with stricter loan terms on other dimensions. Finally, we find that this form of lender capital management extends to loan syndicate participant lenders, in that participants with relatively low capital adequacy take smaller loan shares when the lead arranger sets high covenant strictness.

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I. INTRODUCTION

The structure of the covenant package included in a loan agreement is shaped by many factors. Because financial covenants provide a direct contracting role for accounting, extant literature frequently examines the association between borrowers' financial reporting attributes and the use of financial covenants in debt contracts (e.g., Costello and Wittenberg-Moerman 2011; Demerjian and Owens 2016; Demerjian, Donovan, and Lewis-Western 2020). Although several recent studies examine the association between loan covenant structure and various nonfinancial-reporting *lender* features (e.g., Murfin 2012; Wang and Xia 2014; Bushman, Hendricks, and Williams 2016), evidence on the role of lenders' *reporting attributes* in determining loan covenant structure is sparse. In this study, we posit a link between lender regulatory capital adequacy—a key measure of bank risk—and the design of financial covenants

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included in loan contracts. Stated differently, we examine whether lenders adjust financial covenant design in loan contracts as part of their capital management strategies.

Financial covenants are included in private debt contracts to reduce agency conflicts, provide early warnings of borrower financial deterioration, and allocate control rights efficiently *ex post* (e.g., Christensen and Nikolaev 2012; Christensen, Nikolaev, and Wittenberg-Moerman 2016). Failure of the borrower to maintain financial covenant thresholds, i.e., covenant violation or technical default, allows the lender to take corrective actions, such as accelerating repayment or forcing a renegotiation. Alternatively, the lender can waive the violation (Roberts and Sufi 2009; Demerjian 2017; Nikolaev 2018). Thus, covenant strictness (i.e., the *ex ante* likelihood that a borrower will violate a financial covenant) is an important parameter of loan contract design, as it dictates the *ex ante* expected frequency that control rights will be transferred to lenders.

We predict that lenders with lower regulatory capital will set covenant terms that reduce the likelihood of covenant violation. Financial covenant efficiency is maximized when covenant violation occurs only when a borrower experiences a material increase in credit risk from the lender's perspective. Type I errors occur when a borrower violates a covenant but the lender's assessment is that the borrower's credit quality has not materially deteriorated (i.e., the lender continues to view the initial loan terms as appropriate and therefore does not want to take action against the borrower). Type II errors occur when a borrower experiences a material deterioration in credit quality from the lender's perspective (i.e., cases where the lender would no longer view the initial loan terms as appropriate and would therefore want to take action against the borrower) *without* the occurrence of a covenant violation. All else equal, lower covenant strictness is associated with a lower likelihood of Type I errors and a higher likelihood of Type II errors.

One determinant of covenant strictness that has received little attention in the literature is the relative cost of Type I and Type II errors to the lender. Type II errors expose the lender to potential losses. Depending on the extent of the increase in borrower credit risk, the cost of Type II errors may range from relatively modest (in cases where the borrower's credit risk has increased slightly beyond the point where the lender feels the initial loan terms are no longer appropriate, but the borrower is not yet in danger of financial distress or payment default) to very high (in cases where financial distress and payment default are imminent). The cost of Type I errors, on the other hand, has typically been presumed to be relatively low for both borrowers and lenders (e.g., Dichev and Skinner 2002).

Our central insight is that capital adequacy implications increase the cost of Type I errors *for lenders*. Because covenant violation implies increased borrower credit risk, the probability that a lender is required to internally downgrade a loan to a different risk category increases when the borrower violates a financial covenant (Chava and Roberts 2008). Due to regulatory scrutiny, this is true even if the violation is a Type I error from the lender's perspective—because lenders and regulators have different objective functions. Whereas the lender's objective is to maximize its own expected return from the loan, the regulator's goal is to ensure that lenders maintain adequate loan loss reserves. Therefore, borrower credit quality deterioration likely crosses the regulator's threshold for action (i.e., requiring that the lender downgrade the loan) *before* it crosses the lender's materiality threshold for taking action against the borrower. Consequently, *any* covenant violation—including Type I errors from the lender's perspective—may result in a downgrade of the loan's internal rating and a corresponding increase in loan loss reserves.

An increase in loan loss reserves is costly to the lender because it decreases the lender's Tier 1 regulatory capital.[1] Because capital market participants view regulatory capital as an indicator of general bank risk, a decrease in reported capital adequacy is costly to banks even if their capital level is well above the minimum regulatory threshold (e.g., Owens and Wu 2015). Because this additional capital-adequacy-related cost imposed by borrower covenant violation affects the relative costs of Type I and Type II errors to the lender, we expect that the equilibrium loan contract shifts towards lower covenant strictness when the lender has lower capital adequacy, *ceteris paribus*. Consistent with this argument, Rajan (1994, 401) suggests that banks may weaken covenants "to avoid recognizing default." Researchers have yet to test this proposition empirically.

Using a comprehensive measure of financial covenant strictness from Demerjian and Owens (2016), syndicated loan data from Dealscan, and Call Report data for a broad sample of U.S. banks, we first document that lead arranger banks with lower Tier 1 regulatory capital issue loans with lower financial covenant strictness, consistent with lenders viewing borrower covenant violation as being costlier when regulatory capital is lower. These findings hold after controlling for borrower quality and various borrower and lender characteristics. The findings are economically significant, as a one standard deviation decrease in Tier 1 capital translates into an approximate 9 percent reduction in the *ex ante* probability of covenant violation. Further, these findings hold after including lender fixed effects, which provides evidence that

[1] Practitioner references regard Tier 1 capital as the most reliable capital metric, as Tier 2 capital is more difficult to calculate and more difficult to liquidate. Consistent with this idea, Demirguc-Kunt, Detragiache, and Merrouche (2013) provide evidence that Tier 1 capital is viewed by market participants as the more relevant form of lender capital.

lower capital adequacy is associated with lower covenant strictness across loans issued *within the same bank*. We corroborate this inference by examining covenant strictness around the increase in required regulatory capital imposed by the implementation of Basel III in 2014, which (although subject to several confounds) helps mitigate endogeneity concerns.

Next, we exploit differences in the roles of various financial covenants to provide further corroboration of our primary inferences. Christensen and Nikolaev (2012) provide evidence that *capital covenants* (i.e., those that rely on balance sheet metrics) primarily serve a role in aligning shareholder-debtholder interests, whereas *performance covenants* (i.e., those that rely on income statement metrics) primarily serve the trip-wire function related to borrower performance deterioration. Thus, performance covenants are more likely to generate Type I errors. Accordingly, we predict and find that the association between capital adequacy and covenant strictness is concentrated in performance covenants.

We also document that lead arranger banks with lower Tier 1 capital issue loans with shorter maturities and smaller loan amounts. This suggests that in the equilibrium determination of the menu of contract options, lenders with lower Tier 1 capital are willing to give up covenant protections in favor of tightening other loan terms that do not have direct implications for their Tier 1 capital adequacy. Finally, we provide evidence that our insights regarding the interaction between covenant strictness and lead arranger bank capital adequacy extend to the capital adequacy of syndicate *participant lenders* as well. Specifically, we document that syndicate participant lenders with relatively low capital adequacy accept smaller shares of syndicated loans that were originated with tight covenants by the lead arranger.

Our study contributes to several streams of literature. First, this study adds evidence to the literature that examines the determinants of financial covenant strictness. Many papers examining debt contract design focus on how features of the borrower are reflected in the debt contract (e.g., J. Sunder, S. Sunder, and Zhang 2018; Costello and Wittenberg-Moerman 2011). Our study joins a growing number of papers that examine how *features of the lender itself* are reflected in the structure of financial covenants. Murfin (2012) and Christensen, Macciocchi, Morris, and Nikolaev (2022) provide evidence that poor lender credit screening ability leads lenders to tighten financial covenant strictness. Ma, Stice, and Williams (2021) document how lender features contribute to distinct "covenant styles" in private loan contracts. Bushman, Gao, Martin, and Pacelli (2021) and Herpfer (2021) examine the effect of individual loan officers on financial covenant use. Our study provides evidence on incentives induced by lender regulatory capital (i.e., a lender *reporting attribute*).

Second, this study provides insights that are relevant to the literature that examines capital management by banks. Beatty, Chamberlain, and Magliolo (1995) and Ahmed, Takeda, and Thomas (1999) present evidence consistent with banks using loan loss provisions to reduce expected regulatory costs associated with violating capital requirements. Owens and Wu (2015) provide evidence of real activities management by banks, particularly when capital adequacy is relatively low. Our study sheds light on another real activities mechanism that is used by banks for capital management —specifically, debt-covenant-related contract design.

Third, we contribute to the literature that examines the costs of financial covenants. Skinner (2011) and Christensen et al. (2016) question why loans often include a small number of financial covenants, based on an assumption that the marginal cost to lenders of adding more covenants is low. Our study suggests that lender capital management incentives impose a cost on lenders from borrower covenant violations. Finally, we find that the looser covenants granted by lenders with lower regulatory capital are compensated with shorter loan maturities and smaller loan amounts (i.e., the looser covenants come at a "cost" to borrowers along other dimensions). These results provide evidence of the trade-off that lenders and borrowers face when designing debt contracts, which builds on past evidence on the "pricing" of covenants in loan contracts (e.g., Bradley and Roberts 2015).

II. BACKGROUND AND MOTIVATION

Related Literature

A broad literature examines how borrower financial reporting characteristics are associated with the structure of financial covenants in debt contracts. Costello and Wittenberg-Moerman (2011) provide evidence that borrowers that experience material internal control weaknesses have loan contracts that contain fewer financial covenants. Demerjian and Owens (2016) provide evidence that borrowers with timelier loss recognition receive loans with lower financial covenant strictness. Similarly, Sunder et al. (2018) show that borrowers with more conservative balance sheets have less strict covenants. Demerjian (2017) provides evidence that the degree of uncertainty surrounding a borrower's future operations is positively associated with financial covenant strictness. Demerjian et al. (2020) document that borrowers with higher levels of income smoothing are more likely to have income-statement-based financial covenants in their loans.

Other studies examine how *lender-side* dynamics affect the design of financial covenants (i.e., the supply-side of financial covenants), although relatively few focus on incentives related to lender financial metrics. Murfin (2012) focuses on a lender learning hypothesis and finds that lenders whose loan portfolios have a high number of payment defaults, which indicates poor *ex ante* screening, include stricter financial covenants in newly originated loans. Relatedly, using a sample of banks who have experienced borrower payment defaults, Christensen et al. (2022) show that lenders with more payment defaults increase the strictness and use of performance covenants in subsequent loans. Wang and Xia (2014) find that lenders that are more active in loan securitization originate loans with looser covenants. Bushman et al. (2016) show that banks which experience greater competition loosen underwriting guidelines and attach fewer financial covenants to credit agreements. Bushman et al. (2021) and Herpfer (2021) show that loan officers display a time-invariant component to the use and structure of financial covenants. Ma et al. (2021) present findings that lenders have a "covenant style" based on their features, and this is incremental to the effect of borrower characteristics on covenant design.

