Bank Specialization, Control Rights, and Real Effects

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Abstract. We study the role of lenders' ability to collect and process information in financial contracting. Using a large sample of corporate loans, we analyze how banks' industry specialization affects the use of covenants and the outcomes of covenant violations among public U.S. firms. Lenders specialized in the borrower's industry impose less restrictive financial covenants, provide more customized loan terms, and reduce the investment drop following a covenant breach without harming firms' performance. Our results suggest that specialization improves contracting efficiency by lowering information asymmetries between borrowers and lenders, even absent a previous credit relationship.

Keywords: Bank Specialization, Financial Contracting, Covenant Violations, Corporate Governance, Real Effects.

JEL Classification: L15, L22, G21, G30, G32.

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The vast majority of commercial loan contracts include covenants to mitigate the agency costs stemming from asymmetric information between borrowers and lenders (Roberts & Sufi, 2009). Firms that breach a covenant enter technical default, shifting control rights to creditors. As lenders focus on preserving borrowers' repayment capacity, their choices can significantly differ from the firm management's. Thus, covenant violations can explain the effect of financing frictions on corporate policies (Chava & Roberts, 2008; Nini, Smith, & Sufi, 2012) and the transmission of financial shocks (Chodorow-Reich & Falato, 2022), with consequences on aggregate investment and asset prices (Bisetti, Li, & Yu, 2024). While information asymmetries are central to our theoretical understanding of financial contracting (Gârleanu & Zwiebel, 2009; Smith & Warner, 1979), the existing empirical evidence is limited to how lenders' borrower-specific soft information affects covenant design and covenant violation outcomes.[1] How lenders' broader ability to collect and process information affects the use of loan covenants and, thereby, real economic outcomes, is still largely unexplored.

This paper contributes to closing this gap by studying how banks' informational advantages due to specialization affect the use of loan covenants and the outcomes of covenant violations among large U.S. firms.[2] Our focus is grounded in a growing literature documenting specialization as a salient feature of credit markets. Through repeated interactions with a specific industry, lenders improve their ability to process signals about a defined set of projects, thereby reinforcing or building a comparative advantage in lending to similar firms, even absent a previous credit relationship (Blickle, He, Huang, & Parlatore, 2024; Huang, He, & Parlatore, 2024; Nieuwerburgh & Veldkamp, 2010). Do banks' informational advantages due to specialization affect the design of loan covenants? Does bank specialization matter for borrowers' real outcomes, such as investment and performance, when lenders exercise control rights upon covenant violations?

We aim to answer these questions by examining lenders' industry specialization in the U.S. syndicated loan market, based on the premise that specialization reflects lenders' informational advantages in lending to specific industries (Blickle, Parlatore, & Saunders, 2023; Paravisini, Rappoport, & Schnabl, 2023). Our analysis provides the first empirical evidence that bank

1. See, for example, Hollander and Verriest (2016); Ivashina and Kovner (2011); Keil (2023); Prilmeier (2017).
2. Throughout this paper, we use the terms "lenders", "banks", and "creditors" interchangeably.

specialization comes with less restrictive financial covenants and greater dispersion in contract terms at loan origination, and a smaller decline in investment and better performance following borrowers' covenant violations. We argue that these effects are most likely due to lenders' industry-specific informational advantages, and cannot be rationalized by other plausible explanations, such as risk-taking incentives stemming from government guarantees, relationship lending, geographical proximity, or industry capture. Overall, our results suggest that specialization improves contracting efficiency by lowering information asymmetries between borrowers and lenders.

We define specialization at the bank-industry-year-quarter level as the degree of banks' "over-investment" in an industry relative to the industry size in the credit market (Blickle, Parlatore, & Saunders, 2023). Employing this measure combined with the Text-based Fixed Industry Classification (TFIC) developed by Hoberg and Phillips (2010, 2016), our main results are fourfold. First, specialized lenders choose lower covenant strictness, defined as the ex-ante probability of violating at least one financial covenant (Demerjian & Owens, 2016). Banks with an industry portfolio share twice that of the market grant loans with 7 percentage points looser covenants to firms in that industry. This effect is sizable, amounting to 25% of the sample mean of covenant strictness, and it is not merely the byproduct of a trade-off with other price or non-price terms (Bradley & Roberts, 2015; Rajan & Winton, 1995). This fact is consistent with standard theories of loan contract design (Gârleanu & Zwiebel, 2009), according to which smaller information asymmetries between borrowers and lenders lower the need for stricter covenants, all else equal. Intuitively, ex-ante better-informed lenders seek to reduce the probability of a covenant violation because they have less need for costly ex-post information acquisition through renegotiations.

Second, performance (earnings-based) covenants drive the observed lower covenant strictness, while capital (balance-sheet) covenants are similarly restrictive for both specialized and non-specialized banks.[3] This is what we would expect if specialization indeed captures lenders' industry-specific informational advantages. Earnings-based performance measures, such as interest coverage, produce more accurate information about borrowers' health (Griffin, Nini, &

3. In further analyses, available upon request, we also show that the use of negative covenants such as dividend restrictions or sweeps is also similar for specialized and non-specialized banks.

Smith, Forthcoming) and serve as trip-wires that trigger renegotiations, whereas balance-sheet indicators, such as leverage or net worth, aim to align the incentives of borrowers and lenders ex-ante (Christensen & Nikolaev, 2012).[4] Then, looser performance covenants imply a lower likelihood of renegotiations, which is what Gârleanu and Zwiebel (2009) would predict in the presence of lower information asymmetries.

Third, lenders' industry specialization correlates with greater variability of covenant strictness and pricing in loan contracts to firms borrowing from a bank specialized in the firms' industry (hereafter, core borrowers). For a given bank-industry-year, we compute four common dispersion measures for the distribution of contract characteristics. Regressing these measures on our specialization variable while absorbing all relevant time-varying bank and industry heterogeneity, we find a statistically significant effect of specialization on three out of the four measures, for both covenant strictness and the cost of credit.[5] Coherent with models in which more precise information leads to a screening equilibrium as opposed to a pooling one (Stiglitz & Weiss, 1981), better-informed lenders offer more tailored loan contracts to firms in industries they know better.

Fourth and last, core borrowers experience a smaller investment drop four quarters after a covenant violation. We document that non-core borrowers see a reduction in capital expenditures of up to 0.5% of tangible assets after a covenant violation, while the average core borrower in an industry where the bank's portfolio share is double that of the market only experiences a reduction of 0.2%.[6] This difference is large, implying a 60% smaller reduction in investment, with the effect increasing as banks specialize further. The reduced drop in investment after a violation is linked to performance improvements, too. Core borrowers outperform non-core borrowers in operating cash flow over assets and sales growth, and show a smaller increase

4. Demerjian and Owens (2016) categorize covenants into performance and capital covenant groups, based on Christensen and Nikolaev (2012). Performance covenants include minimum cash interest coverage, minimum debt service coverage, minimum EBITDA, minimum fixed charge coverage, minimum interest coverage, maximum debt-to-EBITDA, and maximum senior debt-to-EBITDA; and capital covenants include minimum quick ratio, minimum current ratio, maximum debt-to-equity, maximum debt-to-tangible net worth, maximum leverage, maximum senior leverage, minimum net worth, and minimum tangible net worth.

5. We employ the All-In Drawn Spread in DealScan as our baseline measure of the cost of credit.

6. In detail, we find that the investment cut associated with a null value of specialization is 0.8% of tangible assets. We find that such a cut decreases in magnitude by 0.3% per unit increase in specialization. Hence, a borrower in an industry in which the bank lends as much as the market will see an investment cut of $0.8 - 0.3\% = 0.5\%$, and a borrower in an industry in which the bank lends twice as the market a 0.2% decrease, on average.

in default probability. Thus, previous industry-specific experience allows lenders to be better managers of firms' assets, resembling the evidence presented by Acharya, Gottschalg, Hahn, and Kehoe (2013) and Bernstein and Sheen (2016) for the private equity industry. These findings suggest that lenders' informational advantages limit the under-investment problem associated with ex-ante agency problems (Smith & Warner, 1979) without harming firms' efficiency.

While acknowledging that our analysis reflects equilibrium outcomes and must be interpreted cautiously regarding causality, our empirical approach aims to minimize bias due to omitted variables. Concerning our results on loan covenant strictness, we strive to make our analysis as close as possible to an "all-else-equal" comparison. We account for a wide range of firm characteristics to control for borrower risk (Demiroglu & James, 2010), such as borrowers' expected default probability (Merton, 1974). We include industry×year-quarter fixed effects to absorb all industry-specific variation and bank×year-quarter fixed effects to control for all those time-varying characteristics that could explain lenders' covenant choices.[7] As Jensen and Meckling (1976) suggest that borrowers prefer lenders with the lowest monitoring costs, we include bank×firm fixed effects to alleviate the concern that our results might simply reflect this non-random bank-firm matching. Our identification thus comes from variation in banks' specialization status over the credit relationship and changes in the firm's industry as defined by the TFIC. Finally, we also control for loan characteristics that might be jointly determined with covenant strictness.

Concerning our results on covenant violations, we identify the effects of bank specialization on firms' investment building on the "quasi-discontinuity" approach by Roberts and Sufi (2009) and Nini, Smith, and Sufi (2012), based on violations reported in SEC filings.[8] In this setting, the researcher identifies the effect of a covenant violation thanks to the sharp reallocation of control rights, accounting for expected drivers of violations such as firm performance measures on

7. These include risk-transfer mechanisms (Drucker & Puri, 2008; Wang & Xia, 2014), risk attitudes (Goyal, 2005; Murfin, 2012), and risk exposures (Miller & Reisel, 2012; Shan, Tang, & Winton, 2019).

8. An alternative approach would be to employ a regression discontinuity design (RDD) in which we identify violations with a threshold-based approach, comparing the underlying accounting variable with the corresponding covenant threshold in Dealscan (Chava & Roberts, 2008). This assumes a perfect discontinuity in the violation status once the threshold is crossed. However, recent evidence casts doubts on this assumption (Dyreng, Ferracuti, Hills, & Kubic, 2021), due to non-standardized covenant definitions (Badawi, Dyreng, de Fontenay, & Hills, 2021) and covenant thresholds that vary over the lending relationship (Denis & Wang, 2014; Roberts, 2015), both of which are unobservable to the econometrician.

which covenants are written. In our case, we focus on the heterogeneity of the violation effects, estimating whether the outcome of a covenant violation depends on the industry specialization of the firm's lender.

Our strategy must confront two main challenges. First, violations could correlate with firm characteristics and post-violation outcomes could depend on the interplay of these characteristics with banks' specialization (Chodorow-Reich & Falato, 2022). We alleviate this concern by including interactions between several firm characteristics and bank specialization in our specifications, and by showing there are no effects on investment in a placebo experiment where violations are falsely assumed to occur four quarters before their actual realization. Second, loans between specialized banks and their core borrowers exhibit looser covenants, hence these borrowers' violations could be more serious than non-core borrowers' and potentially subject to harsher lender intervention. However, this last fact would only bias our estimates against finding a positive effect of lenders' specialization on corporate investment, bolstering the economic significance of our results.

Overall, our evidence that lenders' industry specialization affects the design of loan covenants and the outcomes of covenant violations is consistent with lenders possessing industry-specific informational advantages. However, at least three other explanations could drive our findings. First, industry specialization could be related to other ways of acquiring information: i) long-term credit relationships with borrowers in a given industry (Boot, 2000), and ii) local knowledge spillovers (Agarwal & Hauswald, 2010) due to industrial clusters of firms located in specific geographic areas. We show that neither relationship lending nor geographical proximity affects our results on covenant strictness and post-violation outcomes. To further rule out that borrower-specific information drives our results, we also show that specialized banks write looser covenants to firms in their industry of specialization even absent a previous credit relationship with those firms. Second, industry-specialized banks could, in principle, also display a large market share within that industry. As such, they could be industry-captured and internalize the industry-level spillovers of their credit decisions simply due to size (Giannetti & Saidi, 2019), which would represent an alternative mechanism to the information-based explanation we put forward. We show that controlling for industry market shares does not affect our results. Third, to the extent that covenant violations might be related to firms' financial distress, our

results on post-violation outcomes could represent indirect evidence of "zombie lending" by overly-concentrated lenders (Faria-e Castro, Paul, & Sánchez, 2024). We mitigate this concern by showing that the positive effect on investment induced by industry-specialized lenders is not driven by low-quality firms, i.e., firms with high default probability, high leverage, or low coverage ratios.

Lastly, our results are robust to many alternative specifications and measurement choices. First, the presence of three large lenders (JP Morgan, Bank of America, and Citigroup) in the syndicated loan market does not drive our results. Second, our results do not change if we employ different measures of specialization, different methods to attribute loan shares to lenders, different loan samples, or if, in the computation of our baseline specialization measure, we average portfolio shares using time windows of different lengths. Third, we show that our analysis on covenant violations yields the same results if we include higher order polynomials and the lagged version of our baseline firm-level controls; if we include bank×industry fixed effects; if we limit our analysis to firms' first violations, to firms that only violated a covenant at least once in our sample period, or to firm-quarter observations in which the firm has only one active credit relationship.

Our findings contribute to the empirical research on the role of creditors in corporate borrowers' governance. It is well established that shifts in control rights induced by covenant violations have important implications for corporate policies (Nini, Smith, & Sufi, 2012), such as investment (Chava & Roberts, 2008; Nini et al., 2009), capital structure (Roberts & Sufi, 2009), employment (Falato & Liang, 2016), CEO turnover (Ferreira, Ferreira, & Mariano, 2018), corporate acquisitions (Becher, Griffin, & Nini, 2022), research and development (Chava, Nanda, & Xiao, 2017; Gu, Mao, & Tian, 2017), and within-firm resource allocation (Ersahin, Irani, & Le, 2021). More recent evidence points to heterogeneity in these effects depending on lenders' characteristics (Bird, Ertan, Karolyi, & Ruchti, 2022; Chodorow-Reich & Falato, 2022). We stress the importance of banks' industry-specific knowledge in mitigating the effects of financing frictions on investment, even after accounting for bank- or firm-specific characteristics.[9] Our evidence highlights how lenders' specialization reduces ex-post inefficiencies arising from the

9. Keil (2023) studies how relationship lending, that is, lenders' borrower-specific information, affects the outcomes of covenant violations.

ex-ante inclusion of covenants in debt contracts (Smith & Warner, 1979). Hence, we document how and to what extent the accumulation of expertise in handling specific borrowers increases the efficiency and effectiveness of the tools banks use to address information asymmetries.

Second, this paper contributes to the literature on the design of debt contracts. A long-standing stream of research has documented the importance of borrower characteristics in determining covenant design (Berlin & Mester, 1992; Billett, King, & Mauer, 2007; Chava, Kumar, & Warga, 2010; Demiroglu & James, 2010; Gigler, Kanodia, Sapra, & Venugopalan, 2009; Graham, Li, & Qiu, 2008; Jensen & Meckling, 1976). Another strand has explored the significance of lenders' characteristics and shocks (Abuzov, Herpfer, & Steri, 2020; Christensen, Macciocchi, Morris, & Nikolaev, 2022; Demerjian, Owens, & Sokolowski, 2023; Goyal, 2005; Murfin, 2012). We examine the borrower-lender dimension, seeking empirical verification for financial contracting theories that posit information asymmetries lead the informed party—the borrower—to give up control rights to address the concerns of the uninformed party—the lender (Dessein, 2005; Gârleanu & Zwiebel, 2009). In this sense, the two papers closest to ours are Hollander and Verriest (2016) and Prilmeier (2017), who confirm such a hypothesis by focusing on, respectively, geographical distance and relationship strength.[10] We show that lenders' superior ability to collect and process industry-specific signals is at least as relevant for covenant design as these other sources of information advantage.

Finally, our paper contributes to the empirical literature on specialization in lending.[11] Numerous studies document banks' specialization in lending across various dimensions, such as export markets (Paravisini, Rappoport, & Schnabl, 2023), geographical regions (Casado & Martinez-Miera, 2022; Duquerroy, Mazet-Sonilhac, Mésonnier, & Paravisini, 2022), industries (Blickle, Parlatore, & Saunders, 2023; De Jonghe, Dewachter, Mulier, Ongena, & Schepens, 2020; Di & Pattison, 2023; Jiang & Li, 2022), and collateral (Gopal, 2021). This body of research finds that specialization leads to heterogeneous credit-supply responses to funding shocks, affecting firm-level outcomes. Closely related to our work, Blickle, Parlatore, and Saunders (2023) show

10. Ivashina and Kovner (2011) show that repeated interactions with private equity sponsors reduce the need for restrictive covenants in leveraged buyouts.

