

# Bank Specialization, Control Rights, and Real Effects

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We study how lenders' industry expertise affects loan covenant design and enforcement. Using a large sample of U.S. corporate loans, we find that industry-specialized lenders impose less restrictive financial covenants and exhibit greater dispersion in contract terms. Following a covenant violation, borrowers financed by specialized banks experience smaller drops in investment without a decline in performance. Our results suggest that lenders improve contracting efficiency by leveraging industry-level knowledge, which is transferable across borrowers.

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Covenants are a defining feature of commercial loan contracts, transferring control rights to creditors when borrowers breach predefined terms. Ample evidence shows that lenders' enforcement of such violations has significant financial and macroeconomic consequences (Bisetti, Li, & Yu, 2024; Chava & Roberts, 2008; Chodorow-Reich & Falato, 2022). Theory suggests that covenant design and the exercise of control rights depend on the information lenders hold about their borrowers (Gârleanu & Zwiebel, 2009). Empirical research has focused on borrower-specific information acquired through long-term relationships, showing the relevance of idiosyncratic soft information that can be reused for the same borrower over time (Ivashina & Kovner, 2011; Keil, 2023; Prilmeier, 2017). However, in both theory and practice, the assessment and mitigation of credit risk also draw on information that is transferable across borrowers, such as industry knowledge (see, e.g., Ganguin & Bilardello, 2005; Greenbaum, Thakor, & Boot, 2019). Whether and how this different kind of informational advantage influences covenant design and enforcement remains an open question.

Our contribution is to study how banks' industry specialization affects the design of financial covenants in the U.S. syndicated loan market and the outcomes of covenant violations for borrowing firms.<sup>1</sup> Three aspects motivate our focus. First, specialization is a salient feature of credit markets (Paravisini, Rappoport, & Schnabl, 2023). Second, it provides lenders with an informational advantage that is transferable across borrowers, namely knowledge of industry-specific risks, projects, and competitive dynamics, which differs from and complements the borrower-specific soft information obtained from relationship lending (Blickle, He, Huang, & Parlato, 2025).<sup>2</sup> Crucially, this industry-specific advantage does not necessarily depend on a prior credit relationship. Third, its effects on covenant design and enforcement are not clear ex ante. Industry expertise could reduce the need for restrictive covenants and allow more precise responses to violations. Yet specialized banks already offer more favorable pricing and maturities (Blickle et al., 2023) and may face higher concentration risk, creating incentives to employ tighter covenants and enforce them more aggressively as part of a broader risk-management strategy.

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1. Throughout this paper, we use the terms “lenders”, “banks”, and “creditors” interchangeably.

2. For other theoretical contributions making similar arguments, see Huang, He, and Parlato (2024); Nieuwerburgh and Veldkamp (2010). For empirical evidence, see Blickle, Parlato, and Saunders (2023) and Casado and Martinez-Miera (2025).

We provide the first empirical evidence that bank specialization is associated with less restrictive financial covenants, greater dispersion in contract terms at loan origination, and a smaller decline in investment and better performance following borrowers' covenant violations. These effects are consistent with the presence of industry-specific informational advantages and cannot be explained by risk-taking incentives stemming from government guarantees, borrower-specific information obtained through relationship lending or geographical proximity, and industry capture. Our findings show that industry expertise improves both the design and enforcement of loan covenants by leveraging transferable knowledge that can be reused across borrowers.

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.<sup>3</sup> This result is in line with specialization capturing lenders' industry-specific informational advantages. Earnings-based performance measures, such as interest

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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.

coverage, produce more accurate information about borrowers' health (Griffin, Nini, & Smith, Forthcoming) and serve as trip-wires that trigger renegotiations. In contrast, balance-sheet indicators, such as leverage or net worth, aim to align the incentives of borrowers and lenders ex-ante (Christensen & Nikolaev, 2012).<sup>4</sup> 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.<sup>5</sup> Consistent with models in which more precise information leads to a screening equilibrium instead of a pooling one (Stiglitz & Weiss, 1981), better-informed lenders offer more tailored loan contracts to their core borrowers.

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. In contrast, 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%.<sup>6</sup> 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

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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. 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. Our results indicate 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.

increase 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](#)), including the borrower's 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.<sup>7</sup> 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 by building on the "quasi-discontinuity" approach by [Roberts and Sufi \(2009\)](#) and [Nini, Smith, and Sufi \(2012\)](#), based on violations reported in SEC filings.<sup>8</sup> In this setting, the researcher identifies the effect of a covenant violation thanks to the sharp reallocation of control

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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.

rights, accounting for expected drivers of violations such as firm performance measures on 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 those of 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, thereby 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 hold 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 a wide range of 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, alternative methods to attribute loan shares to lenders, distinct 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 empirical research on creditors' role in corporate 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). Keil (2023) studies how borrower-specific information from relationship lending affects corporate outcomes upon covenant violations. We stress the role of banks' industry-specific knowledge in mitigating the effects of financing frictions on investment and reducing the ex-post inefficiencies arising from the ex-ante inclusion of covenants (Smith & Warner, 1979), even after accounting for bank- or

firm-specific characteristics. Thus, we document how and to what extent the accumulation of expertise in handling borrowers in specific industries 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). Closer to our paper, Hollander and Verriest (2016) show that geographic proximity strengthens lenders' ability to monitor, and Prilmeier (2017) document that strong bank–firm relationships affect covenant use in a non-linear way.<sup>9</sup> These papers analyze how borrower-specific soft information, accumulated through repeated interaction with the same borrower, shapes covenant design. We show that lenders also rely on information transferable across borrowers, such as industry knowledge, and that this industry-specific informational advantage is at least as relevant for covenant design as borrower-specific soft information.