A separate strand of literature examines lender capital management. Both Beatty et al. (1995) and Ahmed et al. (1999) find that banks use loan loss provisions to reduce expected regulatory costs associated with violating capital requirements. Beatty and Liao (2014) discuss how accounting numbers are manipulated in the banking industry in response to capital requirements and other bank financial reporting incentives. Barth, Gomez-Biscarri, Kasznik, and Lopez-Espinosa (2017) find that banks use realized gains on available for sale securities to increase low regulatory capital. Owens and Wu (2015) provide evidence of real activities management where banks temporarily reduce short-term borrowings around financial reporting dates to reduce perceived riskiness, particularly when capital adequacy is relatively low. We build on these papers by investigating how general lender capital management incentives affect financial covenant structure.

Prediction Development

The contracting efficiency of a set of financial covenants is maximized when covenant violation occurs only when a borrower has a decline in performance which represents a material increase in credit risk from the lender's perspective (i.e., where the lender would want to take action against the borrower because the initial loan terms are no longer appropriate). Type I errors occur when the borrower violates a financial covenant, but the lender does not want to act. Type II errors occur when a borrower's credit risk increases beyond the point where the lender would want to act, but there is no covenant violation. In equilibrium, the contracting parties select covenant strictness (i.e., probability of covenant violation, or $PVIOL$) to minimize the following expression:

$$\left[P(TypeI|PVIOL) * C_{TypeI}\right] + \left[P(TypeII|PVIOL) * C_{TypeII}\right] \tag{1}$$

where P is the expected frequency and C is the expected costs of Type I and Type II errors. The expected frequency of each type of error is a function of $PVIOL$. Stricter covenants unconditionally increase the likelihood of covenant violation, thus increasing the likelihood of Type I errors and decreasing the likelihood of Type II errors. The optimal level of $PVIOL$ is therefore a function of the relative costs of Type I and II errors to the lender.

Because covenant violation provides the lender the option to claim control rights and take action against the borrower, all covenant violations, including Type I errors, likely impose some costs on borrowers.[2] However, theory has typically assumed that the lender does not bear any costs associated with a borrower's covenant violation; under rational expectations (Jensen and Meckling 1976), the lender passes on any expected costs to the borrower through various contract provisions.[3] This idea underlies Skinner's (2011, 208) question of lenders regarding covenant inclusion: "why not include a slew of detailed covenants?" Christensen et al. (2016) echo this query. The observation that loan portfolios typically have circumscribed portfolios of financial covenants suggests that there may be lender-side costs associated with financial covenants that have yet to be described in the existing literature. We conjecture that capital adequacy requirements impose such a cost through the following mechanism: (1) borrower covenant violations increase the likelihood that a lender will downgrade the loan to a higher risk category due to increased credit risk, and (2) loan downgrades mechanically lead to lower bank capital because of accounting rules. We next discuss each link of the mechanism in turn.

[2] If the lender issues a waiver for a covenant violation, the cost to the borrower is likely low; there will be some administrative cost, and possibly some action required to remedy the violation. A more substantial cost is that the lender has the *option* to act. We expect this lender option yields a nontrivial expected cost to the borrower, leading to a cost that is low relative to more serious covenant violations—but not costless. This provides incentive for the borrower to avoid covenant violation, whether the default is a Type I error from the lender's perspective or not.

[3] Under rational expectations and price protection, lenders will set contract terms so that they will be indifferent regarding particular borrower characteristics. For example, a lender charges a higher interest rate to a borrower with poor reporting quality relative to a borrower with better reporting quality. Although one may infer the lender would "prefer" better reporting quality, the lender would be indifferent—because any deficiency in reporting quality can be priced in the loan terms. It is unlikely that a lender can price protect against its own features that are independent of the borrower (e.g., capital management incentives).

Covenant Violations and Loan Downgrades

According to accounting standard ASC 450-20, a lender evaluates large groups of small-balance homogeneous loans (e.g., credit card, residential mortgage, consumer installment loans) and applies historical statistics to estimate credit losses. Loans not evaluated under ASC 450-20 are evaluated according to ASC 310-10-35, which indicates that the lender must evaluate loans for impairment on a loan-by-loan basis. Consistent with ASC 310-10-35, lenders assign individual ratings to most commercial loans to estimate credit losses and allocate loan loss reserves (Treacy and Carey 2000; Office of the Comptroller of the Currency 2017), and these ratings are negatively affected by borrower covenant violations. Consistent with this argument, Chava and Roberts (2008, 2098) indicate that "covenant violations often lead to reductions in the bank's internal rating of the loan, a change that causes a corresponding increase in the bank's capital supporting the affected loan."

Related to the above, examiners require that banks maintain an effective loan grading system that identifies loan quality problems in a timely manner (Federal Reserve Board 2006). Specific to covenants, the FDIC, in the Risk Management Manual of Examination Policies, notes that bank reviews must include an examination of "adherence to loan covenants" in banks' lending portfolios (Federal Deposit Insurance Corporation 2015, § 3.2-2). The Federal Reserve Board's Commercial Bank Examination Manual provides similar language (Federal Reserve Board 2018, § 2040.1), which suggests that regulators consider covenant compliance to be relevant and important when grading loans. Further, in its handbook for evaluating bank credit risk ratings, the Comptroller of the Currency states that bank examiners "should be alert for covenants that have been waived or renegotiated by the bank to accommodate a borrower's failure to maintain the original standards" (Office of the Comptroller of the Currency 2017, 63).

This highlights a potential divergence in incentives between the regulator and lender, particularly in the case of borrower covenant violations where the lender does not want to act (i.e., Type I errors). In such cases, the lender may decide to issue a violation waiver to the borrower, subject to remediation by the borrower. Whereas the lender's objective is to maximize its own expected return from the loan (which includes managing its relationship with the borrower), the regulator's goal is to maintain safety and soundness of the banking system, which includes ensuring that lenders maintain adequate loan loss reserves (e.g., Federal Reserve Board 2006). Therefore, the regulator likely has a more granular materiality threshold for action relative to the lender when it comes to borrower credit quality deterioration. That is, borrower credit quality deterioration likely crosses the regulator's threshold for action (i.e., requiring that the lender downgrade the loan) *before* it crosses the lender's materiality threshold for taking action against the borrower. Therefore, *any* covenant violation—including Type I errors from the lender's perspective—may result in a downgrade of the loan's internal rating and a corresponding increase in loan loss reserves. Relatedly, as pointed out by Davenport (2003), "examiners can downgrade a loan below a bank's own rating and force the lenders to boost reserves."[4]

Loan Downgrades and Bank Capital

From an accounting perspective, loan downgrades lead the lender to debit the provision for loan and lease losses (an expense account) and credit the allowance for loan and lease losses, a contra-asset account that reduces the amount of total loans receivable and reflects the risk of the loan portfolio. After the first Basel Accord was issued in 1988, this recognition of credit losses decreases Tier 1 regulatory capital (Beatty and Liao 2014).

Tier 1 capital is a key metric in the banking industry that primarily consists of shareholders' equity (e.g., common stock, preferred stock, retained earnings).[5] The FDIC generally requires that banks maintain a ratio of Tier 1 capital to total assets of at least 4 percent (Federal Deposit Insurance Corporation 2015, § 325.3).[6] Banks that do not comply with the required minimum capital must submit capital restoration plans, cannot borrow from the Federal Reserve, and are ultimately limited in their growth (Beatty and Liao 2014; Code of Federal Regulations Title 12 2023, § 324.405). Other

[4] To shed more light on this mechanism, we discussed the enforcement process with a Federal Reserve Senior Examiner, who confirmed that bank examiners are alert for waived covenant violations, and that it is not at all unusual for an examiner to downgrade a loan based on a waived financial covenant violation. The Examiner noted "If we are finding problems with loan covenant violations … we will confront the institution with the issue. If the bank chooses to ignore … the bank may be cited for a Matter Requiring Attention and need to fix the issue. How often does a bank fail to comply with a Matter Requiring Attention? Not very often." For more details regarding the enforcement process, the Examiner referred us to SR 13-13/ CA 13-10: Supervisory Considerations for the Communication of Supervisory Findings (Federal Reserve Board 2013). We had additional conversations with an experienced credit loan officer who provided consistent comments, and added that failure to comply generally leads to enforcement action and restriction of bank operations.

[5] Specifically, Tier 1 capital is the sum of common stockholders' equity, noncumulative perpetual preferred stock, and minority interests in consolidated subsidiaries, minus all intangible assets, minus deferred tax assets, minus identified losses, minus investments in financial subsidiaries, and minus the amount of the total adjusted carrying value of nonfinancial equity investments that is subject to a deduction from Tier 1 capital (Federal Deposit Insurance Corporation 2015, § 325.2).

[6] The FDIC reserves the right to enforce higher capital levels based on the institution's particular risk profile (Federal Deposit Insurance Corporation 2015, § 325.3). Similarly, banks with well-diversified risk, high asset quality, and high liquidity, among other attributes, are required to maintain a ratio of at least 3 percent (Federal Deposit Insurance Corporation 2015, § 325.2).

restrictions include the payment of capital distributions and management fees. Declines in regulatory capital also have undesirable consequences for banks whose capital adequacy ratios are not near minimum regulatory thresholds. Because capital market participants view a bank's Tier 1 capital as a general indicator of failure risk (e.g., Ng and Roychowdhury 2014), any downward movement in capital adequacy translates into an increase in perceived risk.[7] We predict, therefore, that the incentives to avoid decreases in capital adequacy (and therefore provide lower covenant strictness) are heightened for banks with lower capital adequacy levels, notwithstanding proximity to capital adequacy requirements.

We acknowledge that there are plausible reasons that lenders would *not* lower covenant strictness even when regulatory capital is relatively low. For example, banks with relatively low capital adequacy may be especially concerned about early detection of problem loans (i.e., minimization of Type II errors), which suggests higher covenant strictness in loan contracts, all else equal. That is, banks with relatively low capital levels may be particularly interested in managing credit risk and therefore may rely on financial covenants with higher strictness to enable them to act before the borrower's financial condition further deteriorates. This suggests that even while there are costs to the lender of borrower covenant violations (creating an incentive to avoid Type I errors), the cost of Type II errors may be sufficiently high to motivate setting tight covenants. Accordingly, it is an empirical question as to whether and how bank capital adequacy is associated with the strictness of the financial covenant package in its loan contracts.