11. We focus on credit markets, but we acknowledge a wider literature concerning funding providers in general, e.g., Acharya, Hasan, and Saunders (2006); Beck, De Jonghe, and Mulier (2022); Berger, Minnis, and Sutherland (2017); Black, Krainer, and Nichols (2020); Carey, Post, and Sharpe (1998); Daniels and Ramirez (2008); De Jonghe, Mulier, and Samarin (2025); Saidi and Streitz (2021); Tabak, Fazio, and Cajueiro (2011).

that industry specialization leads to lower loan spreads, longer maturities, and better ex-post loan performance. We complement their findings by showing that specialization influences the design and use of loan covenants, which can have important macroeconomic implications by determining firms' borrowing constraints (Drechsel, 2023; Lian & Ma, 2020). By documenting how specialization affects firms' investment through covenant violations, we show that lenders' specialization has real effects even outside of crisis times and episodes of corporate financial distress (Chava & Roberts, 2008; Dichev & Skinner, 2002).

The paper proceeds as follows. In Section 1, we describe our sample. In Section 2, we illustrate how we measure banks' industry specialization and provide evidence of its salience in the U.S. syndicated loan market. In Section 3, we investigate the implications of lenders' specialization for covenant strictness and other contract characteristics. In Section 4, we analyze its implications for corporate investment and performance through covenant enforcement decisions. In Section 5, we assess several alternative explanations. In Section 6, we provide robustness checks. Section 7 concludes.

1 Data and Sample Construction

To characterize specialization and to study its implications for loan contracts and firm outcomes, we construct a sample of syndicated loans matched with bank and firm characteristics. Below, we describe the sample construction and summarize the sample characteristics.

1.1 Sample Construction

We build our dataset starting from Refinitiv DealScan and Compustat. DealScan contains detailed information on syndicated loans, including credit amounts, covenants, price terms, and maturity. Despite its focus on relatively large loans and firms, DealScan still represents one of the most detailed loan-level sources of information on U.S. firms' credit relationships, spanning almost 40 years (from 1987 to today). It is indeed commonly used to study bank lending (e.g., Bharath, Dahiya, Saunders, & Srinivasan, 2011; Giannetti & Saidi, 2019) and its implications for the real economy (e.g., Chakraborty, Goldstein, & MacKinlay, 2018; Chodorow-Reich, 2014).

Compustat provides balance-sheet information for both banks and firms. We merge the loan data in DealScan with borrowers' quarterly financial information in Compustat using the link table provided by Chava and Roberts (2008), which spans the period from 1987 to 2021.[12] Then, we assign firms to a given industry based on the Text-based Fixed Industry Classification (TFIC) developed by Hoberg and Phillips (2010, 2016). We obtain information on stock prices from CRSP and on firms' credit ratings from Capital IQ.

We match banks in DealScan with their quarterly financial information in Compustat using the link table provided by Schwert (2018), which identifies the Bank Holding Company (BHC) of all DealScan lenders with at least 50 loans or a loan volume of at least $10 billion in the matched DealScan-Compustat sample. As a lending syndicate involves multiple banks with different roles—lead arrangers and participant banks—we focus on the former (Bharath, Dahiya, Saunders, & Srinivasan, 2011; Prilmeier, 2017; Schwert, 2018). Lead arrangers supply credit, negotiate the loan terms with the borrower, carry out due diligence, and market the loan to participant banks. Importantly, they are required to manage the credit relationship and enforce covenants even if they do not retain the entirety of the loan amount on their balance sheets (Ivashina, 2009). We identify lead arrangers using the categorical variables and the textual description of banks' roles provided by DealScan, following the procedure outlined by Chakraborty, Goldstein, and MacKinlay (2018).

To characterize bank specialization, we need banks' time-varying industry exposures. For that, we need to track credit relationships over time. DealScan, however, provides data only on loan originations, and information on loan shares is sparse. To address this issue, we create a bank-firm level panel similar to a credit register (Chakraborty, Goldstein, & MacKinlay, 2018; Doerr & Schaz, 2021). We make the following assumptions: 1) in the presence of a merger/acquisition, we attribute the outstanding loan to the new/acquiring entity as indicated in Schwert (2018)'s linking table unless the originating subsidiary or branch disappears from DealScan; 2) each loan facility is outstanding until the original end date, or if an amendment is reported in DealScan, until the amended end date;[13] 3) the facility amount is entirely attributed

12. The linking table is constantly being updated. As of April 2025, this is the most recent and comprehensive version.

13. To track loan amendments, we exploit the information present in the "facilityamendment" table in the WRDS legacy version of DealScan. One potential caveat is that renegotiated/amended loans could appear as new loans in DealScan; if loan renegotiations are not identically and independently distributed across bank-firm pairs, this

to the lead arranger(s).[14] We use this dataset to establish whether a credit relationship is still active at a given point in time and to compute our baseline measure of bank industry specialization.

Throughout our analysis we restrict the sample to loans originated between 1996 and 2019, as the coverage of syndicated lending and contract terms in DealScan is sparse before 1996 (Chava & Roberts, 2008) and the years post-2019 are affected by the major shock of the COVID-19 pandemic. We further restrict the sample to loans granted to non-financial corporations (i.e., SIC codes from 6000 to 6999 are excluded) headquartered in the U.S. for which the TFIC is available. We winsorize all firm- and loan-level variables at the top and bottom 2.5%.[15] Finally, we drop all observations with missing firm-level variables that are important determinants of covenants and loan spreads, and for which our measure of bank specialization is unavailable.[16]

The first step in our analysis focuses on contract terms at loan origination. In DealScan, there are two possible units of analysis: facility and package (or deal, which is a set of facilities). We conduct the analysis at the package level—hereafter referred to simply as "loan"—as the information available on covenants is at the package level.[17] We supplement the loan-level data provided by DealScan with the comprehensive measure of covenant strictness developed and made available by Demerjian and Owens (2016). This measure takes into account 15 accounting-based covenants and can be interpreted as the ex-ante probability of violating at least one covenant. We also obtain the measures of covenant strictness computed separately for performance and capital covenants. The resulting dataset is a bank-loan level panel at a quarterly frequency, with information at loan origination on firm, loan, and bank characteristics. Following Murfin (2012), we assume the determination of contract terms takes place during the quarter before the actual reported loan starting date. For this part of the analysis, we retain

could imply an imperfect measurement of a bank's lending activity. To partially address this issue, we perform our analysis by dropping from our sample all the loans that have a description such as "This loan amends and restates..." in the various "comment" fields available in DealScan. However, as we discuss in Section 6, our main results do not change if we do not drop these loans.

14. If there are multiple lead arrangers, we split the loan amount equally among them. However, as robustness, we also create alternative versions of this bank-firm panel. See the discussion in Section 6.

15. We do not winsorize the measures of covenant strictness and of expected default probability, which are naturally bounded between 0 and 100.

16. The exact set of variables we require to be non-missing is the set of firm controls we use in our specifications, as described in Section 3.1.

17. We aggregate the facility-level information at the package level by calculating a weighted average of the facility characteristics – loan spread, fees, and maturity – using the respective facility amounts as weights.

only loans with covenant strictness or all-in drawn spread non-missing.

The second step focuses on firm investment around covenant violations and how bank specialization affects this outcome. We merge our quasi-credit register, constructed by tracking credit relationships over time, with the data on covenant violations extracted from companies' SEC filings by Nini, Smith, and Sufi (2012) and Griffin, Nini, and Smith (Forthcoming).[18] In short, a firm is classified to be in violation in a given quarter if it reports a covenant violation in its 10-K or 10-Q filings in that quarter.[19] In line with these studies, we focus on new covenant violations, i.e. violations by a firm that has not violated any covenant in the previous four quarters.[20] New covenant violations "represent the first opportunity for credit intervention and thus provide the cleanest identification of the effect of violations on corporate behavior" (Nini, Smith, & Sufi, 2012, p. 1725).

If a violation is reported for a given quarter, we assume that the firm is in breach of a covenant for one of the credit relationships currently active in that quarter according to our quasi-credit register. We then need to determine which bank manages the violation. If the firm has an active credit relationship with only one lead arranger, then it is straightforward. If a firm has multiple credit relationships currently outstanding in a given quarter, we proceed sequentially. First, we pick the bank with the largest credit amount outstanding with the firm. If multiple banks meet this criterion, we pick the bank with the longest relationship with the firm. If multiple banks still meet this criterion, we pick the bank with the largest total credit amount outstanding.[21] The resulting dataset is a firm-quarter level panel matched with the firms' main bank information and a dummy variable that indicates the quarters in which a firm experiences a covenant violation.

1.2 Sample Characteristics

Table 1 provides summary statistics for the samples used in our empirical analysis. All variables are defined in Table A1. The "origination" sample includes all the loans that satisfy the

18. In the quasi-credit register, we drop all the observations corresponding to bank-quarters in which a given bank has no outstanding loans according to our sample.
19. For a complete description of the text-search algorithm, see Nini et al. (2012) and Griffin et al. (Forthcoming).
20. Firm-quarter observations corresponding to a violation that does not meet this criterion are set to missing.
21. We show that our analysis does not depend on these assumptions, as our results are robust to focusing only on firm-quarters with only one active credit relationship (see Table A16).

criteria described in the previous subsection, for a total of 10,269 unique loan observations, as shown in the top part of Panel A. Note that information on covenant strictness is more limited relative to other loan terms, such as loan spreads. On average, covenants are set such that a firm has a 28% ex-ante probability of violating at least one covenant, and the All-In-Drawn Spread is 187 basis points. The average loan package has a maturity of 4 years, an amount of $900 million, and an average syndicate size of 9 lenders.

The bottom part of Panel A reports information on the borrowers in our sample, which includes 5,458 firm-quarter observations for 1,834 unique firms. These are large, public firms, which average $2 billion in total assets. About 40% of them do not have a long-term issuer credit rating, and for those that have a rating, the average rating is BBB-/BB+.[22] In our sample, firms enter on average into 5 syndicated loan agreements. There are 63 unique lenders, which on average are large banks with $600 billion in total assets, deposits amounting to 60% of total assets, and a Tier 1 capital ratio of 10.5%.

Panel B of Table 1 summarizes the information on the "violations" sample. This includes all firm-quarters observations that can be matched to an outstanding loan, as implied by our pseudo-credit register, and that meet the sample selection criteria described in the previous subsection, totaling 55,139 observations. 1.3% of these observations represent new covenant violations, which is of the same order of magnitude as in Nini, Smith, and Sufi (2012).[23] As there are more firm-quarter observations compared to the "origination" sample, there are some differences in the firm characteristics, such as in average size or leverage, but overall the two samples are comparable. Firms on average make capital expenditures (investment) for $65 million each quarter, amounting to 5% of their tangible assets, and the average four-quarter change in investment is around −0.2%, with a standard deviation of 3%.

22. Rating is a categorical variable. We assign value 1 to AAA ratings, 2 to AA, and so on. The largest value is 9, assigned to "D" or "SD" indicating default in the Capital IQ Long-Term Issuer Credit Rating.
23. In the sample of Nini, Smith, and Sufi (2012) from 1997 to 2008, 2% of observations correspond to a new covenant violation.

2 Bank Specialization in the U.S. Syndicated Loan Market

We now describe how we measure banks' industry specialization and provide evidence highlighting its significance in the U.S. syndicated loan market.

2.1 Measurement

We measure bank industry specialization employing the approach proposed by Paravisini, Rappoport, and Schnabl (2023) and Blickle, Parlatore, and Saunders (2023). A bank is specialized in lending to a specific industry if it has an abnormally large loan portfolio share in that industry. Relative portfolio shares capture the intuitive and theory-grounded idea that the portfolio of a specialized bank should not be representative of the portfolio of the population of banks in the economy (Boyd & Prescott, 1986). The reasoning, as argued by Paravisini, Rappoport, and Schnabl (2023), is the following: if a bank has a comparative lending advantage towards an industry, that will result in a large lending share to that industry by revealed preferences. However, as the industry share in a bank's loan portfolio also depends on industry size, looking at the absolute loan portfolio share is not informative; what matters is a bank's loan portfolio share relative to that of other banks.

Hence, we define bank specialization as the bank's portfolio share relative to the portfolio share of a bank that has a perfectly diversified loan portfolio, i.e., one that is perfectly representative of the industry size distribution in the economy. Formally:

$$Specialization_{b,i,t} = \frac{S_{b,i,t}}{S_{i,t}} \tag{1}$$

$$\text{where } S_{b,i,t} = \frac{AmountLent_{b,i,t}}{\sum_{i=1}^{I} AmountLent_{b,i,t}} \text{ and } S_{i,t} = \frac{AmountLent_{i,t}}{\sum_{i=1}^{I} AmountLent_{i,t}}$$

where $S_{b,i,t}$ denotes the share of outstanding credit to industry i in bank b's total lending portfolio at time t, and $S_{i,t}$ is the share of total credit to industry i at time t, both averaged over a rolling window of 12 quarters.[24] This averaging reduces the influence of those industries

24. This requires a bank to lend to industry i in all the previous 12 quarters. Using different time windows does not change our results, as shown in Section 6.

whose portfolio shares are only sporadically larger (or smaller) in banks' lending portfolios or the entire loan market, and it ensures that we adequately capture the presence of comparative lending advantages, in line with Paravisini, Rappoport, and Schnabl (2023).[25]

Our measure of specialization aims to capture comparative advantages in lending to different industries, which, from an economic perspective, represent sets of specific types of projects in the economy. To approximate this notion of industry as closely as possible, we rely on the Text-Based Fixed Industry Classification (TFIC) developed by Hoberg and Phillips (2010, 2016). The TFIC builds on textual data to track the products (types of projects) that characterize each firm's core business activity. Then, each year, it classifies firms into specific clusters (industries) based on the similarity of firms' core activities. This dynamic allocation to different clusters of similar firms (industries) provides a significant advantage over the static NAICS or SIC industry definitions. In our analysis, we employ the 25-industry version of the TFIC, as it ensures a good balance between the number of firms per industry present in our final sample and sufficient precision in characterizing different sets of projects in the economy.

To further characterize specialization in the syndicated loan market, we also rely on the Herfindahl-Hirschman Index (*HHI*) of a bank's loan portfolio, which provides a bank-level measure of portfolio concentration. In particular, we use it to compare the lending portfolio of the average bank in the syndicated loan market with the overall market portfolio in terms of industry concentration. For bank b at time t, the *HHI* is:

$$HHI_{b,t} = \sum_{i=1}^{I} S_{b,i,t}^2 \tag{2}$$

$HHI_{b,t}$ reaches its maximum, 1, in the presence of a perfectly concentrated portfolio—i.e. $S_{i,b,t} = 1$ for only one industry i, and 0 for all the others—and its minimum, $1/I$, in the presence of a perfectly diversified portfolio, i.e. $S_{i,b,t} = 1/I \ \forall i \in I$. We can then compute the average bank's *HHI* by simply taking a weighted average of every bank's *HHI*, in which the weights are the banks' shares of total credit, and the *HHI* for the market portfolio by summing all the credit

25. Despite this averaging, sporadic abnormally large loans could still lead to large right tails in our measure of specialization, which can distort our estimations. We address this concern by showing that our main results are unchanged if, instead of the ratio between $S_{b,i,t}$ and $S_{i,t}$, we use three different measures of specialization: (i) the difference $S_{b,i,t} - S_{i,t}$, (ii) the simple portfolio share $S_{b,i,t}$, and (iii) a dummy variable capturing the bank's top industry in its loan portfolio. See Section 6.

exposures of every bank, as follows:

$$
\begin{aligned}
HHI_t^{AVGBANK} &= \sum_{b=1}^{B} \frac{AmountLent_{b,t}}{AmountLent_t} \left(\sum_{i=1}^{I} S_{b,i,t}^2 \right) \\
HHI_t^{MKT} &= \sum_{i=1}^{I} S_{i,t}^2
\end{aligned}
\tag{3}
$$

2.2 Evidence

To understand patterns of industry specialization in the syndicated loan market, we start by looking at the measure of loan portfolio diversification. In Figure 1, we plot the *HHI* of the commercial lending portfolio for the average bank and the market, computed for each quarter as in Equation (3). A larger value of *HHI* implies a larger concentration of exposure. Comparing the average *HHI* of the market portfolio (~ 0.07) and that of the average bank (~ 0.105) over time, we observe that the average bank is significantly more concentrated than the market. This implies that not every bank is lending to every industry in the same way, providing suggestive evidence of specialization in lending.

Second, we look at specialization by industry. Specifically, our goal is to understand if banks commonly display abnormally large loan portfolio shares in each industry. Figure 2 shows, at four different moments in time, the box-and-whisker plots of the distribution of bank portfolio shares towards each industry i (i.e., $S_{b,i,t}$). Across time, the majority of industry portfolio share distributions are skewed to the right, and almost every industry displays at least one bank that is a right-tail outlier (represented by a blue dot in the plot). Moreover, specialization is persistent. In Figure 3, we plot the autocorrelation function of the relative lending portfolio shares, $Specialization_{b,i,t}$, as defined in Equation (1). We observe that the autocorrelation between the relative portfolio share for bank b to industry i at year t and at year $t+10$ is still 55%. That is, if a bank concentrates its lending to specific industries, the bank is very likely to keep doing the same in the future. Finally, as shown in Table 1, the average bank's loan portfolio share in an industry is 1.4 times as large as the market's, further pointing to bank specialization in lending as a salient feature of the U.S. syndicated loan market.