Finally, our paper contributes to the empirical literature on specialization in lending.<sup>10</sup> Numerous studies have documented banks' specialization in lending across various dimensions, such as export markets (Paravisini, Rappoport, & Schnabl, 2023), geographical regions (Casado & Martinez-Miera, 2024; Duquerroy, Mazet-Sonilhac, Mésonnier, & Paravisini, 2022), industries (Blickle, Parlatore, & Saunders, 2023; De Jonghe, Dewachter, Mulier, Ongena, & Schepens, 2020; Di & Pattison, 2023; Jiang & Li, 2022), collateral (Gopal, 2021), and new firms (Bonfim, De Haas, Matyunina, & Ongena, 2025). This body of research finds that specialization leads to heterogeneous credit-supply responses to funding shocks, affecting firm-level outcomes (Iyer, Kokas, Michaelides, & Peydró, 2022), and shapes corporate innovation (Degryse, De Jonghe,

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9. Ivashina and Kovner (2011) similarly show that repeated interactions with private equity sponsors reduce covenant strictness in leveraged buyouts.

10. 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).

Gambacorta, & Huylebroek, Forthcoming). Closely related to our work, Blickle, Parlato, and Saunders (2023) show 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 enforcement 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.<sup>11</sup> 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

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

reported in DealScan, until the amended end date;<sup>12</sup> 3) the facility amount is entirely attributed to the lead arranger(s).<sup>13</sup> 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%.<sup>14</sup> 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.<sup>15</sup>

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.<sup>16</sup> 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

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12. 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 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.

13. 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.

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

15. 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.

16. 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.

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 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 \(Forthcoming\)](#).<sup>17</sup> 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.<sup>18</sup> 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.<sup>19</sup> 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 the assignment 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.<sup>20</sup> The resulting dataset is a firm-quarter level panel matched with each firm's main bank information and a dummy variable that indicates the quarters in which a firm experiences a covenant violation.

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17. 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.

18. For a complete description of the text-search algorithm, see [Nini et al. \(2012\)](#) and [Griffin et al. \(Forthcoming\)](#).

19. Firm-quarter observations corresponding to a violation that does not meet this criterion are set to missing.

20. 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 IA16).

## 1.2 Sample Characteristics

Table 1 provides summary statistics for the samples used in our empirical analysis. All variables are defined in Table IA1. The "origination" sample includes all the loans that satisfy the 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+. <sup>21</sup> 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-quarter 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). <sup>22</sup> 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) of \$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%.

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21. 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.

22. 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:

$$Specialization_{b,i,t} = \frac{S_{b,i,t}}{S_{i,t}} \quad (1)$$

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

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.<sup>23</sup> This averaging reduces the influence of those industries

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23. 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 \(2023\)](#).<sup>24</sup>

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:

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

$HHI_{b,t}$  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

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24. 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 ( $\sim 0.07$ ) and that of the average bank ( $\sim 0.105$ ) 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](#)), 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. However, specialization could also lead to stricter covenants if concentrated portfolios increase lenders' exposure to correlated industry risk and create incentives to preserve early control rights. Whether specialization is associated with looser or stricter covenants is therefore an empirical question.

#### 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 \(2012\)](#).<sup>25</sup> Specifically, [Demerjian and Owens \(2016\)](#) define

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25. The measure developed by [Demerjian and Owens \(2016\)](#) can be downloaded on Edward L. Owens' personal

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,  $\beta$ , 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 $\times$ 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 $\times$ 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 $\times$ year-quarter fixed effects ( $\alpha_{i,t}$ ), capturing all time-varying observed and unobserved industry heterogeneity, and bank $\times$ firm fixed effects ( $\alpha_{b,f}$ ), controlling for all bank-firm match-specific observable and unobservable characteristics that are fixed over time.<sup>26</sup> 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.

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

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website <https://sites.google.com/site/edowensphd/researchdata>. We thank the authors for making the measure available.

26. Ideally, we would also want to account for the firm $\times$ 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 $\times$ year-quarter fixed effects not feasible.

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.<sup>27</sup> 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.<sup>28</sup> 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).<sup>29</sup> 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 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

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27. The choice of these controls is based on similar studies on the determinants of loan covenant strictness (Murfin, 2012; Prilmeier, 2017).

28. We classify loans into revolving credit and term loans following the classification of Berg, Saunders, and Steffen (2016).

29. Demerjian and Owens (2016) also provide separate strictness measures computed considering only performance covenants and only capital covenants.

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 $\times$ year-quarter, industry $\times$ year-quarter, and bank $\times$ firm fixed effects. Column (2) 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), and indicate that, in practice, the informational advantages of specialized lenders outweigh concentration-risk concerns in covenant design.

To further pin down the economic mechanism, we distinguish between capital and performance covenants. Capital covenants are used to align incentives ex-ante, while performance covenants serve primarily as trip-wires that trigger renegotiations (Christensen & Nikolaev, 2012). If industry expertise lowers the need for costly renegotiation, we would expect to observe looser performance covenants, with little difference in capital covenants if ex-ante agency conflicts are similar across core and non-core borrowers.