III. SAMPLE AND RESEARCH DESIGN

Sample Selection

We obtain syndicated loan data from Dealscan and delete observations without all necessary loan data described below. Consistent with prior studies (e.g., Murfin 2012; Bushman et al. 2016; Dou 2020), we focus our analyses on the lead arranger bank (rather than syndicate participant lenders), as the lead arranger and borrower generally determine the covenant structure and other nonpricing features of the loan (e.g., loan amount, collateral, maturity) *before* the lead arranger presents the loan to potential syndicate participant lenders for consideration.[8] We delete loan packages with more than one lead arranger because in such cases it is unclear which lead arranger's incentives will dominate contract design.[9] Dealscan loan data are arranged on two levels—facility and package. Facilities represent individual loan tranches, whereas packages are sets of facilities issued concurrently in the same deal. Although there is variation in some of the terms of facilities within a package (e.g., loan type, maturity, and interest spread), the same set of financial covenants typically governs all facilities in the package. Thus, we conduct our analysis at the loan-package level.

We obtain bank data from the quarterly Reports of Condition and Income (hereafter, "Call Reports"), which are publicly available for all banks regulated by the Federal Reserve System, Federal Deposit Insurance Corporation, or the Office of Comptroller of the Currency.[10] We create a text-matching program that matches bank names, city, and state in Dealscan with those of the Call Reports.[11] Using the Dealscan-Compustat linking table from WRDS (Chava and Roberts 2008), we obtain borrowers' financial statement data from Compustat as of the quarter ending immediately before the loan origination date and delete any observations without all required borrower characteristics data described above.[12] The final sample consists of 5,287 loan packages corresponding to 2,662 unique borrowers and 184 unique lead arrangers, with loan initiation dates spanning the years 1996 to 2017. We present sample construction data in Table 1.

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[7] Consistent with this, Owens and Wu (2015) provide evidence that banks take real actions (i.e., window dressing of short-term borrowings) to mask balance sheet risk, and these incentives are exacerbated for banks with lower Tier 1 capital adequacy, even though the sample banks in Owens and Wu (2015) generally have capital adequacy well above the regulatory minimum threshold.

[8] The share of the loan accepted by/granted to each participant lender is the primary loan term that varies during the syndication process. In Section V, we consider whether participant lenders' own capital management incentives interact with covenant strictness to affect syndicate participants' loan share.

[9] Subsequently reported inferences are unchanged if we retain observations with multiple lead arrangers (i.e., where each lead arranger-loan combo is treated as a separate observation).

[10] We obtain Call Reports data from the Bank Regulatory dataset in WRDS, but they are also available at the Federal Reserve Bank of Chicago and the Federal Financial Institutions Examination Council (FFIEC) websites.

[11] Specifically, we first match based on legal name (RSSD 9017), city, and state. If that does not yield a reliable match, we next match based on short name (RSSD 9010), city, and state. Finally, we match any remaining banks manually by searching for the name of the bank (as shown in Dealscan) on the website of the Federal Financial Institutions Examination Council (https://www.ffiec.gov/nicpubweb/nicweb/SearchForm.aspx) to obtain an RSSD 9001 (i.e., the bank identifier). When we cannot locate banks in ffiec.gov, we rely on https://banks.data.fdic.gov/bankfind-suite/bankfind, which only contains banks that are (or were) regulated by the FDIC. The ffiec.gov dataset is more comprehensive, as it includes non-FDIC-monitored banks. We ensure that the dates that a bank was established and ceased to exist, as shown on these websites, span the loan origination dates of a particular bank, as shown in Dealscan.

[12] Inferences remain unchanged if we instead use the most recently reported annual data, and if we winsorize or truncate to mitigate the influence of outliers.

TABLE 1

Sample Construction

	Loan Facilities	Loan Packages	Lead Arrangers	Borrowers
PVIOL (covenant strictness) data	27,262	18,244	1,300	5,557
Sample after keeping only loans with single lead arrangers	16,816	11,676	913	4,951
Sample with valid Call Report matches	11,914	8,424	322	3,944
Call Report required variables	9,781	6,958	230	3,481
Dealscan sample with required variables	9,368	6,614	208	3,351
Final sample after requiring borrower-specific variables	7,371	5,287	184	2,662

Table 1 presents sample construction details that illustrate the effect of various levels of data requirements. Loan facilities are individual loans, such as revolving lines of credit or term loans. Loan packages are groups of loan facilities issued at the same time by the same lead arranger.

Research Design

To examine the relation between bank capital adequacy and the strictness of the financial covenant package attached to a given loan package, we estimate the following model using OLS:

$$PVIOL_l = \beta_0 + \beta_1 LenderTier1Lev_{i,t} + \sum \beta_n LenderControls_{i,t} + \sum \beta_n BorrowerControls_{j,t} + \sum \beta_n LoanControls_l + TimeFE + BankFE + \varepsilon_l. \quad (2)$$

PVIOL is a measure of covenant strictness, i.e., the aggregate probability that at least one financial covenant attached to loan *l* will be violated during the quarter after loan initiation (Demerjian and Owens 2016). *PVIOL* incorporates the number of covenants included in the loan, the slack of each covenant, and the variances and covariances between the underlying financial metrics across all included covenants. We compute *PVIOL* by simulating the borrower's one-quarter-ahead financial measures and recording whether the simulated metrics would lead to a covenant violation, as outlined in detail in Demerjian and Owens (2016). The primary independent variable of interest is *LenderTier1Lev,* lead arranger *i*'s Tier 1 leverage capital ratio in the quarter immediately prior to loan initiation.[13] Based on our previous discussion, we predict $\beta_1 > 0$.

We include a variety of control variables, which we likewise measure in the quarter immediately prior to loan initiation. All variables are defined in detail in Appendix A. Lender controls include the size of the bank (*LenderLogSize*) and bank return on assets (*LenderROA*). We also include bank leverage (*LenderLeverage*) to control for the general capital structure of the bank (e.g., Owens and Wu 2015), total bank deposits scaled by total bank assets (*LenderDeposits*), and two controls for the risk of the bank's overall loan portfolio (*LenderALLL* and *LenderChargeOffs*). We also control for the number of payment defaults in the lender's portfolio (*LenderPortDefaults*) as a proxy for poor screening abilities, which may affect covenant design in newly originated loans (Murfin 2012; Christensen et al. 2022). Borrower controls include size (*BorrowerLogSize*), leverage (*BorrowerLeverage*), and credit quality (*BorrowerBSMProb*).

It is possible that a lender's capital adequacy could affect other non-covenant loan terms (e.g., lenders with lower capital adequacy may prefer shorter maturity loans or smaller loans). Accordingly, we control for loan characteristics, including the natural logarithms of the aggregate face amount of all loan facilities in loan package *l* (*LogDealSize*), the facility-amount-weighted average interest rate in excess of London Inter-Bank Offered Rate (LIBOR) and any fee paid to the lenders (*LogSpread*), and the facility-amount-weighted average loan maturity in months (*LogMaturity*). We also include an indicator variable that captures whether the loan is secured (*Secured*).

Evidence also shows that agency conflicts between the lead arranger and syndicate participants can affect contract design (e.g., Dass, Nanda, and Wang 2020). To control for this possible source of conflict, we include the natural log of the number of lenders in the syndicate (*LogLenders*). We include calendar year-quarter fixed effects throughout and also estimate specifications that include bank fixed effects. Because borrowers and lenders each have multiple loan observations over our sample period, we cluster the standard errors at both borrower and lender levels.

[13] The two primary Tier 1 capital-based regulatory ratios are the Tier 1 leverage capital ratio and the Tier 1 risk-based capital ratio (measured as Tier 1 capital divided by risk-weighted assets). We use the Tier 1 leverage ratio as our primary measure because it is a more transparent measure and is generally the more binding of the two ratios (e.g., Estrella, Park, and Peristiani 2000). However, subsequently reported inferences are similar if we instead use the Tier 1 risk-based capital ratio.

TABLE 2

Descriptive Statistics

Variables	n	Mean	Std. Dev.	p1	p25	p50	p75	p99
PVIOL	5,287	0.371	0.408	0.000	0.020	0.129	0.887	1.000
LenderTier1Lev	5,287	0.071	0.015	0.053	0.061	0.066	0.076	0.131
LenderTier1Rsk	5,287	0.087	0.020	0.065	0.077	0.082	0.089	0.162
LenderALLL	5,287	0.018	0.007	0.006	0.013	0.017	0.021	0.044
LenderChargeOffs	5,287	0.002	0.002	0.000	0.001	0.001	0.002	0.011
LenderDeposits	5,287	0.646	0.111	0.285	0.585	0.654	0.714	0.893
LenderLogSize	5,287	19.028	1.722	13.857	18.019	19.386	20.290	21.339
LenderROA	5,287	0.003	0.001	−0.002	0.002	0.003	0.004	0.007
LenderLeverage	5,287	0.914	0.023	0.827	0.903	0.916	0.930	0.947
LenderPortDefaults	5,287	1.458	2.673	0.000	0.000	0.000	2.000	13.000
LogMaturity	5,287	3.572	0.633	1.609	3.219	3.689	4.094	4.477
Maturity (unlogged)	5,287	41.945	20.856	5.000	25.000	40.000	60.000	88.000
LogDealSize	5,287	4.798	1.497	0.854	3.912	5.011	5.858	7.824
DealSize (unlogged)	5,287	324.964	637.429	2.350	50.000	150.000	350.000	3,000.000
LogSpread	5,287	4.898	0.751	2.996	4.460	5.011	5.472	6.281
Spread (unlogged)	5,287	170.858	113.375	20.000	86.500	150.000	237.903	534.412
Secured	5,287	0.582	0.493	0.000	0.000	1.000	1.000	1.000
LogLenders	5,287	1.506	1.083	0.000	0.693	1.609	2.303	3.689
Lenders (unlogged)	5,287	7.836	9.101	1.000	2.000	5.000	10.000	41.000
BorrowerLogSize	5,287	6.395	1.711	2.450	5.220	6.408	7.531	10.406
BorrowerLeverage	5,287	0.563	0.217	0.142	0.417	0.556	0.692	1.243
BorrowerBSMProb	5,287	0.031	0.103	0.000	0.000	0.000	0.003	0.625
LLP	4,751	0.003	0.006	−0.003	0.001	0.002	0.004	0.027
LogCountViol	4,751	0.407	0.693	0.000	0.000	0.000	0.693	2.944
CountViol (unlogged)	4,751	1.190	3.389	0.000	0.000	0.000	1.000	18.000
ΔNPA	4,751	0.000	0.005	−0.010	−0.001	0.000	0.001	0.015
$\Delta Loan$	4,751	0.046	0.270	−0.138	−0.003	0.020	0.049	0.691

Table 2 presents descriptive statistics for the package-level observations used in the analyses.
All variables are defined in Appendix A.