3 Lenders' Specialization and the Use of Loan Covenants

After documenting clear patterns of specialization, we analyze its implications. First, we examine whether and how specialization affects the use of loan covenants. According to Gârleanu and Zwiebel (2009), greater informational asymmetries between borrowers and lenders lead to stricter covenants, meaning covenant strictness reflects the "information distance" between banks and firms. In their framework, optimal covenant design involves a trade-off between ex-ante costly information acquisition and the potential for future agency problems. Stricter covenants increase the likelihood of a covenant violation, prompting earlier information acquisition through costly renegotiations.

If industry specialization captures lenders' industry-specific informational advantages (Blickle, Parlatore, & Saunders, 2023; Paravisini, Rappoport, & Schnabl, 2023), we hypothesize that loans from banks specialized in the borrower's industry should have looser covenants. With better information ex-ante, specialized lenders prefer to lower the chances of triggering a costly renegotiation. This leads to another testable hypothesis regarding the use of performance and capital covenants. Capital covenants align agency problems ex-ante, while performance covenants act as trip-wires to trigger renegotiations (Christensen & Nikolaev, 2012). Therefore, we hypothesize that looser covenants associated with specialization are primarily due to looser performance covenants, while capital covenants should not differ if the severity of agency problems does not vary across core and non-core borrowers.

3.1 Empirical Strategy

To test these hypotheses, we assess systematic differences in covenant strictness at loan origination between specialized banks' core and non-core borrowers by estimating the following specification:

$$Y_{l,f,i,b,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{b,f} + \beta \cdot Specialization_{b,i,t-1} + \gamma_F \cdot X_{f,t} + \gamma_L \cdot X_{l,f,i,b,t} + \varepsilon_{l,f,i,b,t} \quad (4)$$

where $Y_{l,f,i,b,t}$ stands for covenant strictness of loan l, contracted in year-quarter t between bank b and firm f (operating in industry i). We rely on the measure of covenant strictness developed and made available by Demerjian and Owens (2016), a non-parametric version of

the measure proposed in Murfin (2012).[26] Specifically, Demerjian and Owens (2016) define covenant strictness as the ex-ante probability of violating at least one financial covenant during the lifetime of the loan, ranging from 0 to 100. This measure is characterized by four properties, all valid on an "all else equal" basis. First, it increases in the number of covenants; second, for a fixed number of covenants, it decreases in the initial slack of a covenant, defined as the distance between the level of the covenant threshold and the starting level of the corresponding financial ratio; third, it increases in the volatility of the ratios targeted by covenants; fourth, it decreases in the correlation between covenants—intuitively, since even a single covenant's violation can trigger a technical default, contracting on independent financial ratios increases the probability of violation.

$Specialization_{b,i,t-1}$ is our main variable of interest as defined in Equation (1), i.e., the ratio of industry i's share in bank b's lending portfolio (averaged over 12 quarters), relative to industry i's share in the entire lending market (averaged over 12 quarters), at $t-1$. The coefficient of interest, β, captures how covenant strictness varies for contemporaneous loans arranged to industries in which the bank's pre-set concentration is twice that of the market.

The granular set of fixed effects included in the estimation of Equation (4) plays a key role in making our estimates as informative as possible. First, we use bank×year-quarter fixed effects ($\alpha_{b,t}$), comparing loans arranged by the same bank in the same year and quarter, to core and non-core borrowers. Bank×time fixed effects, however, do not fully account for borrower selection problems, as there might still be systematic differences between core and non-core borrowers even within each bank's borrower pool. To alleviate these concerns, we include industry×year-quarter fixed effects ($\alpha_{i,t}$), capturing all time-varying observed and unobserved industry heterogeneity, and bank×firm fixed effects ($\alpha_{b,f}$), controlling for all bank-firm match-specific observable and unobservable characteristics that are fixed over time.[27] Note that including these fixed effects and the ensuing estimation requirements will result in a regression sample with fewer observations than the "origination" sample we discussed in Section 1.2.

26. The measure developed by Demerjian and Owens (2016) can be downloaded on Edward L. Owens' personal website https://sites.google.com/site/edowensphd/researchdata. We thank the authors for making the measure available.

27. Ideally, we would also want to account for the firm×time dimension. Nonetheless, here we work with very large loans, and even for large firms it is not common to obtain multiple loans at the same time, making the inclusion of firm×year-quarter fixed effects not feasible.

To further reduce potential bias, we account for various observable, time-varying borrower and loan characteristics. At the firm level, $X_{f,t}$ includes separate intercepts for each S&P long-term issuer credit rating (with the omitted dummy variable capturing unrated firms), the expected default probability (EDF) based on the Merton model of credit risk (Merton, 1974) and computed implementing the approach proposed by Bharath and Shumway (2008), as well as the log of total assets, debt to tangible net worth ratio, current ratio, the ratio of property, plant, and equipment to assets, interest coverage ratio, and market-to-book ratio. These controls account for repayment risk (especially for non-rated firms), size, leverage, liquidity, the ability to provide collateral, profitability, and investment opportunities.[28] At the loan level, $X_{l,f,i,b,t}$ includes the log of maturity, the log of the loan amount, the fraction of revolving credit over the total package amount, separate intercepts for different loan purposes, and the log of the number of syndicate participants, ensuring that we compare similar contracts.[29] Then, we double-cluster the standard errors ($\varepsilon_{l,f,i,b,t}$) at the bank and firm levels to account for within-firm and within-bank correlation.

To shed further light on the economic mechanism, we study the heterogeneity in strictness across performance and capital covenants (Christensen & Nikolaev, 2012).[30] We also check whether loan contracts by specialized banks involve a trade-off between covenants, maturity, pricing, the use of performance pricing provisions, and loan amount (e.g., Bradley & Roberts, 2015). We use all these characteristics as alternative left-hand variables in Equation (4) to examine any other differences between specialized banks' contracts with core and non-core borrowers.

Finally, we test whether core borrowers' loan contracts exhibit greater variability in contract terms than non-core borrowers', within a given bank-year pair and while accounting for industry heterogeneity. In particular, we first compute four common measures of dispersion in contract terms for each bank-industry-year triplet, such as the difference between the minimum and maximum value, the interquartile range, the standard deviation, and the kurtosis. Then, we

28. The choice of these controls is based on similar studies on the determinants of loan covenant strictness (Murfin, 2012; Prilmeier, 2017).
29. We classify loans into revolving credit and term loans following the classification of Berg, Saunders, and Steffen (2016).
30. Demerjian and Owens (2016) also provide separate strictness measures computed considering only performance covenants and only capital covenants.

regress these measures on our measure of specialization, including bank×year and industry×year fixed effects. If more precise information leads to better screening (Stiglitz & Weiss, 1981), we expect specialized banks to better cater to the specific needs of core borrowers and perform greater price and non-price discrimination among them.

3.2 Results

We first look at how specialized banks write covenants at loan origination. Table 2 reports the results from the estimation of Equation (4) using covenant strictness as outcome. Column (1) includes bank×year-quarter, industry×year-quarter, and bank×firm fixed effects. Column (adds firm controls. Column (3) further controls for loan characteristics. In columns (4) and (5), the outcome variable is the strictness measure computed considering only performance covenants and only capital covenants, respectively.

In columns (1) to (3), the point estimate on the specialization variable is negative and statistically significant at the 1% confidence level, with an almost identical magnitude. According to our most restrictive specification in column (3), if a bank's lending portfolio share in an industry is twice that of the market, covenants to core borrowers are about 7 percentage points looser than covenants on similar loans to non-core borrowers. This estimate is economically significant, as it amounts to 25% of the empirical sample mean of strictness (see Table 1).

Columns (4) and (5) show that looser performance covenants drive the observed effect on lower covenant strictness associated with specialization, in line with our hypothesis. Specifically, using a measure of strictness based only on performance covenants, banks with an industry loan share double that of the market grant their core borrowers loans with performance covenants that are 8 percentage points looser than those granted to non-core borrowers. In contrast, when examining strictness based only on capital covenants, the coefficient on specialization is both economically and statistically insignificant. Given that lenders use capital covenants to address agency conflicts, this latter finding provides indirect support for our empirical strategy: after controlling for granular fixed effects along with borrower and loan characteristics, core and non-core borrowers do not appear to differ significantly regarding potential ex-ante agency problems.

One concern is that the observed lower covenant strictness might simply reflect a trade-off between loan terms, as discussed by Bradley and Roberts (2015). Looser covenants could be compensated by a higher cost of credit to reflect higher repayment risk, a lower maturity (Rajan & Winton, 1995), or a higher reliance on performance pricing provisions (Asquith, Beatty, & Weber, 2005; Nikolaev, 2018). In Table 3, we display the results from the regressions using these ex-ante contract characteristics as dependent variables in Equation (4). In columns (1)-(4), we present estimates for loan pricing terms, i.e. the spread over LIBOR, the All-In Drawn spread (AISD), the All-In Undrawn spread (AISU), and the total cost of borrowing (TCB) developed by Berg, Saunders, and Steffen (2016).[31] In columns (5)-(7), we instead focus on three non-price terms: the log of maturity, the log of amount, and a dummy for the presence of a performance pricing grid. We find that specialization implies a lower loan spread, and a higher loan amount, coherent with the findings of Blickle, Parlatore, and Saunders (2023), although our estimates are not statistically different from zero. Looking at other measures of the cost of credit, the effects are either zero or negative. Finally, focusing on maturity and the use of performance pricing provisions, neither effect is different from zero. Our results indicate that other contract terms do not offset the observed lower covenant strictness associated with specialization.

Our last set of tests looks at the heterogeneity of loan terms upon origination. Table 4 presents the results; we estimate how multiple measures of dispersion for covenant strictness (in percentage points, columns (1)-(4)) and for the AISD (in basis points, columns (5)-(8)) differ within the same bank, in the same year, across specialized banks' core and non-core industries. We find that specialization is consistently linked to higher dispersion, according to three measures out of four, in both covenant strictness and pricing. This is in line with our expectation that superior information ex-ante allows lenders to offer more tailored contracts to firms in their industries of specialization.

To summarize, our results indicate that banks on average write loan contracts with significantly looser covenants to their core borrowers. Such contracts present greater dispersion in loan terms, suggesting more tailoring, whereas it does not appear that specialized banks ask for higher prices, more restrictive maturity, or smaller amounts in exchange for allowing their core borrowers more leeway. In conclusion, the evidence on lenders' industry specialization

31. The TCB measure is only available until 2012.

and contract terms at loan origination strongly aligns with the presence of industry-specific information advantages.

4 Lenders' Specialization and Covenant Violations

The next part of our analysis focuses on identifying the real effects of bank specialization upon covenant violations. We investigate whether specialization influences lenders' covenant enforcement decisions regarding corporate investment policies, and assess the implications for firm performance. Covenant violations represent an ideal setting to study if and how lenders' characteristics impact corporate investment because, upon a covenant breach, lenders effectively obtain control rights over the firm, and this shift occurs in a sharp, discontinuous way. Under certain conditions, which we discuss in detail below, potential differences in firms' outcomes following violations can thus be attributed to lenders' differential interventions.

In line with previous evidence suggesting that financing providers with industry-specific experience can improve the performance of the firms they finance (Acharya, Gottschalg, Hahn, & Kehoe, 2013; Bernstein & Sheen, 2016), we hypothesize that industry-specific information advantages give banks the ability to better manage borrowers in the event of a covenant violation. In particular, we posit that lenders specialized in the borrower's industry can limit the ex-post under-investment problem associated with including covenants in loan contracts (Smith & Warner, 1979), and that this improves firm performance following a covenant violation. Next, we discuss how we can identify this effect.

4.1 Identification Strategy and Empirical Model

Our empirical exercise aims to determine whether lenders' industry specialization influences firms' outcomes following a covenant violation. To ascertain the impact of specialization on covenant enforcement decisions, we estimate the following empirical model at the firm-quarter

level:

$$\begin{aligned} Y_{f,t+4} - Y_{f,t} = \alpha_{i,t} + \alpha_{b,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} \\ + \theta_3 \cdot Specialization_{b,i,t} \times Violation_{f,t} \\ + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,t} \end{aligned} \tag{5}$$

where the dependent variable is the change in firm f's outcomes between t and $t+4$. Our focus is corporate investment, measured as capital expenditures scaled by tangible assets, as in Chava and Roberts (2008). We also look at the effect on firms' operating performance and default risk. Turning to our variables of interest, $Specialization_{b,i,t}$ is the specialization of bank b in industry i at time t, defined in Equation (1). $Violation_{f,t}$ equals to 1 if firm f violated a financial covenant in year-quarter t, and to 0 otherwise.[32] As in Nini, Smith, and Sufi (2012), we focus exclusively on new violations, i.e. violations by firms that have not violated any covenant in the previous four quarters. The coefficient of interest is θ_3, which measures the difference in violation outcomes between specialized banks' core and non-core borrowers.

There are several identification challenges in the estimation of θ_3. First, we need to separate the effect of violations from the expected changes in investment and performance stemming from differences in firms' fundamentals across violators and non-violators. We address this issue following the "quasi discontinuity" approach implemented by Roberts and Sufi (2009) and Nini, Smith, and Sufi (2012), which has been used to identify various effects of creditors' intervention on firms' outcomes (e.g. Becher et al., 2022; Ersahin et al., 2021). We compare similar firms above and below the relevant covenant threshold by flexibly controlling for a wide range of firms' characteristics on which covenants are bargained upon—the same firm-level controls as in Equation (4)—as well as pre-violation trends in firms' assets and tangible assets (Nini, Smith, & Sufi, 2012), to capture the expected time-series trajectory of the outcomes of interest.[33] Furthermore, we take the within-firm four-quarter difference in the outcomes of interest, removing any firm-level fixed differences across violators and non-violators. We also include industry×year-quarter ($\alpha_{i,t}$) and fiscal-quarter fixed effects ($\alpha_{fiscal\,t}$) to account for industry heterogeneity and seasonal patterns in investment.

Second, we need to ensure that any observed differences in outcomes depending on lenders'

32. See Section 1.1 for more details on how we construct covenant violations.
33. In our robustness tests, we further control for second- and third-order polynomials of these firms' variables as well as their lagged versions.

specialization do not merely reflect the potential correlation between violation outcomes and the interplay of firm characteristics and banks' specialization (Chodorow-Reich & Falato, 2022). To this end, our regression includes interactions between all the above-mentioned firm characteristics and banks' specialization ($X_{f,t} \times Specialization_{b,i,t}$). Furthermore, we account for any time-varying bank-specific factors by including bank×year-quarter fixed effects ($\alpha_{b,t}$), comparing violators and non-violators across core and non-core borrowers of the same bank.

Finally, our estimate might still be biased by ex-ante differences in the probability of violating a covenant. We have shown that covenants from specialized banks to their core borrowers are slacker. However, greater slackness implies that the missteps that lead to violations can be more notable, making these violations potentially worse for lenders (Demiroglu & James, 2010). For this reason, we might expect harsher specialized banks' interventions when their core borrowers violate ex-ante less strict covenants, even if such banks are better at handling their core borrowers' violations. Therefore, the bias we face is against finding evidence of better outcomes for core borrowers, reinforcing the economic significance of a positive finding.

4.2 Results

We now turn to investigating the implications of lenders' specialization for covenant enforcement decisions.

4.2.1 The effects on corporate investment

We begin by visually examining whether covenant violations affect investment differently for specialized banks' core and non-core borrowers. Figure 4 plots investment trends around new covenant violations. In the figure, core borrowers are firms in a lender's favorite industry —where the lender holds the highest 12-quarter average portfolio share—while non-core borrowers operate in other industries. The figure depicts average and median investment levels, with solid red lines for core borrowers and dashed blue lines for non-core borrowers, covering four quarters before and after violations. Before the violation, investment levels are similar across groups. Afterward, both decline initially, but the drop is steeper for non-core borrowers. While core borrowers' investment rebounds after the first quarter, non-core borrowers' investment

continue to decline.

Our unconditional evidence indicates that core borrowers of specialized banks experience smaller declines in investment following covenant violations. Nonetheless, as discussed in the previous section, there are several concerns in simply comparing the post-violation investment outcomes based on lenders' specialization, which is why we now turn to our regression analysis. Table 5 presents the results from the estimation of Equation (5) using the four-quarter differences in investment as the dependent variable. As a sanity check, column (1) first reports the estimates without the interaction between the violation and specialization measures, and replicates the standard result that a shift in control rights induces more conservative policies on violating firms (Chava & Roberts, 2008). Reassuringly, the point estimate on the violation dummy indicates that violating firms experience a 40 basis points decline in investment growth, relative to non-violating borrowers of the same bank, within the same industry. The result is statistically and economically significant, amounting to about 10% of the standard deviation in investment changes.