Consistent with this prediction, Columns (4) and (5) show that performance covenants drive the observed effect on lower covenant strictness associated with specialization. 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](#)). [Blickle et al. \(2023\)](#) show that industry-specialized lenders offer more generous loan terms to their core borrowers and therefore mitigate such concern. However, our sample is significantly different from theirs, so in [Table 3](#), we re-estimate the specification in [Equation \(4\)](#) using other loan characteristics as dependent variables. 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 \(2016\)](#).<sup>30</sup> 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, consistent with the findings of [Blickle, Parlato, and Saunders \(2023\)](#), although our cost of credit results in our sample are noisy. 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

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30. The TCB measure is only available until 2012.

to three measures out of four, in both covenant strictness and pricing. This is consistent with the notion that industry specialization, providing lenders with an information advantage transferable across borrowers, enables lenders to tailor contracts more precisely to their different clients within their sector 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 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.

Theory offers no clear prediction about how industry expertise should affect the enforcement of control rights. In line with evidence that financing providers with industry-specific experience can improve firm performance (Acharya, Gottschalg, Hahn, & Kehoe, 2013; Bernstein & Sheen, 2016), one possibility is that specialized lenders use their informational advantage to intervene more precisely, mitigating the under-investment problem associated with the ex-ante inclusion of covenants (Smith & Warner, 1979). This would predict smaller investment cuts and better performance after a violation. However, specialization could also have the opposite effect. Concentrated portfolios heighten lenders' exposure to correlated risk, which may induce stricter

enforcement and further depress investment, all else equal. Whether specialization mitigates or amplifies the real effects of covenant violations is therefore an empirical question. 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.<sup>31</sup> 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  $\theta_3$ , which measures the difference in violation outcomes between specialized banks' core and non-core borrowers.

There are several identification challenges in the estimation of  $\theta_3$ . 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

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31. See [Section 1.1](#) for more details on how we construct covenant violations.

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.<sup>32</sup> 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' 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.

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32. In our robustness tests, we further control for second- and third-order polynomials of these firms' variables as well as their lagged versions.

### 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 continues 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. For firms in industries in which their bank is twice as specialized as the market, the drop in investment is 60% (0.31/0.51) smaller in magnitude. 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.

Overall, our results indicate that the real effects of covenant violations – through the sudden reallocation of control rights – exhibit economically significant heterogeneity. Lenders' specialization in the borrower's industry drives such heterogeneity. In particular, the evidence is consistent with specialized banks requiring significantly less investment conservatism from their core customers post-violation owing to their informational 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.<sup>33</sup> 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 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

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33. 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).

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.<sup>34</sup> 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  $Violation \times Specialization$  is essentially the same as our baseline result (see [Table 5](#)).

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

## 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 an information advantage of these banks. However, this advantage would derive from acquiring borrower-specific soft information based on geographical proximity, rather than industry-specific 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.<sup>35</sup> 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.<sup>36</sup> 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.

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

36. 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.

### 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, 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 transferable across borrowers, 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, which is a situation where 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).<sup>37</sup> 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.

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

## 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 IA2 and IA3, 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 IA2 and the interaction term between specialization and violation in Table IA3 are very similar to the baseline ones, both in 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 IA4 and IA5, 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 IA6 and IA7, 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.<sup>38</sup> 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 IA8, IA9, and IA10 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 IA8, IA9, and IA10 respectively show that such a variation: (i) correlates with covenants that are

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38. 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.

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.<sup>39</sup> 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 IA8, IA9, and IA10 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.

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.<sup>40</sup> 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 IA11, 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 IA12, 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.

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39. Note that the estimates in the tables refer to a change in excess specialization of 1, i.e., a variation of 100%.

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

**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 IA13, 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, 2008). As presented in Table IA14, 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 IA15 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 IA16, 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 lenders' industry expertise improves the efficiency of debt contracting through an informational advantage transferable across borrowers. Industry-specialized lenders write loans with less restrictive covenants and greater dispersion in contract terms,

consistent with more tailoring to borrower and industry risk. Following a covenant violation, they exercise control rights with more flexibility: core borrowers experience smaller investment cuts and better subsequent performance than comparable non-core borrowers.

Our evidence provides new insights into the debate on specialization in credit markets. While concentrated portfolios could motivate tighter covenants and stricter enforcement for risk-management purposes, theory admits both possibilities. In practice, we find that specialized banks use their industry knowledge to grant more flexibility through looser performance covenants, without offsetting adjustments in spreads or maturities, consistent with models where informational advantages reduce the need for stricter covenants (Gârleanu & Zwiebel, 2009). Upon violation, they intervene less disruptively, as reflected in smaller investment cuts and stronger performance. This heterogeneity in violation outcomes highlights a novel channel for the real effects of bank specialization, operating through the interplay of lenders' information advantages and firms' corporate governance.

Our results also contribute to the literature on financial contracting. By documenting that industry expertise affects both the design and enforcement of covenants, we show that banks use transferable information across borrowers to improve contracting efficiency, complementing the well-established role of borrower-specific soft information from relationship lending.

Finally, our findings underscore the importance of credit market structure in shaping borrower outcomes. Bank specialization influences not only the price and quantity of credit, but also how control rights are allocated and exercised. Although our results indicate positive asset-side effects of specialization, they should not be interpreted as evidence that specialization is a superior business model. Liability-side risks, such as deposit concentration – as illustrated by the collapse of Silicon Valley Bank in 2023 – remain critical. Understanding how specialization shapes both sides of banks' balance sheets is a promising avenue for future research.