Descriptive Statistics

Table 2 presents sample descriptive statistics. The mean of *PVIOL* is 0.371 indicating that, on average, there is a 37 percent probability that a given loan will violate at least one financial covenant one quarter after loan initiation. *PVIOL* exhibits a U-shaped distribution, meaning lead arranger lenders typically assign either very strict or very loose covenants.[14] Mean *LenderTier1Lev* is 7.1 percent, and most lenders have *LenderTier1Lev* well above the required regulatory minimum of 4 percent, consistent with the evidence in Beatty and Liao (2014). Mean *LenderALLL* is 0.018 and indicates that lenders, on average, reserve 1.8 percent of total loans for losses. Mean quarterly *LenderROA* is 0.3 percent (or 1.13 percent annualized), which is consistent with the typically thin margins in the banking industry.

Table 3 reports Pearson (Spearman) correlations below (above) the diagonal for key variables used in the study, where correlations in bold italics are significant at better than the 1 percent level. The correlation between *LenderTier1Lev* and *PVIOL* is positive and statistically significant, which is consistent with lead arrangers with lower levels of regulatory capital assigning less strict financial covenants at loan origination. The relationships between *PVIOL* and other variables are consistent with prior studies (e.g., Demerjian and Owens 2016).

[14] Due to the nature of the dependent variable and concerns about OLS estimation bias, we perform additional analyses using logistic models and fractional response models, and subsequently reported inferences are unaltered.

TABLE 3
Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
PVIOL (1)		***0.11***	0.00	0.03	0.03	***0.06***	***−0.15***	***0.07***	***−0.05***	***−0.05***	***−0.07***	***−0.25***	***0.43***	***0.34***	***−0.19***	***−0.30***	***0.16***	***0.37***
LenderTier1Lev (2)	***0.07***		***0.37***	***0.08***	***0.16***	***0.55***	***−0.33***	***0.36***	***−0.71***	***−0.21***	***−0.13***	***−0.32***	***0.25***	***0.15***	***−0.33***	***−0.27***	***−0.11***	***0.17***
LenderTier1Rsk (3)	0.02	***0.71***		***0.18***	***0.20***	***0.24***	***0.18***	***−0.05***	***−0.34***	***0.13***	***−0.05***	***−0.05***	***0.17***	***0.08***	***−0.09***	0.01	−0.03	0.01
LenderALLL (4)	0.03	***0.25***	***0.34***		***0.51***	***0.08***	***−0.10***	***−0.20***	***0.09***	***−0.06***	***−0.11***	−0.03	***0.14***	0.02	0.00	−0.03	***0.05***	***0.17***
LenderChargeOffs (5)	0.02	***0.29***	***0.32***	***0.58***		***0.12***	***0.13***	***−0.16***	***−0.15***	***0.12***	***−0.16***	***−0.06***	***0.20***	***0.04***	***−0.07***	0.01	0.00	***0.19***
LenderDeposits (6)	***0.03***	***0.22***	***0.10***	−0.03	***0.04***		***−0.23***	***0.30***	***−0.38***	***−0.19***	***−0.10***	***−0.28***	***0.21***	***0.14***	***−0.28***	***−0.23***	***−0.11***	***0.11***
LenderLogSize (7)	***−0.10***	***−0.42***	***−0.15***	***−0.13***	0.02	***−0.28***		***−0.26***	−0.02	***0.59***	***0.20***	***0.40***	***−0.15***	***−0.14***	***0.30***	***0.46***	***0.09***	***−0.21***
LenderROA (8)	***0.03***	***0.18***	−0.03	***−0.16***	***−0.12***	***0.23***	***−0.19***		***−0.23***	***−0.12***	***−0.05***	***−0.19***	0.02	***0.04***	***−0.17***	***−0.20***	***−0.07***	***0.04***
LenderLeverage (9)	***−0.04***	***−0.75***	***−0.54***	***−0.08***	***−0.24***	***−0.20***	***0.10***	***−0.15***		***0.05***	0.02	***0.22***	***−0.20***	***−0.13***	***0.26***	***0.15***	***0.13***	***−0.05***
LenderPortDefaults (10)	0.02	***−0.12***	0.01	−0.02	***0.08***	−0.03	***0.40***	−0.02	***0.07***		0.01	***0.26***	***−0.05***	***−0.08***	***0.24***	***0.30***	***0.10***	0.00
LogMaturity (11)	0.01	***−0.07***	−0.02	***−0.05***	***−0.10***	***−0.14***	***0.20***	−0.02	0.02	***−0.04***		***0.31***	***−0.12***	***0.04***	***0.29***	***0.10***	−0.03	***−0.26***
LogDealSize (12)	***−0.16***	***−0.25***	***−0.09***	***−0.05***	***−0.07***	***−0.33***	***0.50***	***−0.15***	***0.19***	***0.18***	***0.27***		***−0.45***	***−0.33***	***0.83***	***0.80***	***0.28***	***−0.37***
LogSpread (13)	***0.35***	***0.22***	***0.18***	***0.12***	***0.17***	***0.21***	***−0.17***	0.01	***−0.20***	0.02	−0.02	***−0.41***		***0.61***	***−0.40***	***−0.49***	0.02	***0.51***
Secured (14)	***0.28***	***0.13***	***0.10***	***0.05***	***0.06***	***0.14***	***−0.17***	0.02	***−0.11***	***−0.04***	***0.11***	***−0.30***	***0.61***		***−0.29***	***−0.45***	***−0.04***	***0.35***
LogLenders (15)	***−0.13***	***−0.26***	***−0.12***	0.00	***−0.06***	***−0.32***	***0.39***	***−0.15***	***0.23***	***0.17***	***0.25***	***0.78***	***−0.38***	***−0.27***		***0.67***	***0.26***	***−0.30***
BorrowerLogSize (16)	***−0.20***	***−0.23***	***−0.06***	***−0.04***	0.00	***−0.27***	***0.52***	***−0.17***	***0.14***	***0.21***	***0.03***	***0.79***	***−0.47***	***−0.44***	***0.61***		***0.36***	***−0.35***
BorrowerLeverage (17)	***0.24***	***−0.03***	−0.01	***0.04***	0.00	***−0.12***	***0.10***	***−0.05***	***0.06***	***0.08***	−0.01	***0.16***	***0.14***	***0.08***	***0.12***	***0.18***		***0.13***
BorrowerBSMProb (18)	***0.19***	***0.10***	***0.05***	***0.10***	***0.15***	***0.08***	***−0.13***	−0.03	***−0.06***	0.03	***−0.16***	***−0.22***	***0.33***	***0.21***	***−0.21***	***−0.20***	***0.22***	

Table 3 presents Pearson correlation below the diagonal and Spearman correlations above the diagonal. Significant correlations at the 0.01 level or better are presented in bold italics.
All variables are defined in Appendix A.

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IV. EMPIRICAL RESULTS

Preliminary Analysis

As discussed in Section II, a key supposition underlying our main prediction is that borrower covenant violations increase the probability that lenders downgrade the associated loans. Although Chava and Roberts (2008) provide anecdotal evidence based on conversations with lenders on the relation between covenant violations and internal loan downgrades, to the best of our knowledge there is no systematic empirical evidence of this relation. Lenders' internal ratings of loans are not publicly disclosed, so we cannot directly assess whether lenders change ratings following borrower covenant violations. As a second-best solution, we examine the association between covenant violations and loan loss reserves based on the logic that there is a positive correlation between internal loan downgrades and observable loan loss provisioning.

We estimate the following regression equation using the sample of realized covenant violations from Nini, Smith, and Sufi (2012):

$$LLP_{i,t} = \beta_0 + \beta_1 LogCountViol_{i,t} + \sum \beta_n Controls + TimeFE + BankFE + \varepsilon_{i,t}, \tag{3}$$

where $LLP_{i,t}$ is the loan loss provision that lead arranger bank i reports in quarter t. Our variable of interest is $LogCountViol$, which is the natural log of the count of all borrower covenant violations that lender i experiences in its loan portfolio in quarter t. We predict $\beta_1 > 0$. Our vector of controls includes *LenderTier1Lev* to control for the difference in loan risk composition between better and worse capitalized banks. We also include a series of controls from Beatty and Liao (2014), including the beginning-of-period lender size (*LenderLogSize*), the lender's accounting performance (*LenderROA*), the past (quarter $t-1$ and $t-2$), current (quarter t), and future (quarter $t+1$) change in nonperforming loans (ΔNPA), and the change in lending amount ($\Delta Loan$). We estimate two specifications of Equation (3). The first includes bank and year fixed effects. The second includes bank fixed effects and three time-varying macroeconomic variables: change in GDP (ΔGDP), change in the Case-Shiller Real Estate Index ($\Delta CSRET$), and change in unemployment ($\Delta UNEMP$).

We present the results of this analysis in Table 4. In both specifications, the coefficient on $LogCountViol$ is positive and significant. These results suggest that the number of borrower covenant violations that a lender experiences in its loan portfolio during a quarter is positively associated with the lender's provisioning for future loan losses. Although necessarily descriptive, this analysis supports the anecdotal evidence provided in Chava and Roberts (2008) and is consistent with the idea that lenders acknowledge and respond to borrower covenant violations through internal loan downgrades.

Primary Analysis

Table 5 reports the results from the estimation of Equation (2). Column (1) presents the model without bank fixed effects and documents a positive and significant association between a lead arranger's Tier 1 capital adequacy and the probability of covenant violation (coefficient 1.380; t-statistic 2.66), consistent with lead arrangers with lower Tier 1 capital levels originating loans with lower covenant strictness.

One concern with the column (1) specification is that there may be omitted time-invariant bank characteristics that are correlated with both capital adequacy and covenant strictness. For instance, low-quality banks may make generally poor lending decisions exemplified by loose covenants. These poor lending decisions, in turn, may result in relatively low capital adequacy. To address this concern, in column (2) we add bank fixed effects, which control for time-invariant characteristics within a bank and allow us to compare observations *within the same lender*. The association between capital adequacy and probability of covenant violation remains positive and statistically significant (coefficient 2.299; t-statistic 2.51). In other words, a decrease (increase) in a lender's Tier 1 capital is associated with looser (tighter) financial covenants in loans subsequently issued by that lender. In terms of economic magnitude, these results indicate that a one standard deviation decrease in Tier 1 capital is associated with an approximate 9 percent decrease in covenant strictness.[15]

[15] In untabulated analyses, we examine whether the positive association between $PVIOL$ and *LenderTier1Lev* exhibits nonlinearities or inflection points with respect to banks that have very low or very high regulatory capital. Specifically, we add to Equation (2) an indicator for whether the bank's regulatory capital is in the lowest sample quintile along with an interaction between *LenderTier1Lev* and the indicator. The association between $PVIOL$ and *LenderTier1Lev* remains positive and statistically significant at the $p < 0.05$ level, whereas the interaction effect is not significantly different from 0. Findings are consistent if we instead base the indicator on banks in the highest (rather than lowest) sample quintile, or on sample deciles rather than quintiles. That is, we find no evidence of nonlinearities in the association between regulatory capital and covenant strictness.