Then, starting with column (2), we present the estimates from the interacted model, where we account for core borrowers separately from the rest. In the first row, we see that for each bank, industry, and time, the change in investment is 82 basis points smaller for new violators that borrow from banks that have no previous exposure to that industry ($Specialization = 0$). The coefficient is highly statistically significant, and its magnitude more than doubles, amounting now to one-quarter of a standard deviation. In the third row, we see that this negative impact decreases in magnitude as specialization increases. Considering that for non-core borrowers whose bank has the same exposure as the market ($Specialization = 1$) the reduction in investment amounts to 0.51% of tangible assets, the drop in investment is 60% (0.31/0.51) smaller in magnitude for firms in industries in which their bank is twice as specialized as the market. In further columns, we progressively saturate the regression with firm controls (column (3)), pre-violation yearly changes in firms' assets and tangible assets (column (4)), and the interactions of our specialization measure with firm controls (column (5)), as well as with the pre-violation yearly changes in assets and tangible assets (column (6)). The significance of our estimates is unaffected, with almost no change in the magnitude.

From this table, we learn that the real effects of sudden changes in control rights allocation,

induced by covenant violations, display an economically important heterogeneity. Lenders' specialization in the borrower's industry drives such heterogeneity. In particular, this is consistent with specialized banks requiring significantly less investment conservatism from their core customers because of their information advantages.

4.2.2 The effects on corporate performance

In addition to investment, we also examine the effect of bank specialization on firms' performance following covenant violations. Indeed, we want to ensure that the less severe intervention we document is not related to a reduction in future firm performance. That is, we want to be sure that the less severe intervention by specialized banks stems from their information advantages.

To understand whether this is the case, in columns (1) and (2) of Table 6, we first look at the effect on accounting-based measures of performance: the ratio of operating cash flow to assets and the natural log of sales. The point estimates on the interaction term are positive and significant for both outcomes. In column (3), we then look at the impact on the firm's expected default probability, which accounts for market performance, providing an external, third-party validation of the value of banks' interventions. The coefficient of the interaction term is negative and significant. Numerically, these results imply that core borrowers of a bank twice as specialized in one industry experience a 55% smaller drop in cash flows over average assets, a 27% smaller drop in sales growth, and a 25% smaller increase in the expected default probability compared to non-core borrowers, i.e., firms in industries in which the same bank has the same exposure as the market.[34] Logically, these results suggest that the greater leeway granted to core borrowers translates into more operational continuity for firms, and that market-based information points to better chances of survival.

Overall, the results indicate that, following a covenant violation, core borrowers of specialized banks on average experience smaller drops and a swifter recovery in investment, with smaller negative impacts on performance, compared to non-core borrowers. Such evidence suggests

34. The standalone coefficient on violation indicates the effect of a covenant violation for borrowers whose bank has no previous exposure to that industry (i.e., $Specialization = 0$). The magnitudes presented in this section are obtained by comparing violation outcomes of firms in industries in which the bank has the same exposure as the market (i.e., $Specialization = 1$) with firms in industries in which the bank has twice the exposure as the market (i.e., $Specialization = 2$).

that specialized banks better help borrowers improve outcomes when they obtain control rights, signifying positive real effects of specialization that operate through the lenders' influence on firms' corporate governance.

5 Assessment of Alternative Explanations

In this section, we discuss whether the results presented in Tables 2 and 5 could be explained by reasons other than industry-specific information advantages of specialized banks. We explore three other possible economic mechanisms: (i) insurance incentives stemming from a high industry market share; (ii) local knowledge spillovers implied by geographical, rather than industrial, specialization; (iii) the presence of borrower-specific knowledge (i.e., relationship lending). Then, focusing on the outcomes of covenant violations, we deepen our analysis to understand whether we may be observing a specific case of zombie lending.

5.1 High Industry Market Share

First, banks that are specialized in lending towards a given industry might also provide a relatively large share of credit to that industry, i.e., not only the *relative* concentration is high, but also the *absolute* amount of credit provided. This would point to at least two other potential explanations for our results. On the one hand, if specialization is driven by an industry-specific information advantage, it may itself result in a higher market share. Banks could offer favorable credit terms to crowd out other lenders from a given industry (as in Ioannidou & Ongena, 2010), thereby increasing both their industry market share and their industry portfolio share. If this is the case, the observed effect on contract terms could be driven by the bank's industry market share and not by specialization.

On the other hand, banks with a high market share might have incentives to offer better contract terms to borrowers for reasons unrelated to an information advantage. Specifically, Giannetti and Saidi (2019) show that banks with a high market share in an industry are more likely to internalize negative spillovers and possible systemic effects of tougher credit conditions in that industry in periods of distress. For analogous reasons, banks might have incentives to

write less strict contracts, decreasing the probability of triggering covenant violations that might be costly for borrowers operating in industries where they have a high market share.

To address these concerns, we estimate Equation (4) with the variable $Market\ Share_{b,i,t}$, defined as the fraction of credit that bank b provides to industry i relative to the total credit supplied to the industry by all banks in quarter t, averaged over 12 quarters as our baseline measure of specialization. As shown in column (1) of Table 7, the estimated coefficient for industry *Market Share* on covenant strictness is positive and statistically significant at the 1% confidence level, consistent with the evidence provided by Gorostiaga (2022). In economic terms, a 10% increase in banks' industry market share translates into 7 percentage points stricter covenants.[35] Moreover, controlling for industry market share almost doubles the estimated effect of specialization on covenant strictness, indicating that the correlation between market power and specialization may be a relevant source of downward bias.

Additionally, we estimate Equation (5) with *Market Share* as a control and its interaction with the violation dummy. As illustrated in column (1) of Table 8, the point estimates on these variables are not significant, suggesting that market power does not have a significant effect on investment following violations. At the same time, the coefficient of *Violation*×*Specialization* is essentially the same as our baseline result (see Table 5).

5.2 Geographical Proximity

Second, the literature highlights geographic distance as a significant proxy for the degree of asymmetric information between borrowers and lenders. Loans tend to have more favorable terms when borrowers are geographically closer to lenders (Agarwal & Hauswald, 2010; Degryse & Ongena, 2005), even for large corporations (Hollander & Verriest, 2016). Thus, a bank might appear specialized in an industry simply because it lends to specific locations with business concentrations in that industry and that are geographically close to the bank's headquarters. This proximity could explain our results. If this is the case, we would still interpret our findings as reflecting the information advantage of these banks. However, this advantage would derive from acquiring soft information based on geographical proximity, rather than industry-specific

35. Note that *Market Share* ranges from 0 to 1, and the estimates in the tables refer to changes in market shares of 100%.

expertise.

Including bank-firm fixed effects in our specification rules out that geographic distance drives our results to the extent that the locations of firms and banks are invariant over time. This is true for most corporations, but not for all.[36] Thus, our analysis further addresses this issue by directly controlling for geographic distance. In particular, we estimate Equations (4) and (5) including the natural logarithm of one plus the geodetic distance between the firm's and the bank's headquarters, $Distance_{f,b,t}$, computed using the available information on city and state.[37] The results are presented in Column (2) of Tables (7) and (8) for the covenant *strictness* and *violation* analyses, respectively.

The point estimates on the *Distance* variable in Table 7 and on its interaction with the violation dummy in Table 8 are both positive, in line with expectations. Still, the estimated coefficients on our variables of interest are unchanged in economic and statistical significance. In conclusion, the risk of confusing geographical and industry expertise appears small.

5.3 Relationship Lending

Third, one could argue that the industry-specific information advantage could originate from the accumulation of borrower-specific information. This would be consistent with widespread "relationship lending" (Boot, 2000). For example, Bharath, Dahiya, Saunders, and Srinivasan (2011) and Prilmeier (2017) specifically show that relationship lending affects covenants and other contract terms in syndicated loan agreements.

Although bank-firm fixed effects net out any time-invariant effect of a bank-firm relationship, we further control for the time-varying intensity of the relationship. To this end, we define $Rel.\ Intensity_{f,b,t}$, the fraction of total credit to firm f from bank b over the last 3 years before the loan inception date t. Developed by Schenone (2010), this measure has been commonly used in the context of the syndicated loan market (Bharath, Dahiya, Saunders, & Srinivasan,

36. Bai, Fairhurst, and Serfling (2020, fn. 16) document that 87.50% of firms never relocated in the years 1969–2003.

37. We use the historical data on firms' and banks' city and state available on CRSP/Compustat Merged historical tables (COMPHIST and CST_HIST) and supplement them with Compustat current header information when either the city or the state is missing. We then rely on the GoogleV3 geocoder from the `geopy` module in Python to obtain the coordinates of the firm's and bank's cities. Finally, we compute the geodesic distance using the module's 'distance' function.

2011; Prilmeier, 2017).

We estimate Equations (4) and (5) by including *Relationship Intensity* as well as, in Equation (5) only, its interaction with the violation dummy. Tables (7) and (8), in column (3), report the results from these regressions. Across all specifications, the point estimates on our main variables of interest are virtually unchanged and remain statistically significant, validating the hypothesis that banks have an information advantage that stems from industry-specific expertise and not only from borrower-specific information.

To further reinforce the notion that the information advantage is industry-specific and not borrower-specific, we show that an industry-specialized bank grants looser covenants to firms in that industry even when these firms have no previous credit relationship with that bank. We re-estimate Equation (4) by adding a dummy that takes the value 1 if the loan is not the first loan, and 0 if it is the first loan between bank b and firm f, as well as an interaction term of this dummy and our measure of specialization. Table 9 reports the results. Consistent with the relevance of an industry-specific advantage, the estimates on the stand-alone measure of specialization, which captures the effect of specialization on the first loan by a bank to a given firm, are negative and highly statistically significant. On the other hand, the estimate on the interaction term is statistically insignificant, and close to zero, suggesting that banks' industry-specific information advantage translates into less strict covenants for both their existing and new borrowers.

5.4 Zombie Lending

Finally, our results on differential covenant enforcement by specialized lenders could reflect evergreening, or zombie lending, that is a situation in which a bank keeps lending to firms approaching default to avoid recognizing loan losses on its balance sheet. In a recent contribution, Faria-e Castro, Paul, and Sánchez (2024) suggest that banks holding a large share of a firm's debt treat that firm more favorably in situations of financial distress. To the extent that industry-specialized banks represent a large source of credit for their core borrowers and covenant violations might be correlated to financial distress, this mechanism could represent an alternative explanation for our findings.

We show that this explanation is unlikely to drive our results. In Table 10, we conduct a heterogeneity analysis based on three proxies of firm quality, i.e. expected default probability, leverage, and interest coverage ratio. We are interested in understanding whether the smaller drop in investment following specialized lenders' intervention after covenant violations is driven by firms characterized by worse fundamentals. To this end, in our baseline specification described in Equation (5), we include a triple interaction term between specialization, violation status, and a dummy that takes value 1 if the firm is in the top quartile of the EDF (column 1), leverage (column 2), or has an interest coverage ratio below 1 (column 3).[38] Across the three columns of Table 10, the estimates on the triple interaction term are negative, and statistically significant for two out of the three measures of firm quality, whereas the coefficients on the interaction between specialization and violation status remain positive and highly significant. This indicates that our results are driven by firms far from financial distress, which is inconsistent with an evergreening motive and in line with the results of De Jonghe, Mulier, and Samarin (2025), who document a negative relationship between bank industry specialization and zombie lending.

6 Additional Results and Robustness Checks

Next, we carry out a battery of robustness tests for our analyses, as well as a placebo test for our covenant violation analysis.

Heterogeneity across banks. The syndicated loan market is highly concentrated, with three banks (JP Morgan, Bank of America, Citigroup) responsible for a sizable share of the total origination activity. In Tables A2 and A3, we show that the presence of these three banks does not drive our results. Specifically, we allow for a differential effect of specialization in Equations (4) and (5) by further interacting our main variables of interest with a dummy equal to 1 if the lead arranger for a given loan is one of the three largest banks, and to 0 otherwise. The estimates on both the stand-alone specialization variable in Table A2 and the interaction term between specialization and violation in Table A3 are very similar to the baseline ones, both in

38. We conduct this analysis excluding firms that experience a change in their dummy status in any of the four quarters after a violation.

economic and statistical terms. Concentration in syndicated loan origination activity does not drive out results.

Using different rolling windows to measure specialization. Our results remain unchanged if we recalculate bank specialization by averaging industry portfolio shares over 1, 2, 4, or 5 years, instead of 3 years. As shown in Tables A4 and A5, the effect of the specialization variable on covenant strictness, as well as on changes in investment after a covenant violation, remains very similar in both economic magnitude and statistical significance, regardless of the chosen rolling window. Our choice of averaging portfolio shares over a rolling window of 3 years (12 quarters) does not drive our results.

Constructing loan shares. Our results are also robust to attributing loan shares to lead arrangers by considering different loan samples or using alternative methods. In Tables A6 and A7, we present the results of re-estimating Equations (4) and (5) using a measure of specialization calculated by: In column (1), not dropping loan contracts that are likely to be restatements of existing loans; in column (2), using only loans originated from 1996 onward; in column (3), excluding term loans B, as these are most likely to be sold to institutional investors immediately after origination (Blickle, Fleckenstein, Hillenbrand, & Saunders, 2022); in column (4), by attributing loan shares to lead arrangers using the approach by Chodorow-Reich (2014); in column (5), by attributing loan shares to lead arrangers using the method by Doerr and Schaz (2021); in column (6), by attributing loan shares to lead arrangers using the approach by De Haas and Van Horen (2013). In all cases, the estimates are very similar to the baseline results, both in economic magnitude and statistical significance. Our choice of attributing the entire loan amount to the lead arrangers when constructing our specialization measure does not drive our results.

Different measures of specialization. One further concern is that our measure of specialization may put substantial weight on industries that account for a small portion of total credit. In these industries, it is easier for a single lead arranger to appear overexposed. If such cases drive our results, the economic relevance of our estimates may come into question. To address this concern, we repeat our main analyses employing three alternative measures of specialization.

The first one is *Excess Specialization*, i.e., the difference between the bank's portfolio concentration in a given industry and the entire market's concentration in the same industry (as

in Blickle et al., 2023). Following the formal notation of Section 2.1, this measure is defined as $S_{i,b,t} - S_{i,t}$. This choice allows us to reduce the weight of industries that account for small fractions of total granted credit, compared to our baseline specialization measure.[39] The second one is simply the bank's loan portfolio share in an industry (*Portfolio Share*). The third is a dummy variable that captures a bank's favorite industry, that is, the industry with the largest share in a bank's loan portfolio (*Favorite Industry*). We obtain these measures by averaging banks' industry portfolio shares over a 12-quarter rolling window, as we do for our baseline measure.

Tables A8, A9, and A10 show that our four main results remain unchanged if we employ these alternative measures of specializations. Note that the magnitudes of the coefficients are different due to the different scales of the various measures. To illustrate the results, consider, e.g., a 5% change in *Excess Specialization*. This can, e.g., result from comparing a bank with a portfolio concentration in an industry twice as large as the market's, where that industry absorbs 5% of total market credit at that time and 10% of the bank's portfolio. Tables A8, A9, and A10 respectively show that such a variation: (i) correlates with covenants that are around 4.7 percentage points looser at origination, with performance covenants driving this effect; (ii) is associated with greater dispersion in covenant strictness and All-In Drawn Spread; and (iii) leads to 26 basis points smaller decline in investment after a covenant violation for core borrowers, equating to a 52% lower reduction in investment relative to tangible assets.[40] The estimates for *Portfolio Share* are economically and statistically similar to the ones for *Excess Specialization*. Given that the two measures are based on the same scale, this is not surprising.

The estimates for *Favorite Industry* reflect the difference in banks' contracting behavior between their preferred industry and all the others. Tables A8, A9, and A10 show that such difference implies: i) 11 p.p. looser covenants, with performance covenants driving this effect; ii) greater dispersion in covenant strictness and All-In Drawn Spread; iii) a null or, if anything, positive effect on investment following a covenant violation.

39. To give an example, assume that Bank A (Bank B) lends 10% (6%) of its total portfolio to Industry A (Industry B), while market-wide lending to Industry A (Industry B) accounts for 5% (1%). According to our baseline (relative) measure of bank specialization, Banks A and B are specialized in Industries A and B by factors of 2 and 6, respectively. However, both banks' excess specialization is equal (5%) even though the ideal shares for these industries stemming from diversified portfolios are different.
40. Note that the estimates in the tables refer to a change in excess specialization of 1, i.e., a variation of 100%.

Although sometimes different in magnitude, these results remain economically relevant, statistically significant, and consistent with our baseline analysis.

Results on the covenant violation analysis with bank×industry fixed effects. We also estimate Equation (5) with additional bank × industry fixed effects.[41] This controls for all time-invariant bank-industry heterogeneity, which may arise, for instance, if banks have systematic preferences for certain industries. Nevertheless, as shown in Table A11, our main results remain robust when examining covenant violations within the same bank-industry pair.