## References

Abuzov, R., Herpfer, C., & Steri, R. (2020). Do Banks Compete on Non-Price Terms? Evidence from Loan Covenants. Available at <https://ssrn.com/abstract=3278993>

- Acharya, V. V., Gottschalg, O. F., Hahn, M., & Kehoe, C. (2013). Corporate Governance and Value Creation: Evidence from Private Equity. *Review of Financial Studies*, 26(2), 368–402.
- Acharya, V. V., Hasan, I., & Saunders, A. (2006). Should Banks Be Diversified? Evidence from Individual Bank Loan Portfolios. *Journal of Business*, 79(3), 1355–1412.
- Agarwal, S., & Hauswald, R. (2010). Distance and Private Information in Lending. *Review of Financial Studies*, 23(7), 2757–2788.
- Asquith, P., Beatty, A., & Weber, J. (2005). Performance Pricing in Bank Debt Contracts. *Journal of Accounting and Economics*, 40(1-3), 101–128.
- Badawi, A. B., Dyreng, S., de Fontenay, E., & Hills, R. (2021). Contractual Complexity in Debt Agreements: The Case of EBITDA. Available at <https://ssrn.com/abstract=3455497>
- Bai, J. J., Fairhurst, D., & Serfling, M. (2020). Employment Protection, Investment, and Firm Growth. *Review of Financial Studies*, 33(2), 644–688.
- Becher, D. A., Griffin, T. P., & Nini, G. (2022). Creditor Control of Corporate Acquisitions. *Review of Financial Studies*, 35(4), 1897–1932.
- Beck, T., De Jonghe, O., & Mulier, K. (2022). Bank Sectoral Concentration and Risk: Evidence from a Worldwide Sample of Banks. *Journal of Money, Credit and Banking*, 54(6), 1705–1739.
- Berg, T., Saunders, A., & Steffen, S. (2016). The Total Cost of Corporate Borrowing in the Loan Market: Don't Ignore the Fees. *Journal of Finance*, 71(3), 1357–1392.
- Berger, P. G., Minnis, M., & Sutherland, A. (2017). Commercial lending concentration and bank expertise: Evidence from borrower financial statements. *Journal of Accounting and Economics*, 64(2-3), 253–277.
- Berlin, M., & Mester, L. J. (1992). Debt Covenants and Renegotiation. *Journal of Financial Intermediation*, 2(2), 95–133.
- Bernstein, S., & Sheen, A. (2016). The Operational Consequences of Private Equity Buyouts: Evidence from the Restaurant Industry. *Review of Financial Studies*, 29(9), 2387–2418.
- Bharath, S. T., Dahiya, S., Saunders, A., & Srinivasan, A. (2011). Lending Relationships and Loan Contract Terms. *Review of Financial Studies*, 24(4), 1141–1203.
- Bharath, S. T., & Shumway, T. (2008). Forecasting Default with the Merton Distance to Default Model. *Review of Financial Studies*, 21(3), 1339–1369.

- Billett, M. T., King, T.-H. D., & Mauer, D. C. (2007). Growth Opportunities and the Choice of Leverage, Debt Maturity, and Covenants. *Journal of Finance*, 62(2), 697–730.
- Bird, A., Ertan, A., Karolyi, S. A., & Ruchti, T. G. (2022). Short-Termism Spillovers from the Financial Industry. *Review of Financial Studies*, 35(7), 3467–3524.
- Bisetti, E., Li, K., & Yu, J. (2024). The Technical Default Spread. *Review of Financial Studies*, 37(11), 3386–3430.
- Black, L. K., Krainer, J. R., & Nichols, J. B. (2020). Safe Collateral, Arm’s-Length Credit: Evidence from the Commercial Real Estate Market. *Review of Financial Studies*, 33(11), 5173–5211.
- Blickle, K., Fleckenstein, Q., Hillenbrand, S., & Saunders, A. (2022). The Myth of the Lead Arranger’s Share. *Federal Reserve Bank of New York Staff Report No. 922*.
- Blickle, K., He, Z., Huang, J., & Parlatore, C. (2025). Information-based Pricing in Specialized Lending. *Journal of Financial Economics*, 172, 104135.
- Blickle, K., Parlatore, C., & Saunders, A. (2023). Specialization in Banking. *NBER Working Paper No 31077*.
- Bonfim, D., De Haas, R., Matyunina, A., & Ongena, S. (2025). Bank Specialization in Lending to New Firms.
- Boot, A. W. A. (2000). Relationship Banking: What Do We Know? *Journal of Financial Intermediation*, 9(1), 7–25.
- Boyd, J. H., & Prescott, E. C. (1986). Financial Intermediary-Coalitions. *Journal of Economic Theory*, 38(2), 211–232.
- Bradley, M., & Roberts, M. R. (2015). The Structure and Pricing of Corporate Debt Covenants. *Quarterly Journal of Finance*, 05(02), 1550001.
- Carey, M., Post, M., & Sharpe, S. A. (1998). Does Corporate Lending by Banks and Finance Companies Differ? Evidence on Specialization in Private Debt Contracting. *Journal of Finance*, 53(3), 845–878.
- Casado, A., & Martinez-Miera, D. (2024). Local Lending Specialization and Monetary Policy. CEPR Discussion Paper No. 19473. CEPR Press.
- Casado, A., & Martinez-Miera, D. (2025). Banks’ Specialization and Private Information. CEPR Discussion Paper No. 20033. CEPR Press.