TABLE 4

Covenant Violations and Loan Loss Provisioning

Column:		**(1)**	**(2)**
Dep. Var.:	**Pred. Sign**	$LLP_{i,t}$	$LLP_{i,t}$
$LogCountViol_{i,t}$	+	0.001***	0.001***
		(2.88)	(3.71)
$LenderLogSize_{i,t-1}$		0.001**	−0.000
		(2.47)	(−1.40)
$LenderTier1Lev_{i,t}$		0.012	0.000
		(1.43)	(0.05)
$LenderROA_{i,t}$		−0.467***	−0.458***
		(−5.34)	(−5.22)
$\Delta NPA_{i,t+1}$		−0.002	−0.006
		(−0.10)	(−0.38)
$\Delta NPA_{i,t}$		0.009	0.012
		(0.26)	(0.34)
$\Delta NPA_{i,t-1}$		−0.015	−0.006
		(−0.37)	(−0.15)
$\Delta NPA_{i,t-2}$		−0.018	−0.010
		(−0.75)	(−0.41)
$\Delta Loan_{i,t}$		0.003***	0.003***
		(5.05)	(4.55)
ΔGDP_t			−0.000
			(−0.01)
$\Delta CSRET_t$			−0.000
			(−0.09)
$\Delta UNEMP_t$			0.000***
			(6.23)
Fixed effects		Bank, Year	Bank
Observations		4,751	4,751
R^2		0.557	0.536

*, **, *** Denote two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively, where t-statistics based on two-way clustered standard errors at the borrower and lender levels are reported in parentheses. Intercepts and fixed effects coefficients are included in the estimation, but not reported.
Table 4 presents results from estimating Equation (3). *LLP* is the lender's loan loss provision scaled by lagged total loans. *LogCountViol* is the natural log of the number of covenant violations in the lender's loan portfolio.
All variables are defined in Appendix A.

A related concern is that banks with relatively low capital adequacy may habitually make loans to less risky borrowers, and therefore attach looser financial covenants. However, the inclusion of *BorrowerBSMProb*, which controls for general borrower credit quality, mitigates this concern.[16] Borrower leverage and bankruptcy probability are both significantly positively associated with financial covenant strictness, consistent with lenders demanding more protection for higher-risk borrowers, *ceteris paribus*. Several other loan characteristics are associated with financial covenant strictness; for example, stricter covenants are associated with higher interest spreads and collateral requirements.

In Table 5, column (3), we re-estimate Equation (2), replacing *LenderTier1Lev* with an alternate measure of capital adequacy—*LenderTier1Rsk* (i.e., Tier 1 capital divided by risk-weighted assets). As reported, the association between Tier 1 risk-weighted capital adequacy and probability of covenant violation is positive and statistically significant (coefficient 1.042; t-statistic 2.52), consistent with the Tier 1 leverage ratio results.

[16] A subsequent analysis which shows that banks with lower Tier 1 capital tighten other non-covenant-related loan terms (e.g., maturity, amount) also helps mitigate this concern.

TABLE 5

Capital Adequacy Levels and Covenant Strictness

Column:		**(1)**	**(2)**	**(3)**
Dep. Var.:	**Pred. Sign**	***PVIOL***	***PVIOL***	***PVIOL***
LenderTier1Lev	+	1.380***	2.299**	
		(2.66)	(2.51)	
LenderTier1Rsk	+			1.042**
				(2.52)
LenderALLL		−2.790	0.685	0.261
		(−1.61)	(0.42)	(0.16)
LenderChargeOffs		2.087	−9.868**	−9.805*
		(0.38)	(−1.96)	(−1.85)
LenderDeposits		−0.074	−0.392***	−0.354***
		(−1.04)	(−2.99)	(−2.86)
LenderLogSize		0.012**	0.002	0.001
		(2.54)	(0.09)	(0.04)
LenderROA		3.059	1.127	2.636
		(0.65)	(0.22)	(0.50)
LenderLeverage		0.227	0.414	−0.162
		(0.74)	(0.65)	(−0.32)
LenderPortDefaults		0.002	0.003	0.003
		(1.32)	(1.16)	(1.10)
LogMaturity		0.011	0.010	0.011
		(1.11)	(1.00)	(1.09)
LogDealSize		0.005	0.002	0.003
		(0.50)	(0.25)	(0.29)
LogSpread		0.152***	0.153***	0.154***
		(18.90)	(18.39)	(18.35)
Secured		0.067***	0.075***	0.074***
		(4.60)	(5.54)	(5.49)
LogLenders		−0.017	−0.015	−0.015
		(−1.64)	(−1.41)	(−1.40)
BorrowerLogSize		−0.010	−0.009	−0.009
		(−1.35)	(−1.21)	(−1.22)
BorrowerLeverage		0.350***	0.349***	0.350***
		(10.96)	(10.93)	(10.98)
BorrowerBSMProb		0.222***	0.197**	0.199**
		(2.98)	(2.48)	(2.50)
Fixed effects		Quarter	Quarter, Bank	Quarter, Bank
Observations		5,287	5,287	5,287
R^2		0.201	0.239	0.239

*, **, *** Denote two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively, where t-statistics based on two-way clustered standard errors at the borrower and lender levels are reported in parentheses. Intercepts and fixed effects coefficients are included in the estimation, but not reported.

Table 5 presents results from estimating Equation (2). *PVIOL* is the aggregate probability of covenant violation (at loan initiation). *LenderTier1Lev* is the lender's Tier 1 capital scaled by average total assets. *LenderTier1Rsk* is the lender's Tier 1 capital scaled by risk-weighted assets.

All variables are defined in Appendix A.

Because our dependent variable (*PVIOL*) is a continuous variable bounded at zero and one OLS parameters may be biased (e.g., Papke and Wooldridge 2008). To address this concern, we transform *PVIOL* into alternative binary indicator variables (based on splits at median *PVIOL*, mean *PVIOL*, and $PVIOL = 0.5$) and model the relationship between high versus low *PVIOL* and lead arranger capital adequacy using logit regressions. Untabulated results are consistent with and reinforce our OLS findings, in that lower lender capital adequacy is associated with lower financial covenant strictness.[17] We also estimate Equation (2) using a fractional response model, and inferences remain unchanged (untabulated).

We now return to a brief discussion of Christensen et al. (2022), which finds a positive association between a bank's history of borrower payment defaults and performance covenant strictness. Christensen et al. state that "this finding supports our conjecture that the depletion of a lender's capital shifts the lender's preferences toward timelier control over new borrowers" (3). This potential implication of the Christensen et al. (2022) results (i.e., a *negative* association between capital and performance covenant strictness) seems to be the opposite of our result of a *positive* association between bank capital and covenant strictness. However, the two sets of results can be reconciled conceptually. Specifically, the Christensen et al. (2022) sample is limited to lenders who have a history of borrower payment defaults and are therefore likely to view Type II errors as relatively more costly, which would lead to covenant tightening. In contrast, our sample includes lenders who have no adverse borrower default history and are likely to view Type I errors as relatively more costly, which would lead to covenant loosening.

Consistent with this logic, in untabulated analysis we repeat our Table 5 analysis separately for sample partitions of lenders who have no recent borrower defaults (n = 2,246) versus a positive number of recent borrower defaults (n = 2,184) and find that the positive association between *LenderTier1Lev* and *PVIOL* is indeed stronger for the lenders with no recent borrower defaults. We also stress that our analysis (which documents a positive association between capital adequacy and covenant strictness) includes a control for the number of recent defaults in each lender's portfolio (*LendPortDefaults*). We note that, in Table 5, *LendPortDefaults* is insignificant (i.e., the Christensen et al. (2022) finding does not obtain). However, if we restrict our sample to lenders that experience borrower payment defaults (i.e., making the sample more comparable to that in Christensen et al. (2022)), we find a significantly positive association between *LendPortDefaults* and *PVIOL* (i.e., consistent with the Christensen et al. (2022) finding) *and* a significantly positive association between *LenderTier1Lev* and *PVIOL* (untabulated).

Covenant Strictness around Basel III Implementation

A key concern in interpreting our empirical results is endogeneity due to correlated omitted factors that may jointly explain the relation between lender capital adequacy and covenant strictness. The ideal solution would be to find an exogenous change to bank capital adequacy and examine whether such a change is associated with changes to covenant strictness in subsequent loans. We are unable to identify such a setting.[18] We therefore utilize a second-best approach—a change in bank capital adequacy *requirements*. Specifically, we use the implementation of the Third Basel Accord (Basel III), which featured a phase-in of increased regulatory capital requirements. This increase in regulatory minimum capital adequacy thresholds effectively reduced bank capital in a relative sense—that is, banks' existing capital levels became lower relative to the new (higher) threshold.

A threat to the exogeneity of the Basel III setting is that banks could have increased their capital in response to (and in anticipation of) the new regulation. However, there is no evidence in our sample that this occurred: the annual average Tier 1 Leverage of banks in our sample for 2012 through 2015 was 9.6 percent, 9.1 percent, 9.2 percent, and 9.1 percent. Even if banks did adapt to the increased capital requirements in a way that prevented the requirements from becoming more binding, Basel III undoubtedly increased the attention that capital markets paid to capital adequacy as a general measure of bank risk. Accordingly, the increased salience of capital adequacy would provide banks with an enhanced incentive to avoid decreases in Tier 1 capital. Therefore, following the central logic of our study, we predict that Basel III implementation enhanced the incentives for lead arrangers to decrease covenant strictness on subsequent loans, *ceteris paribus*.

As described in Beatty and Liao (2014), the U.S. implementation of Basel III featured a phase-in of higher capital requirements for banks with total consolidated assets of $500 million or more. Although the Basel III phase-in is technically complex, there are two features within our sample period that we can use for identification. First, the implementation of higher capital adequacy requirements for U.S. banks began on January 1, 2014. Second, only specific systemically important banks (referred to as *advanced approaches* banks) were required to begin phasing in the higher capital adequacy requirements on January 1, 2014—non-advanced approaches banks were not required to begin phase-in until January 1, 2015.[19]

[17] Coefficient estimates from this untabulated logit specification suggest that for each 1 percent decrease in *LenderTier1Lev* (e.g., from 6 to 5 percent), the odds of the loan containing strict financial covenants decreases by approximately 4 percent.

[18] For example, although the Troubled Asset Relief Program of 2008 (TARP) resulted in increased regulatory capital for recipient banks, receipt of TARP was not exogenous but was a function of firm characteristics (e.g., Bayazitova and Shivdasani 2011; Duchin and Sosyura 2012).