Results on the covenant violation analysis with additional controls. Our identification strategy aims to ensure that the violation dummy only tracks the impact of the discontinuous transfer in control rights. This hinges on thoroughly accounting for smooth changes in the characteristics of firms and credit relationships. The similarity of the estimated coefficients across the different specifications in Table 5 already suggests that this is likely not the case. Nevertheless, in Table A12, we go one step further and account progressively for second- and third-order polynomials of our controls, their 4-quarter lagged version (as in Nini et al., 2012), and the interactions between all these additional variables and specialization. Our coefficients of interest only slightly decrease in magnitude, with an expected increase in noise due to the collinearity in the many interacted terms.

Placebo test on the covenant violation analysis. To confirm the credibility of our results in Table 5, we conduct a placebo test assuming that a violation happens four quarters before an actual violation. Specifically, for this analysis, we construct a placebo violation dummy that takes the value of 1 four quarters before each new violation, and 0 for all other non-violation quarters. As shown in Table A13, the effects of placebo violations, as well as their interactions with specialization, are not significant. The disappearance of our results when we deliberately misclassify violations confirms the credibility of our baseline results.

Results on the covenant violation analysis by focusing only on firms that violated a covenant before. Another concern would be that violators and non-violators might have inherent differences and thus might invalidate the comparison. To address this, we focus only on firms that violated a covenant at least once during our sample period (as in Chava & Roberts,

41. We do not estimate Equation (4) with bank × industry fixed effects, as that model already includes bank × firm fixed effects.

2008). As presented in Table A14, our results are very close to the baseline estimates in Table 5.

Results on the covenant violation analysis by focusing only on first violations. We also repeat our analysis by focusing exclusively on borrowers' first violation events, in line with Ferreira et al. (2018). Table A15 shows that the estimates are consistent with our baseline analysis. This mitigates the concern that a small sample of firms experiencing multiple violations could explain our results.

Results on the covenant violation analysis with single-bank firms. To carry out our covenant violation analysis, we link covenant violations to firms' lead lenders by relying on bank-firm relationships in DealScan. As a benchmark, we make certain assumptions to match violations to a single lender when the firm has multiple lead lenders in a given quarter (see Section 1.1 for details). In Table A16, we show that our results hold without those assumptions when we focus only on firms with a single lead lender, for which violations can be straightforwardly attributed.

7 Final Remarks

This paper documents that bank specialization in servicing certain types of borrowers is a salient feature of the U.S. syndicated loan market. It is associated with different contract characteristics and has positive real effects for borrowers. Specialized banks write looser covenants when lending to their core customers, without compensating for this by charging higher rates, reducing loan amounts, or shortening maturity. These loans exhibit greater dispersion in contract terms, suggesting more tailoring to meet borrowers' needs. Finally, when covenant violations shift control rights from borrowers to lenders, core borrowers experience only half the investment decline of non-core borrowers, with positive effects on performance.

Our results are relevant to the economic debate on bank specialization for two reasons. First, theory suggests that covenant strictness serves as a valid empirical measure of the information distance between a lender and a borrower. The greater the strictness, the larger the information distance. As such, syndicated lending allows for a direct test of theories of lender specialization predicated on comparative information advantages. Our evidence supports an explanation for lenders' relative concentration in catering to specific borrowers that is based on lower

information asymmetries, rather than, for example, the lenders' attempt to maximize the value of deposit insurance by exposing themselves to greater risks. Second, by investigating how the effects of covenant violations differ between core and non-core borrowers, we propose a novel channel for the real effects of lending specialization based on the interplay between lenders' information advantages and firms' corporate governance.

We show that banking structure can be a crucial driver not only of the price and quantity of credit, but also of how lenders design and wield control rights on their borrowers. Although we find strong positive effects of bank specialization for borrowers, we wish to end with a word of caution. Our evidence that specialized banks are better at managing their preferred assets should not be read as an overall vindication of specialization as a superior business model in the credit industry. For example, deposit concentration played a role in the demise of Silicon Valley Bank in March 2023, and specialization in serving tech corporate borrowers may have caused such concentration at least partially. Thus, although we present strong evidence of the positive asset-side effects of specialization, we point to the liability-side effects as a promising area for future research.

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4

Tables

Table 1. Descriptive Statistics

This table reports the descriptive statistics for the "Origination" and "Violations" sample after applying the selection criteria described in Section 1. The top part of Panel A refers to loan-level observations. The bottom part of Panel A and Panel B refer to observations at the firm-quarter level. All variables are described in Table A1. Changes in Investment, Operating Cash Flows / Avg. Assets, Log(Sales), EDF represent the difference between the variable at $t+4$ and at t.

	Mean	Std. Dev.	25thPct.	50thPct.	75thPct.	Obs.
PANEL A: ORIGINATION SAMPLE						
Loan variables						
Covenant Strictness	28.330	38.713	0.300	4.300	64.500	5,818
Covenant Strictness (Performance only)	24.839	37.145	0.000	2.500	39.200	5,818
Covenant Strictness (Capital only)	5.284	19.479	0.000	0.000	0.100	5,818
All-In Drawn Spread	187.083	115.151	107.500	164.568	250.000	10,099
All-In Undrawn Spread	28.402	17.109	15.000	25.000	37.500	7,083
Loan Amount ($B)	0.918	1.976	0.175	0.400	1.000	10,269
Maturity (Months)	49.890	20.109	36.000	60.000	60.000	10,170
TCB	122.961	119.885	42.795	84.753	158.322	4,709
Spread	186.009	129.583	100.000	154.167	250.000	9,981
I(PP)	0.411	0.482	0.000	0.000	1.000	10,269
N. Lenders	9.216	7.527	4.000	7.000	12.000	10,269
Revolver Fraction	0.709	0.403	0.333	1.000	1.000	10,269
Specialization	1.324	1.199	0.829	1.056	1.460	10,269
Firm variables						
Ln(Assets)	7.595	1.560	6.547	7.580	8.649	5,458
EDF	0.037	0.138	0.000	0.000	0.000	5,458
Tangibility	0.362	0.262	0.131	0.296	0.582	5,458
Leverage	0.522	3.804	−0.618	0.623	1.524	5,458
Current Ratio	1.720	0.976	1.026	1.504	2.157	5,458
Ln(1+Int. Cover. Ratio)	2.268	0.938	1.608	2.126	2.779	5,458
Market-to-Book	1.640	0.816	1.094	1.386	1.916	5,458
Rated	0.581	0.493	0.000	1.000	1.000	5,458
Rating	4.593	0.965	4.000	5.000	5.000	3,173
PANEL B: VIOLATIONS SAMPLE						
Violation	0.013	0.115	0.000	0.000	0.000	55,139
Specialization	1.409	1.536	0.825	1.063	1.480	55,139
Ln(Assets)	7.418	1.563	6.397	7.433	8.483	55,139
EDF	0.048	0.158	0.000	0.000	0.001	55,139
Tangibility	0.340	0.255	0.124	0.266	0.533	55,139
Leverage	0.339	3.782	−1.021	0.517	1.383	55,139
Current Ratio	1.862	1.041	1.127	1.643	2.320	55,139
Ln(1+Int. Cover. Ratio)	2.289	0.966	1.619	2.150	2.811	55,139
Market-to-Book	1.607	0.801	1.082	1.368	1.859	55,139
Investment	0.051	0.038	0.025	0.041	0.065	54,821
CapEx ($M)	64.588	118.616	4.378	15.782	57.433	54,828
Change in Investment	−0.002	0.034	−0.013	−0.000	0.011	53,031
Change in Oper. Cash Flow / Avg. Assets	−0.005	0.047	−0.018	−0.001	0.015	52,287
Change in Log(Sales)	0.047	0.253	−0.029	0.055	0.136	53,379
Change in EDF	0.006	0.177	−0.000	0.000	0.000	50,091

Table 2. The Effect of Bank Specialization on Covenant Strictness

This table reports the estimates of the coefficients from the following regression over the "origination" sample from 1996 to 2019:

$$Y_{l,f,i,b,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{b,f} + \beta \cdot Specialization_{b,i,t-1} + \gamma_F \cdot X_{f,t} + \gamma_L \cdot X_{l,f,i,b,t} + \varepsilon_{l,f,i,b,t}$$

where $Y_{l,f,i,b,t}$ is the measure of covenant strictness for loan l contracted in year-quarter t between bank b and firm f (in industry i), computed using all covenants (columns 1 to 3), performance covenants only (column 4) and capital covenants only (column 5). $Specialization_{b,i,t-1}$ is the ratio of bank b's portfolio share in industry i at quarter $t-1$ (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at quarter $t-1$ (averaged over a rolling 12-quarter window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{b,f}$ are respectively bank×year-quarter, industry×year-quarter, and bank×firm fixed effects. $X_{f,t}$ includes the firm controls reported in the table, plus separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings. X_l includes the loan controls reported in the table, plus separate intercepts for different loan purposes (Corporate Purposes, Working Capital, Debt Repayment, Takeover, CP Backup). All variables are described in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Covenant Strictness				
	All			Performance only	Capital only
	(1)	(2)	(3)	(4)	(5)
Specialization	−6.71***	−6.96***	−7.14***	−8.52***	−0.09
	(−4.17)	(−4.19)	(−4.31)	(−6.82)	(−0.080)
Ln(Assets)		2.38	3.00	1.54	−0.74
		(1.05)	(1.63)	(1.23)	(−0.54)
EDF		5.73	5.76	14.98*	−11.76*
		(0.65)	(0.66)	(1.73)	(−1.76)
Tangibility		−32.23***	−32.69***	−46.00***	−0.84
		(−6.27)	(−5.52)	(−8.42)	(−0.15)
Leverage		−0.24**	−0.24**	−0.21	0.02
		(−2.47)	(−2.17)	(−1.51)	(0.32)
Current Ratio		−3.58***	−3.68***	−1.84	−3.22***
		(−3.05)	(−3.09)	(−1.33)	(−4.01)
Ln(1+Int. Cover. Ratio)		−19.08***	−19.00***	−20.29***	−1.73
		(−13.1)	(−13.4)	(−18.2)	(−1.14)
Market-to-Book		−1.71	−1.84	0.34	−1.78
		(−0.63)	(−0.70)	(0.19)	(−1.10)
Ln(Loan Maturity)			−1.10	−1.88	−0.19
			(−0.54)	(−1.32)	(−0.15)
Ln(Lenders)			−0.50	0.85	−0.73
			(−0.38)	(0.82)	(−0.65)
Ln(Loan Amount)			−0.72	−2.43	1.95
			(−0.31)	(−1.28)	(1.61)
Revolver Fraction			3.58	1.81	3.23
			(1.53)	(0.75)	(1.57)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Bank × Firm FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Rating Dummies	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Loan Purpose Dummies	*No*	*No*	*Yes*	*Yes*	*Yes*
Adj. R^2	.513	.577	.577	.608	.386
Obs.	3,258	3,258	3,258	3,258	3,258

Table 3. The Effect of Bank Specialization on Other Contract Terms

This table reports the estimates of the coefficients from the following regression over the full "origination" sample from 1996 to 2019:

$$Y_{l,f,i,b,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{b,f} + \beta \cdot Specialization_{b,i,t-1} + \gamma_F \cdot X_{f,t} + \varepsilon_{l,f,i,b,t}$$

where $Y_{l,f,i,b,t}$ is one of the variables indicated in each column for loan l contracted in year-quarter t by bank b to firm f (in industry i). $Specialization_{b,i,t-1}$ is the ratio of bank b's portfolio share in industry i at quarter $t-1$ (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at quarter $t-1$ (averaged over a rolling 12-quarter window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{b,f}$ are respectively bank×year-quarter, industry×year-quarter, and bank×firm fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, plus separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings. All variables are described in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Price Terms				Non-Price Terms		
	Loan Spread	AISD	AISU	TCB	Maturity	Loan Amount	I(PP)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Specialization	−2.20	1.04	0.43	−10.29	0.00	0.03	0.03
	(−0.54)	(0.31)	(1.19)	(−1.55)	(0.028)	(1.16)	(1.57)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Bank × Firm FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Adj. R^2	.674	.718	.76	.644	.362	.721	.282
Obs.	7,388	7,438	4,483	2,800	7,438	7,438	7,438

Table 4. Bank Specialization and Dispersion of Key Contract Terms

This table reports the estimates of the coefficients from the following regression over the full sample from 1996 to 2019:

$$Y_{b,i,t} = \alpha_{b,t} + \alpha_{i,t} + \beta \cdot \textit{Specialization (Yearly)}_{b,i,t} + \varepsilon_{b,i,t}$$

where $Y_{b,i,t}$ is one of the measures of dispersion of either covenant strictness or All-In Drawn Spread as indicated in the columns below, calculated using the distribution of all loans by bank b to industry i in year t. *Specialization (Yearly)*$_{b,i,t}$ is the yearly average (from quarter Q4 of year $t-1$ to Q3 of year t) of the quarterly ratios of bank b's portfolio share in industry i (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at quarter $t-1$ (averaged over a rolling 12-quarter window). $\alpha_{b,t}$ and $\alpha_{i,t}$ are respectively bank×year and industry×year fixed effects. t statistics (in parentheses) are obtained from two-way clustering at the bank and industry×year level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Covenant Strictness				All-In Drawn Spread			
	Diff(Max, Min)	Interquartile Range	Std. Dev.	Kurtosis	Diff(Max, Min)	Interquartile Range	Std. Dev.	Kurtosis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specialization (Yearly)	2.072***	1.080*	−0.037	0.047**	7.753***	0.340	0.966*	0.076***
	(3.28)	(1.76)	(−0.13)	(2.24)	(4.38)	(0.44)	(1.74)	(4.20)
Adj. R^2	.24	.117	.146	.153	.245	.072	.084	.298
Obs.	2,890	2,890	2,020	1,928	3,311	3,311	3,255	3,178

Table 5. Bank Specialization and Firm Investment: Analysis of Covenant Violations

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times Violation_{f,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of firm f's main bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment					
	(1)	(2)	(3)	(4)	(5)	(6)
Violation	−0.0039***	−0.0082***	−0.0088***	−0.0084***	−0.0085***	−0.0082***
	(−3.15)	(−5.40)	(−5.77)	(−5.52)	(−5.68)	(−5.32)
Specialization	0.0001	0.0000	−0.0000	−0.0001	0.0023*	0.0016
	(0.45)	(0.24)	(−0.12)	(−0.26)	(1.81)	(1.17)
Violation×Specialization		0.0031***	0.0031***	0.0031***	0.0030***	0.0030***
		(3.92)	(4.04)	(3.95)	(3.91)	(3.56)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*No*	*No*	*No*	*Yes*	*No*	*Yes*
Firm Controls × Spec	*No*	*No*	*No*	*No*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*No*	*No*	*No*	*No*	*No*	*Yes*
R^2	.12	.12	.122	.137	.122	.138
Obs.	52,517	52,517	52,517	52,517	52,517	52,517

Table 6. Bank Specialization and Firm Performance

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times Violation_{f,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in the variable indicated in each column from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of firm f's main bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Oper. Cash Flow / Avg. Assets	Change in Log(Sales)	Change in EDF
	(1)	(2)	(3)
Violation	−0.0090***	−0.0481**	0.0484***
	(−3.12)	(−2.37)	(5.87)
Specialization	0.0007	−0.0024	0.0005
	(0.32)	(−0.37)	(0.100)
Violation×Specialization	0.0032**	0.0102*	−0.0098**
	(2.32)	(1.73)	(−2.18)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*
Firm Controls	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*Yes*	*Yes*	*Yes*
Firm Controls × Spec	*Yes*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*Yes*	*Yes*	*Yes*
R^2	.201	.293	.512
Obs.	51,657	52,755	49,501

Table 7. Bank Specialization and Covenant Strictness: Other Explanations

This table reports the estimates of the coefficients from the following regression over the "origination" sample from 1996 to 2019:

$$Y_{l,f,i,b,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{b,f} + \beta \cdot Specialization_{b,i,t-1} + \delta \cdot Other\ Var_{b,f,i,t-1} + \gamma_F \cdot X_{f,t} + \gamma_L \cdot X_{l,f,i,b,t} + \varepsilon_{l,f,i,b,t}$$

where $Y_{l,f,i,b,t}$ is the measure of covenant strictness (computed using all covenants) for loan l contracted in year-quarter t between bank b and firm f (in industry i). $Specialization_{b,i,t-1}$ is the ratio of bank b's portfolio share in industry i at quarter $t-1$ (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at quarter $t-1$ (averaged over a rolling 12-quarter window). *Other Var* is one of the other variables reported in the table. $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{b,f}$ are respectively bank×year-quarter, industry×year-quarter, and bank×firm fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, plus separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings. $X_{l,f,i,b,t}$ is the vector of loan-level controls reported in Table 2, plus separate intercepts for different loan purposes (Corporate Purposes, Working Capital, Debt Repayment, Takeover, CP Backup). All variables are described in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Covenant Strictness		
	(1)	(2)	(3)
Specialization	−13.49***	−7.17***	−7.10***
	(−4.27)	(−4.32)	(−4.40)
Market Share	74.50***		
	(3.74)		
Ln(1+Distance)		0.80	
		(0.66)	
Rel. Intensity			−0.55
			(−0.29)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*
Bank × Firm FE	*Yes*	*Yes*	*Yes*
Firm Controls	*Yes*	*Yes*	*Yes*
Loan Controls	*Yes*	*Yes*	*Yes*
Adj. R^2	.578	.577	.576
Obs.	3,258	3,256	3,258