- Chakraborty, I., Goldstein, I., & MacKinlay, A. (2018). Housing Price Booms and Crowding-Out Effects in Bank Lending. *Review of Financial Studies*, 31(7), 2806–2853.
- Chava, S., Kumar, P., & Warga, A. (2010). Managerial Agency and Bond Covenants. *Review of Financial Studies*, 23(3), 1120–1148.
- Chava, S., Nanda, V., & Xiao, S. C. (2017). Lending to Innovative Firms. *Review of Corporate Finance Studies*, 6(2), 234–289.
- Chava, S., & Roberts, M. R. (2008). How Does Financing Impact Investment? The Role of Debt Covenants. *Journal of Finance*, 63(5), 2085–2121.
- Chodorow-Reich, G. (2014). The Employment Effects of Credit Market Disruptions: Firm-Level Evidence from the 2008–9 Financial Crisis. *Quarterly Journal of Economics*, 129(1), 1–59.
- Chodorow-Reich, G., & Falato, A. (2022). The Loan Covenant Channel: How Bank Health Transmits to the Real Economy. *Journal of Finance*, 77(1), 85–128.
- Christensen, H. B., Macciocchi, D., Morris, A., & Nikolaev, V. V. (2022). Financial shocks to lenders and the composition of financial covenants. *Journal of Accounting and Economics*, 73(1), 101426.
- Christensen, H. B., & Nikolaev, V. V. (2012). Capital Versus Performance Covenants in Debt Contracts. *Journal of Accounting Research*, 50(1), 75–116.
- Daniels, K., & Ramirez, G. G. (2008). Information, Credit Risk, Lender Specialization and Loan Pricing: Evidence from the DIP Financing Market. *Journal of Financial Services Research*, 34(1), 35–59.
- Degryse, H., De Jonghe, O., Gambacorta, L., & Huylebroek, C. (Forthcoming). Bank Specialization and Corporate Innovation. *Review of Finance*.
- Degryse, H., & Ongena, S. (2005). Distance, Lending Relationships, and Competition. *Journal of Finance*, 60(1), 231–266.
- De Haas, R., & Van Horen, N. (2013). Running for the exit? International bank lending during a financial crisis. *Review of Financial Studies*, 26(1), 244–285.
- De Jonghe, O., Dewachter, H., Mulier, K., Ongena, S., & Schepens, G. (2020). Some Borrowers Are More Equal than Others: Bank Funding Shocks and Credit Reallocation. *Review of Finance*, 24(1), 1–43.

- De Jonghe, O., Mulier, K., & Samarin, I. (2025). Bank Specialization and Zombie Lending. *Management Science*, 71(2), 1260–1286.
- Demerjian, P. R., & Owens, E. L. (2016). Measuring the Probability of Financial Covenant Violation in Private Debt Contracts. *Journal of Accounting and Economics*, 61(2-3), 433–447.
- Demerjian, P. R., Owens, E. L., & Sokolowski, M. (2023). Lender Capital Management and Financial Covenant Strictness. *The Accounting Review*, 98(6), 149-172.
- Demiroglu, C., & James, C. M. (2010). The Information Content of Bank Loan Covenants. *Review of Financial Studies*, 23(10), 3700–3737.
- Denis, D. J., & Wang, J. (2014). Debt covenant renegotiations and creditor control rights. *Journal of Financial Economics*, 113(3).
- Di, W., & Pattison, N. (2023). Industry specialization and small business lending. *Journal of Banking & Finance*, 149, 106797.
- Dichev, I. D., & Skinner, D. J. (2002). Large-Sample Evidence on the Debt Covenant Hypothesis. *Journal of Accounting Research*, 40(4), 1091–1123.
- Doerr, S., & Schaz, P. (2021). Geographic diversification and bank lending during crises. *Journal of Financial Economics*, 140(3), 768–788.
- Drechsel, T. (2023, April). Earnings-based borrowing constraints and macroeconomic fluctuations. *American Economic Journal: Macroeconomics*, 15(2), 1-34.
- Drucker, S., & Puri, M. (2008). On Loan Sales, Loan Contracting, and Lending Relationships. *Review of Financial Studies*, 22(7), 2835–2872.
- Duquerroy, A., Mazet-Sonilhac, C., Mésonnier, J.-S., & Paravisini, D. (2022). Bank Local Specialization. *Banque de France Working Paper No. 865*.
- Dyreng, S., Ferracuti, E., Hills, R., & Kubic, M. (2021). Measurement Error when Estimating Covenant Violations. Available at <https://ssrn.com/abstract=3931427>
- Ersahin, N., Irani, R. M., & Le, H. (2021). Creditor control rights and resource allocation within firms. *Journal of Financial Economics*, 139(1), 186–208.
- Falato, A., & Liang, N. (2016). Do Creditor Rights Increase Employment Risk? Evidence from Loan Covenants. *Journal of Finance*, 71(6), 2545-2590.
- Faria-e Castro, M., Paul, P., & Sánchez, J. M. (2024). Evergreening. *Journal of Financial*