[19] Our sample contains loans by seven advanced approaches banks: Wells Fargo Bank, Citibank, Bank of America, U.S. Bank National Association, Bank of New York Mellon, JPMorgan Chase Bank, and Morgan Stanley Bank.

TABLE 6

Difference-in-Differences Analysis: Basel III Implementation

Column:		**(1)**		**(2)**
Dep. Var.:	**Pred. Sign**	***PVIOL***	**Pred. Sign**	***PVIOL***
LenderTier1Lev	+	2.000**	+	44.484*
		(2.11)		(1.82)
Post		−0.454***		−0.501
		(−3.12)		(−0.68)
LenderTier1Lev * *Post*	+	3.964**		4.121
		(2.38)		(0.56)
AdvApproach				−1.348
				(−0.41)
LenderTier1Lev * *AdvApproach*				−17.261
				(−0.61)
AdvApproach * *Post*				−2.606**
				(−2.16)
LenderTier1Lev * *AdvApproach* * *Post*			+	29.968**
				(2.52)
Controls Included		Borrower, Lender, Loan		Borrower, Lender, Loan
Fixed effects		Bank		Bank
Observations		7,004		297
R^2		0.229		0.311

*, **, *** Denote two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively, where t-statistics based on two-way clustered standard errors at the borrower and lender levels are reported in parentheses. Control variables, intercepts, and fixed effects coefficients are included in the estimation, but not reported.

Table 6 presents results from estimating Equations (4) and (5). *PVIOL* is the aggregate probability of covenant violation (at loan initiation). *LenderTier1Lev* is the lender's Tier 1 capital scaled by average total assets. *Post* is an indicator variable that equals 1 for loans issued in 2014 or later, and equals 0 otherwise. *AdvApproach* is an indicator that equals 1 if the bank was required to use the advanced approaches implementation of Basel III, and equals 0 otherwise.

All variables are defined in Appendix A.

Based on the first feature, we implement a pre-post design using our full sample period (with observations in years 2014–2017 comprising the post-period), where the model uses the same basic structure as Equation (2) with the addition of an indicator and interaction[20]:

$$PVIOL_l = \beta_0 + \beta_1 LenderTier1Lev_{i,t} + \beta_2 Post_t + \beta_3 LenderTier1Lev_{i,t} * Post_t + \sum \beta_n LenderControls_{i,t} + \sum \beta_n BorrowerControls_{j,t} + \sum \beta_n LoanControls_l + BankFE + \varepsilon_l. \quad (4)$$

Post is an indicator variable that equals 1 for loans issued after January 1, 2014 and equals 0 for loans issued prior to January 1, 2014. All other variables are as previously defined, and we do not include time fixed effects because of the *Post* indicator. Based on our primary analysis, we predict $\beta_1 > 0$. Based on our logic above, we further predict $\beta_3 > 0$ (i.e., a strengthening of the positive association between bank capital and covenant strictness after the implementation of Basel III). We report results from Equation (4) in Table 6, column (1). First, we note that there is a significantly positive coefficient on *LenderTier1Lev* (coefficient 2.000; t-statistic 2.11), which confirms that the general result we document earlier exists prior to Basel III implementation. More importantly, there is a positive coefficient on the *LenderTier1Lev* * *Post* interaction, as predicted (coefficient 3.964; t-statistic 2.38).

[20] As discussed in Section III, our primary analyses exclude loan observations with multiple lead arrangers. There is, however, a temporal trend towards multiple-lead-arranger loans, which results in relatively few single-lead-arranger loans in the post-2014 period. Thus, for the analyses in this section, we retain multiple-lead-arranger loans in our sample, and in such cases measure bank-level variables using the lead arranger with the lowest Tier 1 capital.

The second feature (i.e., staggered implementation across advanced- and non-advanced-approaches banks) allows us to implement a difference-in-differences design. We estimate the following extended model using a two-year subsample spanning 2013–2014 (i.e., one year in the pre-period and one year in the post-period):

$$\begin{aligned} PVIOL_l = {} & \beta_0 + \beta_1 LenderTier1Lev_{i,t} + \beta_2 Post_t + \beta_3 LenderTier1Lev_{i,t} * Post_t \\ & + \beta_4 AdvApproach_i + \beta_5 LenderTier1Lev_{i,t} * AdvApproach_i \\ & + \beta_6 AdvApproach_i * Post_t + \beta_7 LenderTier1Lev_{i,t} * AdvApproach_i * Post_t \\ & + \sum \beta_n LenderControls_{i,t} + \sum \beta_n BorrowerControls_{j,t} + \sum \beta_n LoanControls_l \\ & + BankFE + \varepsilon_l. \end{aligned} \tag{5}$$

AdvApproach is an indicator that equals 1 if the lead arranger is an advanced approaches bank and equals 0 otherwise. All other variables are as previously defined. Based on our primary analysis, we predict $\beta_1 > 0$. We further predict $\beta_7 > 0$, i.e., in 2014, the strengthened association between capital adequacy and covenant strictness after Basel III implementation (as documented in Table 6, column (1)) should be concentrated in the advanced approaches banks because non-advanced approaches banks were not required to implement Basel III until 2015.

We report results from Equation (5) in Table 6, column (2). Four coefficient estimates are noteworthy and corroborative of our inferences, even though we have relatively low power due to reduced sample size. First, the coefficient on *LenderTier1Lev* is significantly positive (coefficient 44.484; t-statistic 1.82), which indicates that the positive association between capital adequacy and covenant strictness holds for non-advanced approaches banks in 2013. Second, the insignificant coefficient on *LenderTier1Lev* ∗ *AdvApproach* (coefficient −17.261; t-statistic −0.61) indicates that there is a similar positive association between capital adequacy and covenant strictness for advanced and non-advanced approaches banks in 2013 (as we expect because in 2013 the new requirements were not yet implemented for *any* banks). Finally, the insignificant *LenderTier1Lev* ∗ *Post* coefficient (coefficient 4.121; t-statistic 0.56) and significantly positive *LenderTier1Lev* ∗ *AdvApproach* ∗ *Post* coefficient (coefficient 29.968; t-statistic 2.52) together indicate that, in 2014, the positive association between capital adequacy and covenant strictness strengthened *only* for the advanced approaches banks, which indeed were the only banks that faced implementation of the higher capital adequacy requirements in 2014.

One concern with this difference-in-differences analysis is that it relies on the parallel trends assumption. To assess the validity of this assumption, we estimate Equation (5) using a two-year window that is one year earlier than our analysis in Table 6 (i.e., 2012–2013). Because this precedes any bank implementation of Basel III, if the parallel trends assumption holds, we do not expect to see significance on the triple interaction term β_7. In untabulated analysis, we indeed find an insignificant coefficient (coefficient: −9.317, t-statistic: −0.83). We acknowledge that the Basel III setting likely introduces several confounds, but we believe this evidence collectively supports the positive association between lender capital adequacy and covenant strictness.

V. ADDITIONAL ANALYSES

Performance versus Capital Covenants

Christensen and Nikolaev (2012) classify financial covenants into two categories based on their functional roles. *Capital covenants*, which are based primarily on balance sheet information, control agency problems by imposing restrictions on the borrower's capital structure. *Performance covenants* rely on income statement information and provide early warnings of financial deterioration. As outlined in Christensen and Nikolaev (2012), the trip-wire role for performance covenants requires frequent violation, thus are more likely (relative to capital covenants) to result in Type I errors and violation waivers.[21] Accordingly, we predict that lead arrangers with relatively low Tier 1 capital adequacy lower covenant strictness primarily by lowering the strictness of performance covenants rather than capital covenants. To examine this prediction, we first compute the expected probability that a borrower violates a performance covenant (*PVIOLPerform*) and, alternately, a capital covenant (*PVIOLCapital*), as defined in Appendix A. Next, we re-estimate Equation (2) after replacing *PVIOL* with *PVIOLPerform* and *PVIOLCapital*, alternately.

We present results in Table 7. Column (1) documents a significant positive relation between lead arranger capital adequacy and performance covenant strictness (coefficient 2.060; t-statistic 2.20). In contrast, column (2) documents an insignificant relation between capital adequacy and capital covenant strictness (coefficient 0.140; t-statistic 0.27). We test

[21] Consistent with this idea, Christensen and Nikolaev (2012) find that greater use of performance covenants relative to capital covenants is associated with a higher likelihood of future contract renegotiation.

TABLE 7

Performance Covenants versus Capital Covenants

Column:		(1)	(2)
Dep. Var.:	Pred. Sign	*PVIOLPerform*	*PVIOLCapital*
LenderTier1Lev	+	2.060**	0.140
		(2.20)	(0.27)
LenderALLL		−1.979	1.662
		(−1.13)	(1.37)
LenderChargeOffs		−11.020**	1.115
		(−2.04)	(0.28)
LenderDeposits		−0.285**	−0.198***
		(−2.32)	(−2.96)
LenderLogSize		0.011	−0.014
		(0.51)	(−0.61)
LenderROA		0.807	1.800
		(0.14)	(0.46)
LenderLeverage		0.966	−0.683
		(1.45)	(−1.53)
LenderPortDefaults		0.000	0.001
		(0.23)	(0.99)
LogMaturity		0.023***	−0.023**
		(2.77)	(−2.54)
LogDealSize		−0.003	0.006
		(−0.32)	(0.94)
LogSpread		0.148***	0.025***
		(17.54)	(3.18)
Secured		0.066***	0.019***
		(5.25)	(3.01)
LogLenders		−0.011	−0.004
		(−1.17)	(−0.70)
BorrowerLogSize		−0.011	−0.007
		(−1.63)	(−1.32)
BorrowerLeverage		0.287***	0.135***
		(9.53)	(4.43)
BorrowerBSMProb		0.210***	0.039
		(2.69)	(0.81)
Fixed effects		Quarter, Bank	Quarter, Bank
Observations		5,287	5,287
R^2		0.228	0.145

*, **, *** Denote two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively, where t-statistics based on two-way clustered standard errors at the borrower and lender levels are reported in parentheses. Intercepts and fixed effects coefficients are included in the estimation, but not reported.

Table 7 presents results from estimating a variant of Equation (2) with alternative dependent variables. *PVIOLPerform* (*PVIOLCapital*) is the aggregate probability of covenant violation at loan initiation across performance (capital) covenants included on a given loan package. *LenderTier1Lev* is the lender's Tier 1 capital scaled by average total assets.

All variables are defined in Appendix A.

whether these coefficients differ using seemingly unrelated regressions and find a statistical difference at the 10 percent level ($\chi^2 = 3.07$, p-value = 0.080). These results are consistent with our prediction that lead arrangers relax performance covenants rather than capital covenants in response to their capital management incentives. This allows banks to reduce costly Type I errors while maintaining protection relating to agency problems by preserving capital covenant strictness.