Table 8. Bank Specialization and Firm Investment: Other Explanations

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times Violation_{f,t} + \theta_4 \cdot Other\ Var_{b,f,i,t} + \theta_5 \cdot Violation \times Other\ Var_{b,f,i,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of firm f's main bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). $Other\ Var_{b,f,i,t}$ is one of the other variables reported in the table. $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is a vector of firm-level controls consisting of all those included in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment		
	(1)	(2)	(3)
Violation	−0.0089***	−0.0209***	−0.0011
	(−3.70)	(−3.24)	(−0.25)
Specialization	0.0016	0.0021	0.0016
	(1.16)	(1.45)	(1.16)
Violation×Specialization	0.0030***	0.0029***	0.0030***
	(3.57)	(2.98)	(3.52)
Market Share	0.0008		
	(0.44)		
Violation×Market Share	0.0046		
	(0.62)		
Ln(1+Distance)		0.0001*	
		(1.87)	
Violation×Ln(1+Distance)		0.0019*	
		(1.90)	
Rel. Intensity (Qtr)			−0.0013**
			(−2.20)
Violation×Rel. Intensity (Qtr)			−0.0080*
			(−1.77)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*
Firm Controls	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*Yes*	*Yes*	*Yes*
Firm Controls × Spec	*Yes*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*Yes*	*Yes*	*Yes*
R^2	.138	.141	.138
Obs.	52,517	50,234	52,517

Table 9. Bank Specialization and Covenant Strictness: First-Time Borrowers

This table reports the estimates of the coefficients from the following regression over the "origination" sample from 1996 to 2019:

$$Y_{l,f,i,b,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{b,f} + \beta \cdot Specialization_{b,i,t-1} + \delta \cdot \mathbb{I}(No\ First\ Loan)_{b,f,l,t} + \theta \cdot Specialization_{b,i,t-1} \times \mathbb{I}(No\ First\ Loan)_{b,f,l,t} + \gamma_F \cdot X_{f,t} + \gamma_L \cdot X_{l,f,i,b,t} + \varepsilon_{l,f,i,b,t}$$

where $Y_{l,f,i,b,t}$ is the measure of covenant strictness for loan l contracted in year-quarter t between bank b and firm f (in industry i), computed using all covenants (columns 1 to 3), performance covenants only (column 4) and capital covenants only (column 5). $Specialization_{b,i,t-1}$ is the ratio of bank b's portfolio share in industry i at quarter $t-1$ (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at quarter $t-1$ (averaged over a rolling 12-quarter window). $\mathbb{I}(No\ First\ Loan)_{b,f,l,t}$ is a dummy that takes value 0 if loan l at time t is the first loan between bank b and firm f, and 1 otherwise. $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{b,f}$ are respectively bank×year-quarter, industry×year-quarter, and bank×firm fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, plus separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings. $X_{l,f,i,b,t}$ is the vector of loan-level controls reported in Table 2, plus separate intercepts for different loan purposes (Corporate Purposes, Working Capital, Debt Repayment, Takeover, CP Backup). All variables are described in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Covenant Strictness				
	All			Performance only	Capital only
	(1)	(2)	(3)	(4)	(5)
Specialization	−5.90**	−7.40***	−8.22***	−9.82***	0.70
	(−2.37)	(−2.77)	(−3.22)	(−5.84)	(0.42)
𝕀(No First Loan)	−4.05	−3.49	−4.56	−7.87**	4.02**
	(−1.19)	(−0.97)	(−1.34)	(−2.37)	(2.46)
𝕀(No First Loan) × Specialization	−0.85	0.54	1.31	1.63	−0.98
	(−0.26)	(0.17)	(0.42)	(0.63)	(−0.64)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Bank × Firm FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Loan Controls	*No*	*No*	*Yes*	*Yes*	*Yes*
Adj. R^2	.513	.577	.577	.61	.387
Obs.	3,258	3,258	3,258	3,258	3,258

Table 10. Bank Specialization and Firm Investment: Heterogeneity across Firm Quality

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019:

$$
\begin{aligned}
Y_{f,t+4} - Y_{f,t} = {} & \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} \\
& + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot \mathbb{I}(z = Z) + \theta_4 \cdot Specialization_{b,i,t} \times Violation_{f,t} \\
& + \theta_5 \cdot Violation \times \mathbb{I}(z = Z) + \theta_6 \cdot Specialization_{b,i,t} \times \mathbb{I}(z = Z) + \theta_7 \cdot Specialization_{b,i,t} \times Violation_{f,t} \times \mathbb{I}(z = Z) \\
& + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + + \varepsilon_{f,b,t}
\end{aligned}
$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of firm f's main bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). $\mathbb{I}(z = Z)$ is a dummy equal to 1 if a firm at time t an EDF in top quartile (column 1); a leverage in the top quartile (column 2); an interest coverage ratio below 1 (column 3); and to 0 otherwise. $X_{f,t}$ is a vector of firm-level controls consisting of all those included in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

Dependent variable:	Z indicates:		
Change in Investment	High EDF	High Leverage	Low Interest Coverage
	(1)	(2)	(3)
Violation	−0.0116***	−0.0098***	−0.0074***
	(−3.03)	(−3.20)	(−3.74)
Specialization	0.0020	0.0015	0.0013
	(1.16)	(1.02)	(0.86)
Violation×Specialization	0.0073***	0.0046**	0.0029***
	(5.77)	(2.47)	(3.08)
$\mathbb{I}(z = Z)$	−0.0020*	−0.0016***	−0.0075***
	(−1.84)	(−2.70)	(−5.82)
Violation×$\mathbb{I}(z = Z)$	0.0127	0.0175*	0.0141**
	(1.50)	(1.86)	(2.50)
$\mathbb{I}(z = Z)$×Specialization	−0.0009	0.0008**	0.0022***
	(−1.26)	(2.08)	(2.74)
Violation×$\mathbb{I}(z = Z)$×Specialization	−0.0108***	−0.0126**	−0.0036
	(−3.06)	(−2.21)	(−0.75)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*
Firm Controls	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*Yes*	*Yes*	*Yes*
Firm Controls × Spec	*Yes*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*Yes*	*Yes*	*Yes*
R^2	.14	.14	.139
Obs.	51,576	51,819	52,193

Figures

Figure 1. Comparison Between Portfolio Concentration of the Average Bank and the "Market"

This figure plots on the y-axis the *HHI* measure of loan portfolio concentration, and on the x-axis the year at which it is recorded. *HHI* is computed for the Market (blue, dashed line) and Average Bank (red, solid line) portfolios over each year-quarter. A higher value of *HHI* implies that lending to sectors is more concentrated in the market/average bank's portfolio.

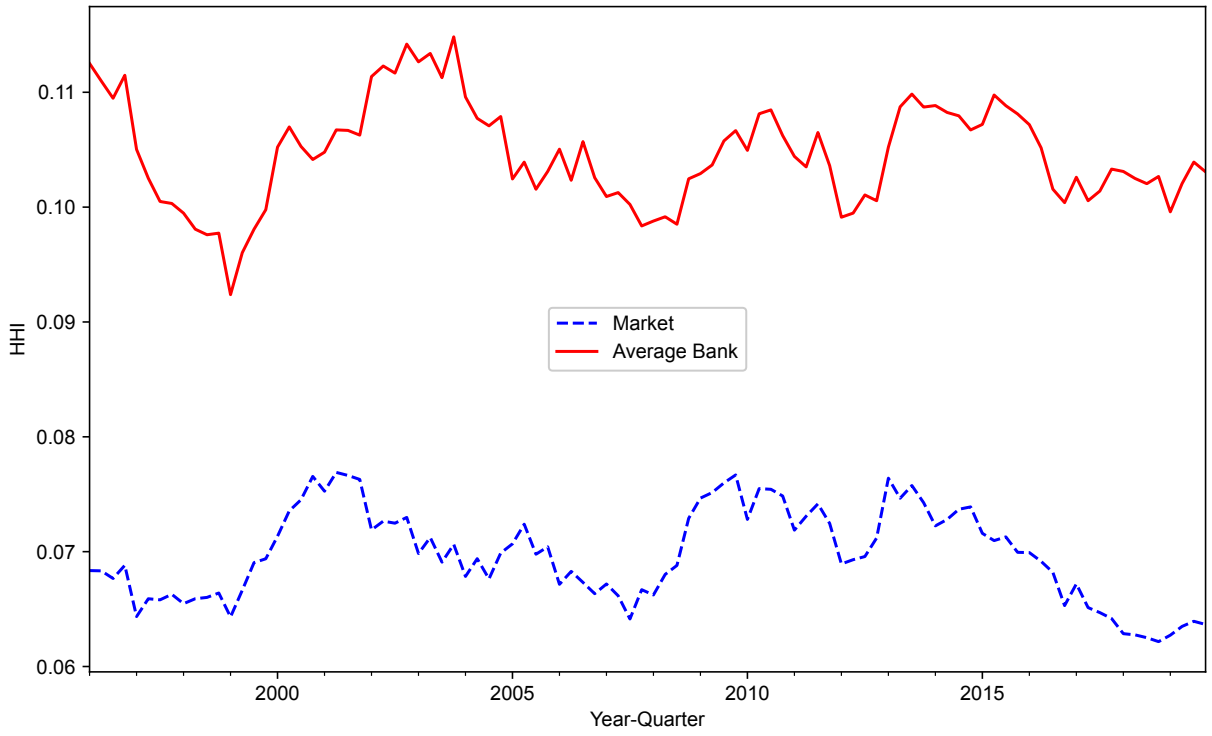


Figure 2. Specialization Is Common Across Industries and Time

This figure presents evidence of specialization in lending towards specific industries in four different moments: 2000q2, 2005q2, 2010q2, 2015q2. Each subfigure reports the box-plot graph, for each of the 25 TFIC industries, of the distribution of banks' demeaned loan portfolio shares in a given industry. Each dot represents an outlier, indicating banks specialized in that industry.

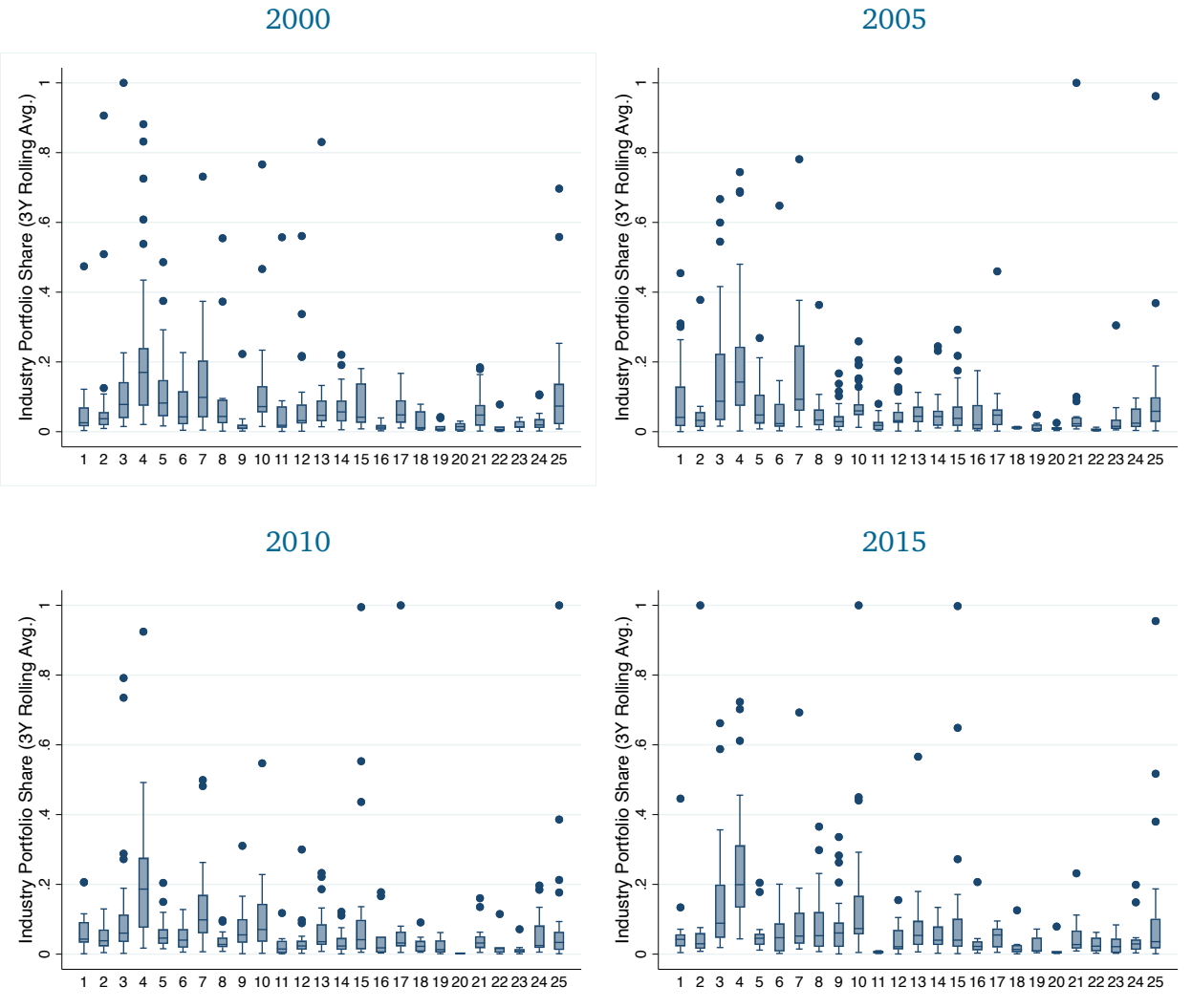


Figure 3. Specialization Is Persistent Over Time

This figure plots the *n*-year autocorrelation of the relative portfolio share, averaged at the bank-year-sector level, where *n* takes value from 1 to 10.

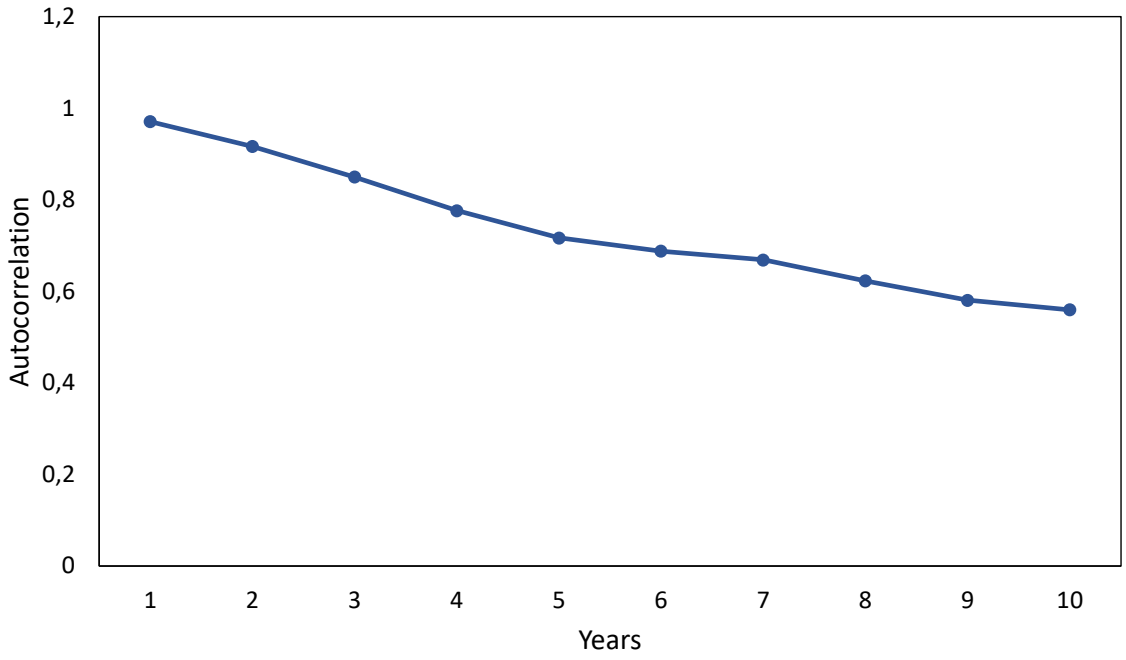
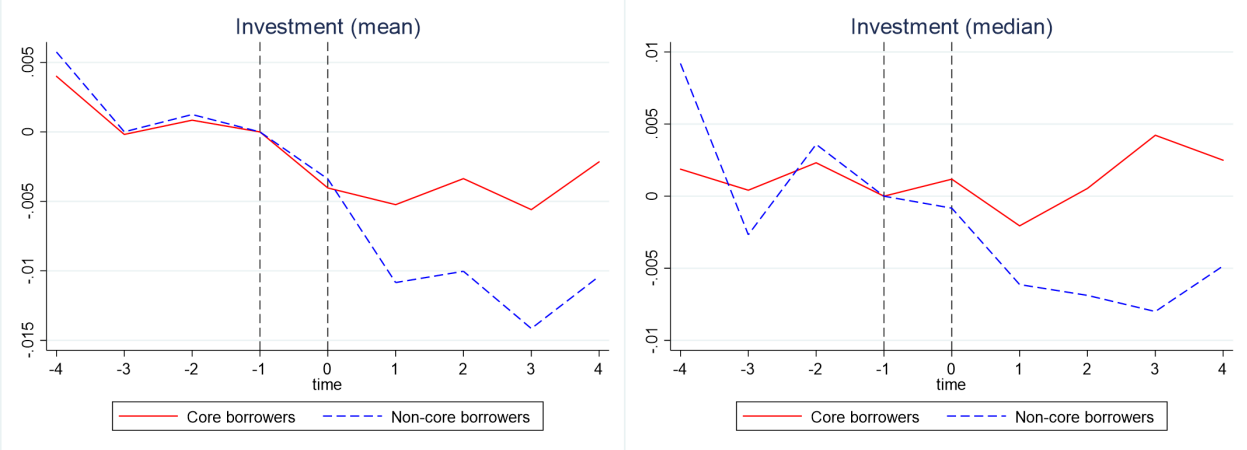


Figure 4. Violations Impact Core Customers' Investment Less

This figure plots the mean (left) and median (right) of investment four quarters before and after covenant violations, separately for core and non-core customers. For this plot, we define core borrowers as firms operating in the industry where their lender has the highest 12-quarter averaged portfolio share (i.e., the bank's favorite industry), and non-core borrowers as those operating in other industries. For comparability, we normalize the y-axis so the figures for core and non-core borrowers are set to zero in quarter $t-1$, i.e., the y-axis demonstrates the value in each quarter relative to $t-1$.