- Economics*, 153, 103778.
- Ferreira, D., Ferreira, M. A., & Mariano, B. (2018). Creditor Control Rights and Board Independence. *Journal of Finance*, 73(5), 2385–2423.
- Ganguin, B., & Bilardello, J. (2005). *Fundamentals of Corporate Credit Analysis*. New York: McGraw-Hill.
- Gârleanu, N., & Zwiebel, J. (2009). Design and Renegotiation of Debt Covenants. *Review of Financial Studies*, 22(2), 749–781.
- Giannetti, M., & Saidi, F. (2019). Shock Propagation and Banking Structure. *Review of Financial Studies*, 32(7), 2499–2540.
- Gigler, F., Kanodia, C., Sapra, H., & Venugopalan, R. (2009). Accounting Conservatism and the Efficiency of Debt Contracts. *Journal of Accounting Research*, 47(3), 767–797.
- Gopal, M. (2021). How Collateral Affects Small Business Lending: The Role of Lender Specialization. *U.S. Census Bureau Center for Economic Studies Working Paper 21-22*.
- Gorostiaga, J. (2022). It's Not You, It's Them: Industry Spillovers and Loan Portfolio Optimization.
- Goyal, V. K. (2005). Market discipline of bank risk: Evidence from subordinated debt contracts. *Journal of Financial Intermediation*, 14(3), 318–350.
- Graham, J. R., Li, S., & Qiu, J. (2008). Corporate misreporting and bank loan contracting. *Journal of Financial Economics*, 89(1), 44–61.
- Greenbaum, S. I., Thakor, A. V., & Boot, A. W. (2019). *Contemporary Financial Intermediation* (4th ed.). Academic Press.
- Griffin, T., Nini, G., & Smith, D. C. (Forthcoming). Losing Control: The 20-Year Decline in Loan Covenant Restrictions. *Journal of Finance*.
- Gu, Y., Mao, C. X., & Tian, X. (2017). Banks' Interventions and Firms' Innovation: Evidence from Debt Covenant Violations. *The Journal of Law and Economics*, 60(4), 637–671.
- Hoberg, G., & Phillips, G. (2010). Product Market Synergies and Competition in Mergers and Acquisitions: A Text-Based Analysis. *Review of Financial Studies*, 23(10), 3773–3811.
- Hoberg, G., & Phillips, G. (2016). Text-Based Network Industries and Endogenous Product Differentiation. *Journal of Political Economy*, 124(5), 1423–1465.
- Hollander, S., & Verriest, A. (2016). Bridging the Gap: The Design of Bank Loan Contracts and

- Distance. *Journal of Financial Economics*, 119(2), 399–419.
- Huang, J., He, Z., & Parlatore, C. (2024). Specialized Lending when Big Data Hardens Soft Information.
- Ioannidou, V., & Ongena, S. (2010). “Time for a Change”: Loan Conditions and Bank Behavior when Firms Switch Banks. *Journal of Finance*, 65(5), 1847–1877.
- Ivashina, V. (2009). Asymmetric Information Effects on Loan Spreads. *Journal of Financial Economics*, 92(2), 300–319.
- Ivashina, V., & Kovner, A. (2011). The Private Equity Advantage: Leveraged Buyout Firms and Relationship Banking. *Review of Financial Studies*, 24(7), 2462–2498.
- Iyer, R., Kokas, S., Michaelides, A., & Peydró, J.-L. (2022). Shock Absorbers and Transmitters: The Dual Facets of Bank Specialization. *SSRN Electronic Journal*.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Jiang, S., & Li, J. Y. (2022). He Who Lends Knows. *Journal of Banking & Finance*, 138, 106412.
- Keil, J. (2023). Lending relationships when creditors are in control. *Journal of Corporate Finance*, 79, 102363.
- Lian, C., & Ma, Y. (2020). Anatomy of Corporate Borrowing Constraints. *Quarterly Journal of Economics*, 136(1), 229–291.
- Merton, R. C. (1974). On the Pricing of Corporate Debt: The Risk Structure of Interest Rates. *Journal of Finance*, 29(2), 449–470.
- Miller, D. P., & Reisel, N. (2012). Do Country-level Investor Protections Affect Security-level Contract Design? Evidence from Foreign Bond Covenants. *Review of Financial Studies*, 25(2), 408–438.
- Murfin, J. (2012). The Supply-Side Determinants of Loan Contract Strictness. *Journal of Finance*, 67(5), 1565–1601.
- Nieuwerburgh, S. V., & Veldkamp, L. (2010). Information Acquisition and Under-Diversification. *Review of Economic Studies*, 77(2), 779–805.
- Nikolaev, V. V. (2018). Scope for Renegotiation in Private Debt Contracts. *Journal of Accounting and Economics*, 65(2-3), 270–301.
- Nini, G., Smith, D. C., & Sufi, A. (2012). Creditor control rights, corporate governance, and

- firm value. *Review of Financial Studies*, 25(6), 1713-1761.
- Nini, G., Smith, D. C., Sufi, A., Nini, G., Smith, D. C., & Sufi, A. (2009). Creditor control rights and firm investment policy. *Journal of Financial Economics*, 92(3), 400-420.
- Paravisini, D., Rappoport, V., & Schnabl, P. (2023). Specialization in Bank Lending: Evidence from Exporting Firms. *Journal of Finance*, 78(4), 2049-2085.
- Prilmeier, R. (2017). Why Do Loans Contain Covenants? Evidence from Lending Relationships. *Journal of Financial Economics*, 123(3), 558–579.
- Rajan, R., & Winton, A. (1995). Covenants and Collateral as Incentives to Monitor. *Journal of Finance*, 50(4), 1113–1146.
- Roberts, M. R. (2015). The Role of Dynamic Renegotiation and Asymmetric Information in Financial Contracting. *Journal of Financial Economics*, 116(1), 61–81.
- Roberts, M. R., & Sufi, A. (2009). Control rights and capital structure: An empirical investigation. *Journal of Finance*, 64(4), 1657–1695.
- Saidi, F., & Streitz, D. (2021). Bank Concentration and Product Market Competition. *Review of Financial Studies*, 34(10), 4999–5035.
- Schenone, C. (2010). Lending Relationships and Information Rents: Do Banks Exploit Their Information Advantages? *Review of Financial Studies*, 23(3), 1149–1199.
- Schwert, M. (2018). Bank Capital and Lending Relationships. *Journal of Finance*, 73(2), 787–830.
- Shan, C., Tang, D. Y., & Winton, A. (2019). Do Banks Still Monitor When there is a Market for Credit Protection? *Journal of Accounting and Economics*, 68(2-3), 101241.
- Smith, C. W., & Warner, J. B. (1979). On Financial Contracting: An Analysis of Bond Covenants. *Journal of Financial Economics*, 7(2), 117–161.
- Stiglitz, J. E., & Weiss, A. (1981). Credit Rationing in Markets with Imperfect Information. *American Economic Review*, 71(3), 393–410.
- Tabak, B. M., Fazio, D. M., & Cajueiro, D. O. (2011). The Effects of Loan Portfolio Concentration on Brazilian Banks' Return and Risk. *Journal of Banking & Finance*, 35(11), 3065–3076.
- Wang, Y., & Xia, H. (2014). Do Lenders Still Monitor When They Can Securitize Loans? *Review of Financial Studies*, 27(8), 2354–2391.