Non-Price Loan Terms

Our analysis thus far leads to the question of whether borrowers receive lower covenant strictness as a "free" benefit from low-capital-adequacy lead arrangers because of lenders' capital management incentives. This seems unlikely in equilibrium; rather, we expect that lead arrangers will require borrowers to compensate for the looser covenants by tightening some other aspect(s) of debt contracts. Otherwise, all borrowers would seek loans from banks with relatively low Tier 1 capital. To determine the extent to which there are observable trade-offs being made among loan terms, we investigate whether lender Tier 1 capital is associated with maturity, loan amount, and interest rate by alternating the dependent variable in Equation (2) (retaining *PVIOL* in the specification as a control variable). If lenders with lower capital adequacy "tighten" other non-covenant loan terms, we predict that the coefficient on *LenderTier1Lev* will be positive, positive, and negative when the dependent variable is maturity, loan amount, and interest rate, respectively.

We present results of this analysis in Table 8. As we report in column (1), the significantly positive *LenderTier1Lev* coefficient (coefficient 3.157; t-statistic 1.87) indicates that lead arrangers with relatively low Tier 1 capital originate shorter maturity loans. Likewise, as reported in column (2), the significantly positive *LenderTier1Lev* coefficient (coefficient 3.203; t-statistic 1.65) indicates that lead arrangers with relatively low Tier 1 capital reduce their borrowers' loan amounts.[22] The *LenderTier1Lev* coefficient estimate in column (3) is statistically insignificant (coefficient −0.303; t-statistic −0.29), indicating no association between Tier 1 capital and interest rates. This evidence collectively suggests that in the equilibrium determination of the menu of contract options, lead arrangers with relatively low Tier 1 capital are willing to give up covenant protections in favor of tightening other loan terms that do not directly affect their Tier 1 capital adequacy. Conversely, borrowers from such banks are willing to accept tighter non-covenant loan terms in exchange for less restrictive covenants.

An important caveat applies to our interpretation of the results in Table 8. We cannot infer that changing maturity or size fully compensates the lender for less strict covenants, because we do not have a model of how loan parameters jointly map into the *ex ante* expected default rate of a loan. For example, we ideally would be able to claim that "an X percent decrease in covenant strictness is offset by a Y percent decrease in loan maturity"—but we cannot quantify the complex trade-offs between loan parameters and their individual and joint effects on default risk. Thus, although our results are consistent with the existence of a trade-off, we acknowledge that the "compensation" for lower strictness may be less than complete and that other unmeasured factors could be affecting our results.

Borrower-Bank Matching

It is possible that our numerous control variables do not sufficiently address the complex interactions between borrowers and lenders. Relevant to our study, Schwert (2018) finds that "bank-dependent" borrowers—i.e., borrowers lacking access to public debt markets—are more likely to borrow from well-capitalized banks. To ensure that our results are robust to this endogenous matching, we estimate our main regression (Equation (2)) after including an indicator variable for bank-dependent borrowers (i.e., whether the borrower has an S&P senior unsecured debt rating, following Schwert 2018) and its interaction with *LenderTier1Lev*. In untabulated results, we find that both the bank dependence indicator and the interaction term are statistically insignificant. Importantly, we find the main effect of *LenderTier1Lev* remains positive and significant.

Latent Risk in Banks' Loan Portfolios

Another concern with our main results is that some banks issue riskier loans than others, and these risk preferences may vary over time. If these preferences affect capital adequacy, the interpretation of our main results may be confounded because bank fixed effects only control for time-invariant bank features. Here, we discuss additional analyses that control for specific aspects of bank riskiness using the insight that certain types of loans (e.g., merger and acquisition financing and leveraged buyouts) are inherently riskier than loans that are used for corporate purposes or refinancings.

First, we include loan purpose indicators in our estimation of Equation (2), and our inferences are unchanged (untabulated). Next, following Ivashina and Kovner (2011), we identify a sample of *sponsored* loans (loans that are issued in

[22] These associations may raise a concern that the positive association we document between covenant strictness and capital adequacy is a byproduct of the maturity and loan amount associations. For example, suppose lead arrangers with low capital adequacy choose to originate loans with shorter maturities or lower amounts, and loans with shorter maturities or lower amounts usually include less strict covenants. This concern is mitigated by our inclusion of alternative loan characteristic controls in our primary analyses. However, to further mitigate this concern that low amount or low maturity loans are driving our results, we repeat our primary analysis separately using subsamples of loans with high maturity and high loan amount and continue to find a positive association between Tier 1 capital and covenant strictness (untabulated).

TABLE 8

Capital Adequacy Levels and Alternative Loan Terms

Column:		(1)		(2)		(3)
Dep. Var.:	Pred. Sign	*LogMaturity*	Pred. Sign	*LogDealSize*	Pred. Sign	*LogSpread*
LenderTier1Lev	+	3.157*	+	3.203*	−	−0.303
		(1.87)		(1.65)		(−0.29)
LenderALLL		−1.924		−5.119		3.483
		(−0.65)		(−1.40)		(1.35)
LenderChargeOffs		−15.552**		10.305		1.611
		(−2.08)		(1.10)		(0.19)
LenderDeposits		0.072		−0.458**		0.018
		(0.46)		(−2.50)		(0.12)
LenderLogSize		0.125***		−0.018		0.020
		(3.96)		(−0.44)		(0.86)
LenderROA		4.056		1.827		−11.090**
		(0.47)		(0.24)		(−2.31)
LenderLeverage		0.335		2.537**		−0.976
		(0.38)		(2.03)		(−1.23)
LenderPortDefaults		−0.010***		0.005**		0.005
		(−4.19)		(2.16)		(1.35)
PVIOL		0.021		0.007		0.269***
		(0.99)		(0.24)		(13.52)
LogMaturity				0.231***		−0.007
				(9.78)		(−0.23)
LogDealSize		0.168***				−0.045***
		(10.21)				(−4.84)
LogSpread		−0.008		−0.072***		
		(−0.23)		(−4.96)		
Secured		0.113***		0.135***		0.537***
		(5.53)		(4.51)		(16.21)
LogLenders		0.125***		0.602***		0.027
		(5.96)		(22.66)		(1.59)
BorrowerLogSize		−0.163***		0.413***		−0.129***
		(−20.53)		(30.39)		(−14.45)
BorrowerLeverage		−0.115**		−0.028		0.355***
		(−2.46)		(−0.51)		(9.23)
BorrowerBSMProb		−0.473***		−0.091		0.597***
		(−4.71)		(−0.90)		(4.37)
Fixed effects		Quarter, Bank		Quarter, Bank		Quarter, Bank
Observations		5,287		5,287		5,287
R^2		0.352		0.841		0.606

*, **, *** Denote two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively, where t-statistics based on two-way clustered standard errors at the borrower and lender levels are reported in parentheses. Intercepts and fixed effects coefficients are included in the estimation, but not reported.
Table 8 presents results from estimating a variant of Equation (2) with alternative dependent variables. *LenderTier1Lev* is the lender's Tier 1 capital scaled by average total assets. *LogMaturity* is the natural log of the facility amount-weighted average loan maturity in months. *LogDealSize* is the natural log of the aggregate face amount of all loan facilities in the loan package. *LogSpread* is the natural log of the facility amount-weighted average interest rate in excess of LIBOR (or other risk-free rate), in basis points.
All variables are defined in Appendix A.

a borrower's name by another party, typically a buyout firm) to identify loans that are inherently higher risk. From our sample of 5,287 packages, we identify 138 (2.6 percent) that are sponsored. To ensure that these sponsored packages are not driving our results, we (alternately) include an indicator variable for sponsored loans and exclude the sponsored loans from our analysis. Untabulated results show that our main inferences are unaffected in both cases.

Syndicate Participant Lenders' Capital Management and Loan Share

Syndicate *participant* lenders' capital adequacy-related incentives are unlikely to directly affect a loan's covenant strictness because the covenant structure is determined by the lead arranger prior to offering shares of the loan to potential syndicate participants. However, participant lenders' own capital management incentives may affect the share of loans they accept, conditional on the covenant strictness embedded therein. Specifically, we predict that a syndicate participant with relatively low capital adequacy will accept a smaller share of loans that have tight covenants. To test this prediction, we estimate the following equation:

$$LogAmount_{i,l} = \beta_0 + \beta_1 PVIOL_l + \beta_2 - LenderTier1Lev_{i,t} + \beta_3 PVIOL_l * -LenderTier1Lev_{i,t} + \sum \beta_n LenderControls_{i,t} + \sum \beta_n BorrowerControls_{j,t} + \sum \beta_n LoanControls_l + FixedEffects + \varepsilon_l, \quad (6)$$

where *LogAmount* is the natural log of the syndicate participant lender *i*'s share of loan *l* in millions of dollars. Note that all the lender-level variables now refer to an individual syndicate participant lender rather than a lead arranger, which increases our sample size to 15,465 participant-package observations. Further, we multiply *LenderTier1Lev* by -1 to facilitate interpretation of the interaction term (i.e., $-$*LenderTier1Lev* decreases as lender capital adequacy increases). All other variables are as previously defined. For this analysis, we focus on and predict a negative $PVIOL * -LenderTier1Lev$ interaction (i.e., $\beta_3 < 0$), which would be consistent with participant lenders with lower capital adequacy accepting a smaller share of loans that have tight covenants. We report this analysis in Table 9, column (1). As reported, the $PVIOL * -LenderTier1Lev$ interaction is significantly negative.

In Table 9, column (2), we adapt Equation (6) and convert the continuous variable *LenderTier1Lev* to an indicator variable (*LowTier1Lev*), which equals 1 (0) if the lender's Tier 1 leverage ratio is below (above) the sample median. The interaction is negative and statistically significant, again indicating that participant lenders with relatively low capital take smaller shares of loans with tightly set financial covenants.