Appendix

Table A1. Variable Definitions

Variable Name	Definition	Data Source	Unit
Specialization	Ratio of the share of an industry in the bank's lending portfolio relative to the share of an industry in the entire lending market (defined in Equation (1))	Dealscan	float
Specialization (nY)	Defined in Equation (1), obtained averaging over $4 \times n$ quarters	Dealscan	float
Excess Specialization	Difference between the share of an industry in the bank's lending portfolio and the share of an industry in the entire lending market (defined in Section 6)	Dealscan	float $(-1, 1)$
Portfolio Share	Share of an industry in bank's portfolio	Dealscan	float $[0, 1]$
Favorite Industry	Dummy equal to 1 if industry has the largest share in the bank's portfolio, 0 otherwise	Dealscan	int (0/1)
EDF	See Bharath and Shumway (2008), pp. 1247-48	CRSP/ Compustat	float (%)
Assets	`atq`	Compustat	USD Mil
Average Assets	$[\text{Assets}(t) + \text{Assets}(t-1)]/2$	Compustat	USD Mil
Tangible Assets	`ppentq`	Compustat	USD Mil
Tangibility	Tangible Assets/Assets	Compustat	float
Tangible Net Worth	`atq - intanq - ltq`	Compustat	float
Leverage	(`dlttq` + `dlcq`)/Tangible Net Worth	Compustat	float
Current Ratio	`actq/lctq`	Compustat	float
Operating Cash Flows	Rolling 4-qtr sum of `oibdq`	Compustat	float
Int. Cover. Ratio	Operating Cash Flows/Rolling 4-qtr sum of `xintq`	Compustat	float
Equity Market Cap	`prccq`×`cshoq`	Compustat	float
Book Equity	`atq - ltq + txditcq`	Compustat	float
Market to Book	(Equity Market Cap - Book Equity + Assets)/Assets	Compustat	float
Capital Expenditures	$\texttt{capxy}(t,Q) - \sum_{q=1}^{Q-1} \texttt{capxy}(t,q)$, where $Q \in \{1,2,3,4\}$	Compustat	float
Investment	Capital Expenditures/Tangible Assets	Compustat	float
Sales	`saleq`	Compustat	float
Rated	Dummy variable equal to 1 if firm-quarter has a long-term issuer credit rating, and to 0 otherwise	Capital IQ	int (0/1)
Rating	Categorical variable equal to 1 for credit rating "AAA", to 2 for "AA", ... , to 9 for "D"/"SD" (indicating default)	Capital IQ	int

Table A1. Variable Definitions

N. Loans	Number of packages per borrower over sample period	Dealscan	int
Covenant Strictness	Ex-ante probability of violating a financial covenant. See Demerjian and Owens (2016)	Dealscan	float (%)
Covenant Strictness (Performance only)	Ex-ante probability of violating a performance covenant. See Demerjian and Owens (2016)	Dealscan	float (%)
Covenant Strictness (Capital only)	Ex-ante probability of violating a capital covenant. See Demerjian and Owens (2016)	Dealscan	float (%)
Violation	Dummy equal to 1 if the firm violates a covenant in a quarter for the first time in 4 quarters, missing if another violation occurs in previous 4 quarters, 0 otherwise	SEC	int (0/1)
Violation (First)	Dummy equal to 1 if the firm violates a covenant in a quarter for the first time, 0 otherwise (missing for any subsequent violations)	SEC	int (0/1)
AISD (All-In Spread Drawn)	Average of each facility's `allindrawn` in package weighted by `facilityamt`	Dealscan	basis points
AISU (All-In Spread Undrawn)	Average of each facility's `allinundrawn` in package weighted by `facilityamt`	Dealscan	basis points
Spread over Libor	Average of each facility's `maxbps_libor` in package weighted by `facilityamt`	Dealscan	basis points
TCB	Total cost of borrowing (see Berg et al. 2016)	Dealscan	basis points
I(PP)	Average of each facility's dummy equal to 1 if facility has performance pricing grid, weighted by `facilityamt`	Dealscan	float (%)
Loan Amount	Ln(`dealamount`)	Dealscan	USD
Maturity	Ln(average of each facility's `maturity` in package weighted by `facilityamt`)	Dealscan	months
Lenders	Ln(N. syndicate members)	Dealscan	int
Revolver Fraction	Revolver credit amount in package / `dealamount`	Dealscan	float
Rel. Intensity	Fraction of credit that the firm obtained from the bank over the total amount of credit the firm received in the last 3 years	Dealscan	float $[0,1]$
Rel. Intensity (Qtr.)	Fraction of outstanding credit the firm has with the bank at t over the firm's total credit outstanding at t	Dealscan	float $[0,1]$
Market Share	Fraction of credit that the bank provides to the industry relative to the total credit supplied to the industry by all banks	Dealscan	float $[0,1]$
Distance	Geodesic distance between a firm's and a bank's city of headquarter	Compustat/ SEC	float

Table A2. Bank Specialization and Covenant Strictness: Heterogeneity Across Banks

This table reports the estimates of the coefficients from the following regression over the "origination" sample from 1996 to 2019:

$$Y_{l,f,i,b,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{b,f} + \beta \cdot Specialization_{b,i,t-1} + \theta \cdot Specialization_{b,i,t-1} \times \mathbb{I}(Big\ 3)_b + \gamma_F \cdot X_{f,t} + \gamma_L \cdot X_{l,f,i,b,t} + \varepsilon_{l,f,i,b,t}$$

where $Y_{l,f,i,b,t}$ is the measure of covenant strictness for loan l contracted in year-quarter t between bank b and firm f (in industry i), computed using all covenants (columns 1 to 3), performance covenants only (column 4) and capital covenants only (column 5). $Specialization_{b,i,t-1}$ is the ratio of bank b's portfolio share in industry i at quarter $t-1$ (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at quarter $t-1$ (averaged over a rolling 12-quarter window). $\mathbb{I}(Big\ 3)_b$ is a dummy that takes the value 1 if JP Morgan Chase, Bank of America, or Citigroup granted the loan, and 0 otherwise. $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{b,f}$ are respectively bank×year-quarter, industry×year-quarter, and bank×firm fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, plus separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings. $X_{l,f,i,b,t}$ is the vector of loan-level controls reported in Table 2, plus separate intercepts for different loan purposes (Corporate Purposes, Working Capital, Debt Repayment, Takeover, CP Backup). All variables are described in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Covenant Strictness				
	All			Performance only	Capital only
	(1)	(2)	(3)	(4)	(5)
Specialization	−6.42**	−9.58***	−9.56***	−10.50***	−1.20
	(−2.76)	(−3.59)	(−3.61)	(−6.73)	(−0.82)
$\mathbb{I}(Big3)\times$ Specialization	−0.85	7.68*	7.09	5.81*	3.24
	(−0.21)	(1.71)	(1.68)	(1.71)	(1.12)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Bank × Firm FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Loan Controls	*No*	*No*	*Yes*	*Yes*	*Yes*
Adj. R^2	.512	.577	.577	.608	.386
Obs.	3,258	3,258	3,258	3,258	3,258

Table A3. Bank Specialization and Firm Investment: Heterogeneity Across Banks

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times Violation_{f,t} + \theta_4 \cdot Violation \times \mathbb{I}(Big\ 3)_b$$
$$+ \theta_5 \cdot Specialization_{b,i,t} \times \mathbb{I}(Big\ 3)_b + \theta_6 \cdot Specialization_{b,i,t} \times Violation_{f,t} \times \mathbb{I}(Big\ 3)_b + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of bank b's portfolio share in industry i at quarter t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at quarter t (averaged over a rolling 12-quarter window). $\mathbb{I}(Big\ 3)_b$ is a dummy that takes the value 1 if JP Morgan Chase, Bank of America, or Citigroup is firm f's main bank at time t, and 0 otherwise. $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment					
	(1)	(2)	(3)	(4)	(5)	(6)
Violation	−0.0039***	−0.0095***	−0.0103***	−0.0095***	−0.0100***	−0.0093***
	(−3.15)	(−2.96)	(−3.24)	(−2.91)	(−3.14)	(−2.81)
Specialization	0.0001	0.0000	−0.0000	−0.0001	0.0023*	0.0016
	(0.45)	(0.12)	(−0.16)	(−0.27)	(1.80)	(1.16)
Violation×Specialization		0.0033***	0.0033***	0.0032***	0.0032***	0.0031***
		(3.72)	(3.88)	(3.71)	(3.72)	(3.35)
Violation×$\mathbb{I}(Big3)$		0.0021	0.0023	0.0009	0.0024	0.0010
		(0.49)	(0.56)	(0.23)	(0.58)	(0.24)
$\mathbb{I}(Big3)$×Specialization		0.0003	0.0001	0.0001	0.0001	0.0001
		(0.70)	(0.31)	(0.14)	(0.35)	(0.29)
Violation×$\mathbb{I}(Big3)$×Specialization		−0.0001	−0.0000	0.0008	−0.0001	0.0008
		(−0.073)	(−0.026)	(0.59)	(−0.071)	(0.54)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*No*	*No*	*No*	*Yes*	*No*	*Yes*
Firm Controls × Spec	*No*	*No*	*No*	*No*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*No*	*No*	*No*	*No*	*No*	*Yes*
R^2	.12	.12	.122	.137	.122	.138
Obs.	52,517	52,517	52,517	52,517	52,517	52,517

Table A4. Bank Specialization and Covenant Strictness: Alternative Time Windows to Compute Specialization

This table reports the estimates of the coefficients on the *Specialization* variable—built based on portfolio shares averaged over different time windows—from the following regression over the "origination" sample from 1996 to 2019:

$$Y_{l,f,i,b,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{b,f} + \beta \cdot \textit{Specialization (nY)}_{b,i,t-1} + \gamma_F \cdot X_{f,t} + \gamma_L \cdot X_{l,f,i,b,t} + \varepsilon_{l,f,i,b,t}$$

where $Y_{l,f,i,b,t}$ is the measure of covenant strictness (computed using all covenants) for loan l contracted in year-quarter t between bank b and firm f (in industry i). *Specialization (nY)*$_{b,i,t-1}$ is the ratio of bank b's portfolio share in industry i at quarter $t-1$ (averaged over a rolling $4 \times n$-year window) relative to the market-wide share of credit to industry i at quarter $t-1$ (averaged over a rolling $4 \times n$-year window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{b,f}$ are respectively bank×year-quarter, industry×year-quarter, and bank×firm fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, plus separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings. $X_{l,f,i,b,t}$ is the vector of loan-level controls reported in Table 2, plus separate intercepts for different loan purposes (Corporate Purposes, Working Capital, Debt Repayment, Takeover, CP Backup). t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Covenant Strictness				
	(1)	(2)	(3)	(4)	(5)
Specialization (1Y)	-5.26^{***}				
	(-3.19)				
Specialization (2Y)		-6.60^{***}			
		(-3.58)			
Specialization			-7.14^{***}		
			(-4.31)		
Specialization (4Y)				-6.04^{***}	
				(-3.48)	
Specialization (5Y)					-4.90^{**}
					(-2.14)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Bank × Firm FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Loan Controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Adj. R^2	.576	.579	.577	.576	.573
Obs.	3,322	3,292	3,258	3,178	3,067

Table A5. Bank Specialization and Firm Investment: Alternative Time Windows

This table reports the estimates of the coefficients on the *Specialization* variable—built based on portfolio shares averaged over different time windows—from the following regression over the "violations" sample from 1996 to 2019:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization\ (nY)_{b,i,t} + \theta_3 \cdot Specialization\ (nY)_{b,i,t} \times Violation_{f,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization\ (nY)_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization\ (nY)_{b,i,t}$ is the ratio of bank b's portfolio share in industry i at time $t-1$ (averaged over a rolling $4 \times n$-year window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling $4 \times n$-year window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment				
	(1)	(2)	(3)	(4)	(5)
Violation	−0.0077***	−0.0078***	−0.0082***	−0.0087***	−0.0080***
	(−4.40)	(−4.89)	(−5.32)	(−5.60)	(−4.73)
Specialization (1Y)	0.0018*				
	(1.97)				
Violation×Specialization (1Y)	0.0029***				
	(3.22)				
Specialization (2Y)		0.0021*			
		(1.70)			
Violation×Specialization (2Y)		0.0026***			
		(2.95)			
Specialization			0.0016		
			(1.17)		
Violation×Specialization (3Y)			0.0030***		
			(3.56)		
Specialization (4Y)				0.0012	
				(0.84)	
Violation×Specialization (4Y)				0.0031***	
				(3.62)	
Specialization (5Y)					0.0010
					(0.67)
Violation×Specialization (5Y)					0.0027***
					(2.97)
R^2	.141	.141	.138	.137	.136
Obs.	54,432	53,484	52,517	51,368	50,131

Table A6. Bank Specialization and Covenant Strictness: Alternative Assumptions for the Computation of Specialization Measure

This table reports the estimates of the coefficients from the following regression over the "origination" sample from 1996 to 2019:

$$Y_{l,f,i,b,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{b,f} + \beta \cdot Specialization_{b,i,t-1} + \gamma_F \cdot X_{f,t} + \gamma_L \cdot X_{l,f,i,b,t} + \varepsilon_{l,f,i,b,t}$$

where $Y_{l,f,b,t}$ is the measure of covenant strictness for loan l contracted in year-quarter t between bank b and firm f (in industry i), computed using all covenants (columns 1 to 3), performance covenants only (column 4) and capital covenants only (column 5). $Specialization_{b,i,t-1}$ is the ratio of bank b's portfolio share in industry i at quarter $t-1$ (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at quarter $t-1$ (averaged over a rolling 12-quarter window). Specialization is calculated using: in columns (1), all loans, without dropping loan contracts that are likely to be restatements of existing loans; in columns (2), only loans originated from 1996 onward; in columns (3), excluding term loans B; in columns (4), by attributing loan shares to lead arrangers as in Chodorow-Reich (2014); in columns (5), by attributing loan shares to lead arrangers as in Doerr and Schaz (2021); and in columns (6), by attributing loan shares to lead arrangers as in De Haas and Van Horen (2013). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{b,f}$ are respectively bank×year-quarter, industry×year-quarter, and bank×firm fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, plus separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings. $X_{l,f,i,b,t}$ is the vector of loan-level controls reported in Table 2, plus separate intercepts for different loan purposes (Corporate Purposes, Working Capital, Debt Repayment, Takeover, CP Backup). t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Covenant Strictness					
	Starting Samples			Loan Share Attribution Methods		
	Amend/Restate	From 1996	No Term Loans B	Chodorow-Reich (2014)	Doerr & Schaz (2021)	De Haas & Van Horen (2013)
	(1)	(2)	(3)	(4)	(5)	(6)
Specialization	−6.7***	−7.1***	−7.08***	−4.56***	−4.82***	−6.83***
	(−5.08)	(−4.31)	(−3.90)	(−3.62)	(−3.59)	(−4.41)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Bank × Firm FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Loan Controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Adj. R^2	.577	.581	.577	.576	.576	.577
Obs.	3,260	3,252	3,258	3,258	3,258	3,258

Table A7. Bank Specialization and Firm Investment: Alternative Assumptions for the Computation of Specialization Measure

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times Violation_{f,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of firm f's main bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). Specialization is calculated using: in columns (1), all loans, without dropping loan contracts that are likely to be restatements of existing loans; in columns (2), only loans originated from 1996 onward; in columns (3), excluding term loans B; in columns (4), by attributing loan shares to lead arrangers as in Chodorow-Reich (2014); in columns (5), by attributing loan shares to lead arrangers as in Doerr and Schaz (2021); and in columns (6), by attributing loan shares to lead arrangers as in De Haas and Van Horen (2013). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment					
	Starting Samples			Loan Share Attribution Methods		
	Amend/Restate	From 1996	No Term Loans B	Chodorow-Reich (2014)	Doerr & Schaz (2021)	De Haas & Van Horen (2013)
	(1)	(2)	(3)	(4)	(5)	(6)
Violation	−0.0079***	−0.0082***	−0.0085***	−0.0089***	−0.0090***	−0.0081***
	(−5.35)	(−5.32)	(−5.48)	(−5.93)	(−6.12)	(−5.33)
Specialization	0.0012	0.0016	0.0016	0.0018	0.0017	0.0016
	(1.05)	(1.17)	(1.14)	(1.31)	(1.24)	(1.25)
Violation × Specialization	0.0028***	0.0030***	0.0032***	0.0035***	0.0036***	0.0029***
	(3.73)	(3.56)	(3.74)	(3.71)	(3.67)	(3.55)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls × Spec	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
R^2	.139	.138	.137	.138	.138	.138
Obs.	52,823	52,513	52,396	52,517	52,517	52,517

Table A8. Bank Specialization and Covenant Strictness: Alternative Specialization Measures

This table reports the estimates of the coefficients from the following regression over the "origination" sample from 1996 to 2019:

$$Y_{l,f,i,b,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{b,f} + \beta \cdot \textit{Other Specialization}_{b,i,t-1} + \gamma_F \cdot X_{f,t} + \gamma_L \cdot X_{l,f,i,b,t} + \varepsilon_{l,f,i,b,t}$$

where $Y_{l,f,i,b,t}$ is the measure of covenant strictness for loan l contracted in year-quarter t between bank b and firm f (in industry i), computed using all covenants (columns 1 to 3), performance covenants only (column 4) and capital covenants only (column 5). $\textit{Other Specialization}_{b,i,t-1}$ is one of the three alternative measures of specialization reported in the table. $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{b,f}$ are respectively bank×year-quarter, industry×year-quarter, and bank×firm fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, plus separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings. $X_{l,f,i,b,t}$ is the vector of loan-level controls reported in Table 2, plus separate intercepts for different loan purposes (Corporate Purposes, Working Capital, Debt Repayment, Takeover, CP Backup). t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Covenant Strictness		
	All	Performance only	Capital only
	(1)	(2)	(3)
Excess Specialization	−93.91***	−120.56***	2.41
	(−2.85)	(−6.82)	(0.12)
Adj. R^2	.576	.608	.386
Obs.	3,258	3,258	3,258
Portfolio Share	−93.91***	−120.56***	2.41
	(−2.85)	(−7.03)	(0.12)
Adj. R^2	.576	.608	.386
Obs.	3,258	3,258	3,258
Favorite Industry	−11.24**	−9.33*	−4.51*
	(−2.69)	(−2.01)	(−1.81)
Adj. R^2	.576	.605	.387
Obs.	3,258	3,258	3,258

Table A9. Bank Specialization and Dispersion of Key Contract Terms: Alternative Specialization Measures

This table reports the estimates of the coefficients from the following regression over the full sample from 1996 to 2019:

$$Y_{b,i,t} = \alpha_{b,t} + \alpha_{i,t} + \beta \cdot \textit{Other Specialization (Yearly)}_{b,i,t} + \varepsilon_{b,i,t}$$

where $Y_{i,b,t}$ is one of the measures of dispersion of either covenant strictness or All-In Drawn Spread as indicated in the columns below, calculated using the distribution of all loans by bank b to industry i in year t. *Other Specialization (Yearly)*$_{b,i,t}$ is one of the three alternative measures of specialization reported in the table, averaged over four quarters (from quarter Q4 of year $t-1$ to Q3 of year t). $\alpha_{b,t}$ and $\alpha_{i,t}$ are respectively bank×year and industry×year fixed effects. t statistics (in parentheses) are obtained from two-way clustering at the bank and industry×year level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Covenant Strictness				All-In Drawn Spread			
	Diff(Max, Min)	Interquartile Range	Std. Dev.	Kurtosis	Diff(Max, Min)	Interquartile Range	Std. Dev.	Kurtosis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Excess Specialization (Yearly)	50.452***	29.477**	−4.556	1.453**	239.132***	35.611	43.483**	1.827***
	(3.11)	(2.09)	(−0.51)	(2.26)	(6.33)	(1.36)	(2.63)	(4.16)
Adj. R^2	.24	.118	.146	.154	.248	.072	.085	.296
Obs.	2,890	2,890	2,020	1,928	3,311	3,311	3,255	3,178
Portfolio Share (Yearly)	50.514***	29.495**	−4.546	1.456**	238.875**	35.088	43.258**	1.829***
	(3.11)	(2.08)	(−0.51)	(2.26)	(6.31)	(1.34)	(2.62)	(4.17)
Adj. R^2	.24	.118	.146	.154	.248	.072	.085	.296
Obs.	2,890	2,890	2,020	1,928	3,311	3,311	3,255	3,178
Favorite Industry (Yearly)	5.469*	4.911*	1.716	−0.107	29.973***	4.304	2.976	0.344***
	(1.89)	(1.73)	(0.98)	(−1.27)	(3.39)	(0.61)	(0.77)	(3.84)
Adj. R^2	.236	.117	.147	.151	.24	.072	.083	.294
Obs.	2,890	2,890	2,020	1,928	3,311	3,311	3,255	3,178

Table A10. Bank Specialization and Firm Investment: Alternative Specialization Measures

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Other\ Specialization_{b,i,t} + \theta_3 \cdot Other\ Specialization_{b,i,t} \times Violation_{f,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Other\ Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is one of the three alternative measures of specialization reported in the table. $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment		
	(1)	(2)	(3)
Violation	−0.0050***	−0.0079***	−0.0052***
	(−4.27)	(−4.43)	(−3.79)
Excess Specialization	0.0238		
	(0.72)		
Violation×Excess Specialization	0.0522***		
	(2.73)		
Portfolio Share		0.0275	
		(1.18)	
Violation×Portfolio Share		0.0491***	
		(3.27)	
Favorite Industry			0.0022
			(0.59)
Violation×Favorite Industry			0.0078**
			(2.41)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*
Firm Controls	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*Yes*	*Yes*	*Yes*
Firm Controls × Spec	*Yes*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*Yes*	*Yes*	*Yes*
R^2	.138	.139	.139
Obs.	52,517	52,517	52,517

Table A11. Bank Specialization and Firm Investment: Results with bank × industry fixed effects

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{b,i} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times Violation_{f,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of firm f's main bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). $\alpha_{b,t}$, $\alpha_{i,t}$, $\alpha_{b,i}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, bank×industry, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment					
	(1)	(2)	(3)	(4)	(5)	(6)
Violation	−0.0039***	−0.0080***	−0.0084***	−0.0080***	−0.0083***	−0.0078***
	(−3.28)	(−4.88)	(−5.15)	(−4.92)	(−4.94)	(−4.77)
Specialization	−0.0000	−0.0001	−0.0001	−0.0002	0.0028	0.0024
	(−0.17)	(−0.33)	(−0.54)	(−0.61)	(1.56)	(1.14)
Violation×Specialization		0.0029***	0.0030***	0.0029***	0.0028***	0.0028***
		(3.35)	(3.39)	(3.35)	(3.19)	(3.06)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Bank × Industry FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*No*	*No*	*No*	*Yes*	*No*	*Yes*
Firm Controls × Spec	*No*	*No*	*No*	*No*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*No*	*No*	*No*	*No*	*No*	*Yes*
R^2	.134	.134	.136	.15	.136	.151
Obs.	52,477	52,477	52,477	52,477	52,477	52,477

Table A12. Bank Specialization and Firm Investment: Additional control variables a lá Nini, Smith, and Sufi (2012)

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times Violation_{f,t} + \Phi_1 \cdot \Gamma_{f,t} + \Phi_2 \cdot \Gamma_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the difference in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $\Gamma_{f,t}$ is a vector of firm-level controls consisting of all those included in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the second- and third-degree polynomials of the same firm-level controls, excluding the rating dummies ("Higher Order Firm Controls" in the table), their lagged 4-quarter values, excluding the rating dummies ("Lagged Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment					
	(1)	(2)	(3)	(4)	(5)	(6)
Violation	−0.0082***	−0.0067***	−0.0066***	−0.0077***	−0.0068***	−0.0066***
	(−5.38)	(−3.11)	(−2.98)	(−4.79)	(−3.10)	(−2.77)
Specialization	−0.0001	−0.0000	−0.0000	0.0158***	0.0016	0.0018
	(−0.26)	(−0.17)	(−0.11)	(3.29)	(1.08)	(0.20)
Violation×Specialization	0.0031***	0.0022*	0.0022*	0.0027***	0.0023*	0.0022*
	(3.91)	(1.89)	(1.87)	(3.29)	(1.81)	(1.69)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Higher Order Firm Controls	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*
Lagged Firm Controls	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
Firm Controls × Spec	*No*	*No*	*No*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*No*	*No*	*No*	*Yes*	*Yes*	*Yes*
Higher Order Firm Controls × Spec	*No*	*No*	*No*	*Yes*	*No*	*Yes*
Lagged Firm Controls × Spec	*No*	*No*	*No*	*No*	*Yes*	*Yes*
R^2	.138	.15	.151	.139	.151	.152
Obs.	52,517	43,691	43,691	52,517	43,691	43,691

Table A13. Bank Specialization and Firm Investment: Placebo Experiment

This table reports the estimates of the coefficients from the following regression over a sample, from 1996 to 2019, that excludes firm-quarters in which firms report a violation:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Placebo\ Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times Placebo\ Violation_{f,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the difference in firm *f*'s investment from year-quarter *t* to *t+4*. $Placebo\ Violation_{f,t}$ is equal to 1 at time t if firm f experiences a new covenant violation in year-quarter *t+4*, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is a vector of firm-level controls consisting of all those included in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment					
	(1)	(2)	(3)	(4)	(5)	(6)
Placebo Violation	−0.0040	−0.0034	−0.0037	−0.0035	−0.0036	−0.0034
	(−1.49)	(−0.90)	(−0.93)	(−0.91)	(−0.90)	(−0.88)
Specialization	0.0000	0.0001	−0.0000	−0.0001	0.0021*	0.0016
	(0.24)	(0.25)	(−0.11)	(−0.25)	(1.74)	(1.11)
Placebo Violation×Specialization		−0.0004	−0.0004	−0.0002	−0.0004	−0.0002
		(−0.24)	(−0.20)	(−0.11)	(−0.22)	(−0.13)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*No*	*No*	*No*	*Yes*	*No*	*Yes*
Firm Controls × Spec	*No*	*No*	*No*	*No*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*No*	*No*	*No*	*No*	*No*	*Yes*
R^2	.121	.121	.123	.138	.123	.139
Obs.	51,843	51,843	51,843	51,843	51,843	51,843

Table A14. Bank Specialization and Firm Investment: Only Firms in Violation at Least Once

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019, restricted to firms that have violated a covenant at least once:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times Violation_{f,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of firm f's main bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment					
	(1)	(2)	(3)	(4)	(5)	(6)
Violation	−0.0039***	−0.0080***	−0.0084***	−0.0077***	−0.0085***	−0.0078***
	(−3.18)	(−4.56)	(−5.00)	(−4.70)	(−4.96)	(−4.92)
Specialization	0.0004	0.0003	0.0003	0.0004	0.0027*	0.0025
	(1.16)	(0.88)	(0.88)	(1.04)	(1.82)	(1.40)
Violation×Specialization		0.0030***	0.0030***	0.0029***	0.0031***	0.0030***
		(3.44)	(3.53)	(3.40)	(3.64)	(3.70)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*No*	*No*	*No*	*Yes*	*No*	*Yes*
Firm Controls × Spec	*No*	*No*	*No*	*No*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*No*	*No*	*No*	*No*	*No*	*Yes*
R^2	.181	.182	.183	.199	.184	.2
Obs.	22,032	22,032	22,032	22,032	22,032	22,032

Table A15. Bank Specialization and Firm Investment: Only First Violations

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019, dropping all the new violations that are not a firm's first violations:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot First\ Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times First\ Violation_{f,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $First\ Violation_{f,t}$ is equal to 1 if firm f experiences its first covenant violation in year-quarter t, and to 0 otherwise—observations corresponding to subsequent firm-quarters with violations are set to missing. $Specialization_{b,i,t}$ is the ratio of firm f's main bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.5% and 10%, respectively.

	Change in Investment					
	(1)	(2)	(3)	(4)	(5)	(6)
Violation (First)	−0.0030**	−0.0114***	−0.0118***	−0.0107**	−0.0119***	−0.0104**
	(−2.12)	(−2.81)	(−2.88)	(−2.63)	(−2.82)	(−2.63)
Specialization	0.0001	0.0001	−0.0000	−0.0001	0.0022*	0.0016
	(0.40)	(0.25)	(−0.11)	(−0.25)	(1.80)	(1.14)
Violation (First) ×Specialization		0.0063**	0.0063**	0.0059**	0.0064**	0.0056**
		(2.28)	(2.25)	(2.11)	(2.20)	(2.10)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*No*	*No*	*No*	*Yes*	*No*	*Yes*
Firm Controls × Spec	*No*	*No*	*No*	*No*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*No*	*No*	*No*	*No*	*No*	*Yes*
R^2	.12	.121	.122	.137	.123	.138
Obs.	52,165	52,165	52,165	52,165	52,165	52,165

Table A16. Bank Specialization and Firm Investment: Only Single-Bank Lenders

This table reports the estimates of the coefficients from the following regression over the "violations" sample from 1996 to 2019, restricted to firms that have only one active credit relationship in a given quarter:

$$Y_{f,t+4} - Y_{f,t} = \alpha_{b,t} + \alpha_{i,t} + \alpha_{fiscal\,t} + \theta_1 \cdot Violation_{f,t} + \theta_2 \cdot Specialization_{b,i,t} + \theta_3 \cdot Specialization_{b,i,t} \times Violation_{f,t} + \Phi_1 \cdot X_{f,t} + \Phi_2 \cdot X_{f,t} \times Specialization_{b,i,t} + \varepsilon_{f,b,t}$$

where the dependent variable is the change in firm f's investment from year-quarter t to $t+4$. $Violation_{f,t}$ is equal to 1 if firm f experiences a new covenant violation in year-quarter t, and to 0 otherwise. $Specialization_{b,i,t}$ is the ratio of firm f's main bank b's portfolio share in industry i at time t (averaged over a rolling 12-quarter window) relative to the market-wide share of credit to industry i at time t (averaged over a rolling 12-quarter window). $\alpha_{b,t}$, $\alpha_{i,t}$, and $\alpha_{fiscal\,t}$ are respectively bank×year-quarter, industry×year-quarter, and end-of-fiscal-year quarter fixed effects. $X_{f,t}$ is the vector of firm-level controls reported in Table 2, as well as separate intercepts for Capital IQ S&P Long Term Issuer Credit Ratings ("Firm Controls" in the table), plus the lagged 4-quarter difference in Log(Assets) and Tangibility ("Diff. Firm Controls" in the table). All variables are defined in Table A1. t statistics (in parentheses) are obtained from two-way clustering at the bank and firm level. ***, **, * indicate statistical significance at the 1%, 5% and 10%, respectively.

	Change in Investment					
	(1)	(2)	(3)	(4)	(5)	(6)
Violation	−0.0041***	−0.0093***	−0.0099***	−0.0094***	−0.0096***	−0.0091***
	(−3.04)	(−5.22)	(−5.40)	(−5.25)	(−5.05)	(−4.93)
Specialization	0.0001	0.0001	−0.0000	−0.0000	0.0031**	0.0020
	(0.51)	(0.32)	(−0.025)	(−0.087)	(2.36)	(1.36)
Violation×Specialization		0.0038***	0.0038***	0.0037***	0.0037***	0.0036***
		(5.37)	(5.45)	(5.46)	(4.47)	(4.18)
Bank × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry × YearQtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Fiscal Qtr FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Firm Controls	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Diff. Firm Controls	*No*	*No*	*No*	*Yes*	*No*	*Yes*
Firm Controls × Spec	*No*	*No*	*No*	*No*	*Yes*	*Yes*
Diff. Firm Controls × Spec	*No*	*No*	*No*	*No*	*No*	*Yes*
R^2	.132	.133	.134	.15	.135	.151
Obs.	42,338	42,338	42,338	42,338	42,338	42,338