TABLE 9

Syndicate Participant Capital Adequacy and Loan Share

Column: **Dep. Var.:**	**Pred. Sign**	**(1)** ***LogAmount***	**(2)** ***LogAmount***
PVIOL		−0.078	0.047
		(−1.38)	(1.44)
−*LenderTier1Lev*		−0.048	
		(−0.08)	
PVIOL ∗ −*LenderTier1Lev*	−	−1.177*	
		(−1.90)	
LowTier1Lev			0.011
			(0.63)
PVIOL ∗ *LowTier1Lev*	−		−0.066**
			(−2.40)
LenderALLL		3.141**	2.937*
		(1.99)	(1.82)
LenderChargeOffs		9.137***	9.307***
		(2.97)	(3.02)
LenderDeposits		0.257**	0.272**
		(2.08)	(2.26)
LenderLogSize		0.116***	0.114***
		(4.51)	(4.39)
LenderROA		4.675*	4.773*
		(1.67)	(1.71)

(continued on next page)

TABLE 9 (continued)

Column:		(1)	(2)
Dep. Var.:	Pred. Sign	*LogAmount*	*LogAmount*
LenderLeverage		−0.568	−0.830**
		(−1.00)	(−2.58)
LenderPortDefaults		0.007	0.007
		(1.44)	(1.43)
LogMaturity		−0.056***	−0.056***
		(−2.66)	(−2.66)
LogDealSize		0.600***	0.600***
		(15.42)	(15.48)
LogSpread		−0.101***	−0.101***
		(−4.90)	(−4.89)
Secured		−0.106***	−0.106***
		(−3.63)	(−3.63)
LogLenders		−0.669***	−0.669***
		(−17.16)	(−17.17)
BorrowerLogSize		0.032**	0.033**
		(2.08)	(2.11)
BorrowerLeverage		−0.180**	−0.181**
		(−2.49)	(−2.51)
BorrowerBSMProb		0.157	0.153
		(1.11)	(1.09)
Fixed effects		Quarter, Bank	Quarter, Bank
Observations		15,465	15,465
Adjusted R^2		0.490	0.490

*, **, *** Denote two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively, where t-statistics based on two-way clustered standard errors at the borrower and lender levels are reported in parentheses. Intercepts and fixed effects coefficients are included in the estimation, but not reported.

Table 9 presents results from estimating Equation (6). *LogAmount* is the natural log of lender *i*'s share of loan *l* in millions of dollars. *PVIOL* is the aggregate probability of covenant violation (at loan initiation). *LenderTier1Lev* is the lender's Tier 1 capital scaled by average total assets and is multiplied by minus one to facilitate interpretation. *LowTier1Lev* is an indicator that takes the value of one if the lender's Tier 1 capital is below the sample median calendar year-quarter Tier 1 capital and 0 otherwise.

All variables are defined in Appendix A (in this analysis, lender-level variables capture characteristics of syndicate participant lenders rather than lead arrangers).

VI. CONCLUSION

We document that lenders with lower Tier 1 regulatory capital issue loans with lower financial covenant strictness, consistent with lenders viewing borrower covenant violations as costlier when regulatory capital is lower. We infer this as consistent with a borrower covenant violation increasing the likelihood that the lender will need to downgrade the associated loan, which triggers accounting for loan loss reserves that further decreases the lender's regulatory capital. Because of regulatory scrutiny, this is true even if the lender waives the violation.

Consistent with lenders loosening the types of covenants that are particularly prone to violations when the lender does not want to take action against the borrower (i.e., a higher likelihood of Type I errors), we find that banks with lower capital adequacy loosen performance covenant strictness more than capital covenant strictness. Finally, we find that banks with relatively low regulatory capital issue loans with shorter maturity and lower loan amounts. This suggests that in the equilibrium determination of the menu of contract options, banks with relatively low Tier 1 capital are willing to lower covenant strictness in favor of tightening other loan terms that do not have direct implications for their capital adequacy.

A key challenge with the interpretation of our results is the issue of causality. Regulatory capital is likely to be correlated with other features and decisions of a bank, leading to the potential for omitted variables that limit the inferences from our analysis. Although we have attempted to address this concern with additional analysis (including the implementation of Basel III and various cross-sectional analyses), this challenge in identifying causality may limit the inferences from our study.

In addition, to contributing to our understanding of the underlying determinants of covenant design in debt contracts, we provide evidence on lender-side financial reporting incentives that constrain the strictness of financial covenants. Thus, our evidence reveals that equilibrium loan contract terms are affected by a lender-side cost of borrower covenant violation not yet considered in the literature. Specifically, our results suggest that banks alter the design of covenants in their loan contracts as part of their capital management strategies.

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APPENDIX A

Variable Definitions

$AdvApproach_i$	An indicator variable that equals 1 if the lead arranger on a given loan is classified as an "advanced approaches" bank under Basel III. Those banks include Wells Fargo Bank, Citibank, Bank of America, U.S. Bank National Association, Bank of New York Mellon, JPMorgan Chase Bank, and Morgan Stanley Bank (note: certain other banks that are Basel III advanced approaches banks are not present as lead arrangers in our sample, including PNC, State Street, Northern Trust, American Express, Capital One, Goldman Sachs, HSBC, and TD Group).
$BorrowerBSMProb_{j,t}$	Borrower *j*'s Black-Scholes-Merton market-based probability of default, measured at the month-end immediately preceding loan initiation (e.g., Hillegeist, Keating, Cram, and Lundstedt 2004). (Source: Compustat, CRSP)
$BorrowerLeverage_{j,t}$	Borrower *j*'s total liabilities divided by total assets, measured at the end of the most recent quarter prior to loan initiation. (Source: Compustat)
$BorrowerLogSize_{j,t}$	Natural log of borrower *j*'s total assets (in millions) measured at the end of the most recent quarter prior to loan initiation. (Source: Compustat)
$\Delta CSRET_t$	The return on the Case-Shiller Real Estate Index over the quarter. (Source: Federal Reserve Bank of St. Louis)
ΔGDP_t	Change in GDP over the quarter. (Source: Federal Reserve Bank of St. Louis)
$LenderALLL_{i,t}$	Lender *i*'s allowance for loan and lease losses scaled by total loans, measured at the end of the most recent quarter prior to loan initiation. (Source: Call Reports)
$LenderChargeOffs_{i,t}$	Lender *i*'s charge-offs scaled by total loans, measured at the end of the most recent quarter prior to loan initiation. (Source: Call Reports)
$LenderDeposits_{i,t}$	Lender *i*'s deposits scaled by total assets, measured at the end of the most recent quarter prior to loan initiation. (Source: Call Reports)
$LenderLeverage_{i,t}$	Lender *i*'s total liabilities divided by quarter-end total assets, measured at the end of the most recent quarter prior to loan initiation. (Source: Call Reports)
$LenderLogSize_{i,t}$	Natural log of lender *i*'s total assets at quarter-end (in thousands) measured at the end of the most recent quarter prior to loan initiation. (Source: Call Reports)
$LenderPortDefaults_{i,t}$	The number of payment defaults in lender *i*'s loan portfolio during the 360 days prior to loan initiation, where payment default is the count of borrowers with outstanding Dealscan loan packages in which the lender was the lead arranger and for which the borrower's rating was changed to default or selective default by S&P ratings database, following Christensen et al. (2022).
$LenderROA_{i,t}$	Lender *i*'s net income divided by average total assets, measured at the end of the most recent quarter prior to loan initiation. (Source: Call Reports)
$LenderTier1Lev_{i,t}$	Lender *i*'s Tier 1 capital divided by average total assets, measured at the end of the most recent quarter prior to loan initiation. (Source: Call Reports)
$LenderTier1Rsk_{i,t}$	Lender *i*'s Tier 1 capital divided by risk-weighted assets, measured at the end of the most recent quarter prior to loan initiation. (Source: Call Reports)
$LLP_{i,t}$	Lender *i*'s loan loss provision scaled by lagged total loans. (Source: Call Reports)
$\Delta Loan_{i,t}$	Lender *i*'s change in total loans divided by lagged total loans. (Source: Call Reports)
$LogAmount_{i,l}$	Natural log of lender *i*'s share of loan *l* in millions of dollars. (Source: Dealscan)
$LogCountViol_{i,t}$	Natural log of debt covenant violations experienced by lender *i* in quarter *t*. (Source: Nini et al. 2012)
$LogDealSize_l$	Natural log of the aggregate face amount of all loan facilities (in millions) in loan package *l*. (Source: Dealscan)
$LogLenders_l$	Natural log of the number of lenders in the syndicate for loan *l*. (Source: Dealscan)
$LogMaturity_l$	Natural log of the facility amount-weighted average loan maturity (in months) for loan package *l*. (Source: Dealscan)
$LogSpread_l$	Natural log of the facility amount-weighted average interest rate in excess of LIBOR (in basis points) for loan package *l*. (Source: Dealscan)
$LowTier1Lev_{i,t}$	An indicator that equals 1 if lender *i*'s Tier 1 capital is below the median calendar year-quarter Tier 1 capital and equals 0 otherwise. (Source: Call Reports)
$\Delta NPA_{i,t}$	Lender *i*'s quarterly change in nonperforming assets divided by lagged total loans. (Source: Call Reports)

(continued on next page)

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APPENDIX A (continued)

$Post_l$	An indicator that equals 1 if loan l was initiated in 2014 or later and equals 0 otherwise.
$PVIOL_l$	Aggregate probability of covenant violation (at the loan initiation date) across all covenants included in loan package l, computed as in Demerjian and Owens (2016). Specifically, we use Compustat data to create a panel of quarter-over-quarter changes in ratio form of 15 financial ratios that underlie the 15 common financial covenants that can be included in a loan contract, where each observation is then categorized into a size/profitability double-sorted bin. We then use Dealscan to compute covenant slack for all covenants on each Dealscan loan package, and simulate the borrower's one-quarter-ahead financial measures by applying observed quarter-over-quarter changes from a firm-quarter randomly selected from the Compustat panel for a firm in the borrower's size/profitability bin. We repeat this 1,000 times, and compute *PVIOL* as the total number of simulation instances where any covenant is violated divided by 1,000. (Sources: Compustat, Dealscan)
$PVIOLPerform_l$	Aggregate probability of covenant violation (at the loan initiation date) across all performance covenants included on loan package l, computed in similar fashion to *PVIOL*, where *PVIOLPerform* is the number of simulation instances where any performance covenant is violated divided by 1,000. Following Christensen and Nikolaev (2012), we classify the following covenants as performance covenants: Min. Interest Coverage, Min. Cash Interest Coverage, Min. Fixed Charge Coverage, Min. Debt Service Coverage, Max. Debt-to-EBITDA, Max. Senior Debt-to-EBITDA, and Min. EBITDA. (Sources: Compustat, Dealscan)
$PVIOLCapital_l$	Aggregate probability of covenant violation (at the loan initiation date) across all capital covenants included on loan package l, computed in similar fashion to *PVIOL*, where *PVIOLCapital* is the number of simulation instances where any capital covenant is violated divided by 1,000. Following Christensen and Nikolaev (2012), we classify the following covenants as capital covenants: Max. Leverage, Max. Senior Leverage, Max. Debt-to-Tangible Net Worth, Max. Debt-to-Equity, Min. Current Ratio, Min. Quick Ratio, Min. Net Worth, and Min. Tangible Net Worth. (Sources: Compustat, Dealscan)
$Secured_l$	An indicator that equals 1 if loan package l is secured and equals 0 otherwise. (Source: Dealscan)
$\Delta UNEMP_t$	Change in unemployment rate over the quarter. (Source: Federal Reserve Bank of St. Louis)