# 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 refers to observations at the firm-quarter level. All variables are described in Table IA1. 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.	25 <sup>th</sup> Pct.	50 <sup>th</sup> Pct.	75 <sup>th</sup> Pct.	Obs.
<b>PANEL A: ORIGINATION SAMPLE</b>						
<b>Loan variables</b>						
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
<b>Firm variables</b>						
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
<b>PANEL B: VIOLATIONS SAMPLE</b>						
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 IA1.  $t$  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*** (-4.17)	-6.96*** (-4.19)	-7.14*** (-4.31)	-8.52*** (-6.82)	-0.09 (-0.080)
Ln(Assets)		2.38 (1.05)	3.00 (1.63)	1.54 (1.23)	-0.74 (-0.54)
EDF		5.73 (0.65)	5.76 (0.66)	14.98* (1.73)	-11.76* (-1.76)
Tangibility		-32.23*** (-6.27)	-32.69*** (-5.52)	-46.00*** (-8.42)	-0.84 (-0.15)
Leverage		-0.24** (-2.47)	-0.24** (-2.17)	-0.21 (-1.51)	0.02 (0.32)
Current Ratio		-3.58*** (-3.05)	-3.68*** (-3.09)	-1.84 (-1.33)	-3.22*** (-4.01)
Ln(1+Int. Cover. Ratio)		-19.08*** (-13.1)	-19.00*** (-13.4)	-20.29*** (-18.2)	-1.73 (-1.14)
Market-to-Book		-1.71 (-0.63)	-1.84 (-0.70)	0.34 (0.19)	-1.78 (-1.10)
Ln(Loan Maturity)			-1.10 (-0.54)	-1.88 (-1.32)	-0.19 (-0.15)
Ln(Lenders)			-0.50 (-0.38)	0.85 (0.82)	-0.73 (-0.65)
Ln(Loan Amount)			-0.72 (-0.31)	-2.43 (-1.28)	1.95 (1.61)
Revolver Fraction			3.58 (1.53)	1.81 (0.75)	3.23 (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 <sup>2</sup>	.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 IA1.  $t$  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 (-0.54)	1.04 (0.31)	0.43 (1.19)	-10.29 (-1.55)	0.00 (0.028)	0.03 (1.16)	0.03 (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:

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

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  $t$ .  $\text{Specialization (Yearly)}_{b,i,t}$  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)	Interquart. Range	Std. Dev.	Kurtosis	Diff(Max, Min)	Interquart. Range	Std. Dev.	Kurtosis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specialization (Yearly)	2.072*** (3.28)	1.080* (1.76)	-0.037 (-0.13)	0.047** (2.24)	7.753*** (4.38)	0.340 (0.44)	0.966* (1.74)	0.076*** (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 IA1.  $t$  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*** (-3.15)	-0.0082*** (-5.40)	-0.0088*** (-5.77)	-0.0084*** (-5.52)	-0.0085*** (-5.68)	-0.0082*** (-5.32)
Specialization	0.0001 (0.45)	0.0000 (0.24)	-0.0000 (-0.12)	-0.0001 (-0.26)	0.0023* (1.81)	0.0016 (1.17)
Violation×Specialization		0.0031*** (3.92)	0.0031*** (4.04)	0.0031*** (3.95)	0.0030*** (3.91)	0.0030*** (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 IA1.  $t$  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*** (-3.12)	-0.0481** (-2.37)	0.0484*** (5.87)
Specialization	0.0007 (0.32)	-0.0024 (-0.37)	0.0005 (0.100)
Violation×Specialization	0.0032** (2.32)	0.0102* (1.73)	-0.0098** (-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:

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

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  $i$ ).  $\text{Specialization}_{b,i,t-1}$  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).  $\text{Other Var}$  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 IA1.  $t$  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*** (-4.27)	-7.17*** (-4.32)	-7.10*** (-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 $\times$ year-quarter, industry $\times$ year-quarter, and end-of-fiscal-year quarter fixed effects ("Fixed Effects" in the table).  $X_{f,t}$  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 IA1.  $t$  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*** (-3.70)	-0.0209*** (-3.24)	-0.0011 (-0.25)
Specialization	0.0016 (1.16)	0.0021 (1.45)	0.0016 (1.16)
Violation $\times$ Specialization	0.0030*** (3.57)	0.0029*** (2.98)	0.0030*** (3.52)
Market Share	0.0008 (0.44)		
Violation $\times$ Market Share	0.0046 (0.62)		
Ln(1+Distance)		0.0001* (1.87)	
Violation $\times$ Ln(1+Distance)		0.0019* (1.90)	
Rel. Intensity (Qtr)			-0.0013** (-2.20)
Violation $\times$ Rel. Intensity (Qtr)			-0.0080* (-1.77)
Fixed Effects	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
Diff. Firm Controls	Yes	Yes	Yes
Firm Controls $\times$ Spec	Yes	Yes	Yes
Diff. Firm Controls $\times$ 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:

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

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).  $\text{Specialization}_{b,i,t-1}$  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).  $\mathbb{I}(\text{No First Loan})_{b,f,l,t}$  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 IA1.  $t$  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** (-2.37)	-7.40*** (-2.77)	-8.22*** (-3.22)	-9.82*** (-5.84)	0.70 (0.42)
$\mathbb{I}(\text{No First Loan})$	-4.05 (-1.19)	-3.49 (-0.97)	-4.56 (-1.34)	-7.87** (-2.37)	4.02** (2.46)
$\mathbb{I}(\text{No First Loan}) \times \text{Specialization}$	-0.85 (-0.26)	0.54 (0.17)	1.31 (0.42)	1.63 (0.63)	-0.98 (-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:

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

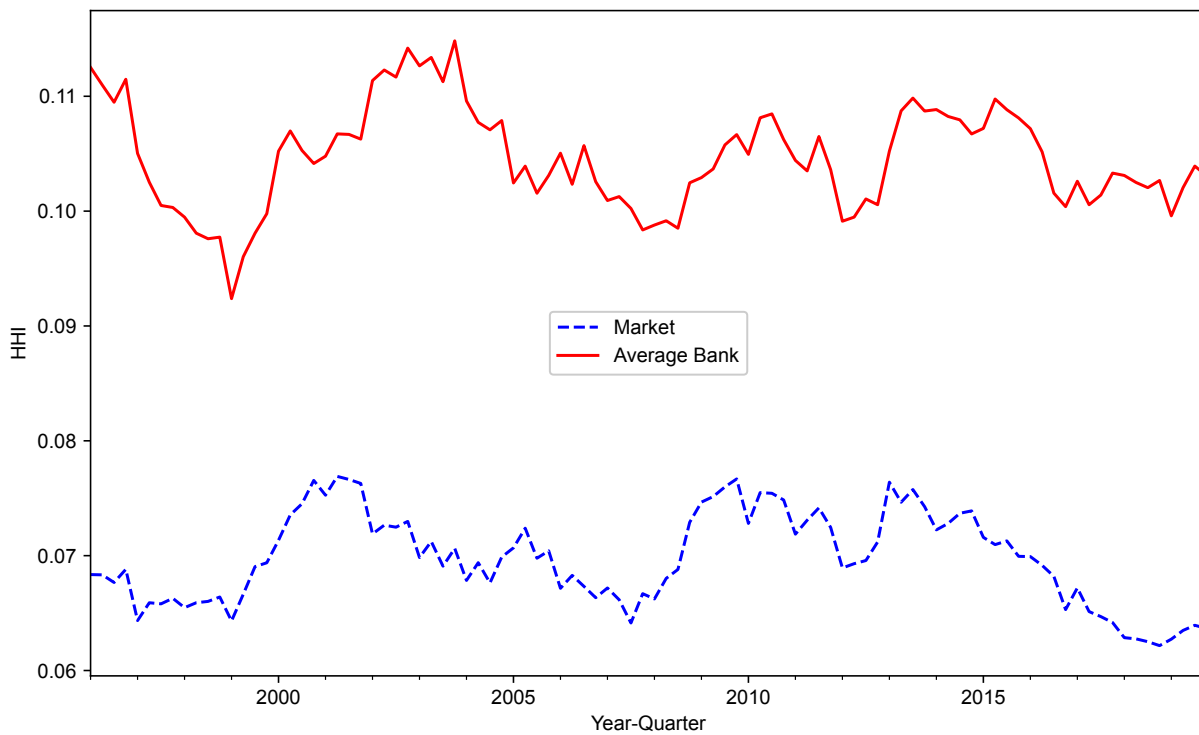
where the dependent variable is the change in firm  $f$ 's investment from year-quarter  $t$  to  $t + 4$ .  $Violation_{f,t}$  is equal to 1 if firm  $f$  experiences a new covenant violation in year-quarter  $t$ , and to 0 otherwise.  $Specialization_{b,i,t}$  is the ratio of firm  $f$ 's main bank  $b$ '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.  $\alpha_{b,t}$ ,  $\alpha_{i,t}$ , and  $\alpha_{fiscal\ t}$  are respectively bank $\times$ year-quarter, industry $\times$ year-quarter, and end-of-fiscal-year quarter fixed effects ("Fixed Effects" in the table).  $X_{f,t}$  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 IA1.  $t$  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:		
	High EDF	High Leverage	Low Interest Coverage
Change in Investment	(1)	(2)	(3)
Violation	-0.0116*** (-3.03)	-0.0098*** (-3.20)	-0.0074*** (-3.74)
Specialization	0.0020 (1.16)	0.0015 (1.02)	0.0013 (0.86)
Violation $\times$ Specialization	0.0073*** (5.77)	0.0046** (2.47)	0.0029*** (3.08)
$\mathbb{I}(z = Z)$	-0.0020* (-1.84)	-0.0016*** (-2.70)	-0.0075*** (-5.82)
Violation $\times$ $\mathbb{I}(z = Z)$	0.0127 (1.50)	0.0175* (1.86)	0.0141** (2.50)
$\mathbb{I}(z = Z)\times$ Specialization	-0.0009 (-1.26)	0.0008** (2.08)	0.0022*** (2.74)
Violation $\times$ $\mathbb{I}(z = Z)\times$ Specialization	-0.0108*** (-3.06)	-0.0126** (-2.21)	-0.0036 (-0.75)
Fixed Effects	Yes	Yes	Yes
Firm Controls, Diff. Firm Controls	Yes	Yes	Yes
(Firm Controls, Diff. Firm Controls) $\times$ Spec	Yes	Yes	Yes
$R^2$	.14	.14	.139
Obs.	51,576	51,819	52,193

# Figures

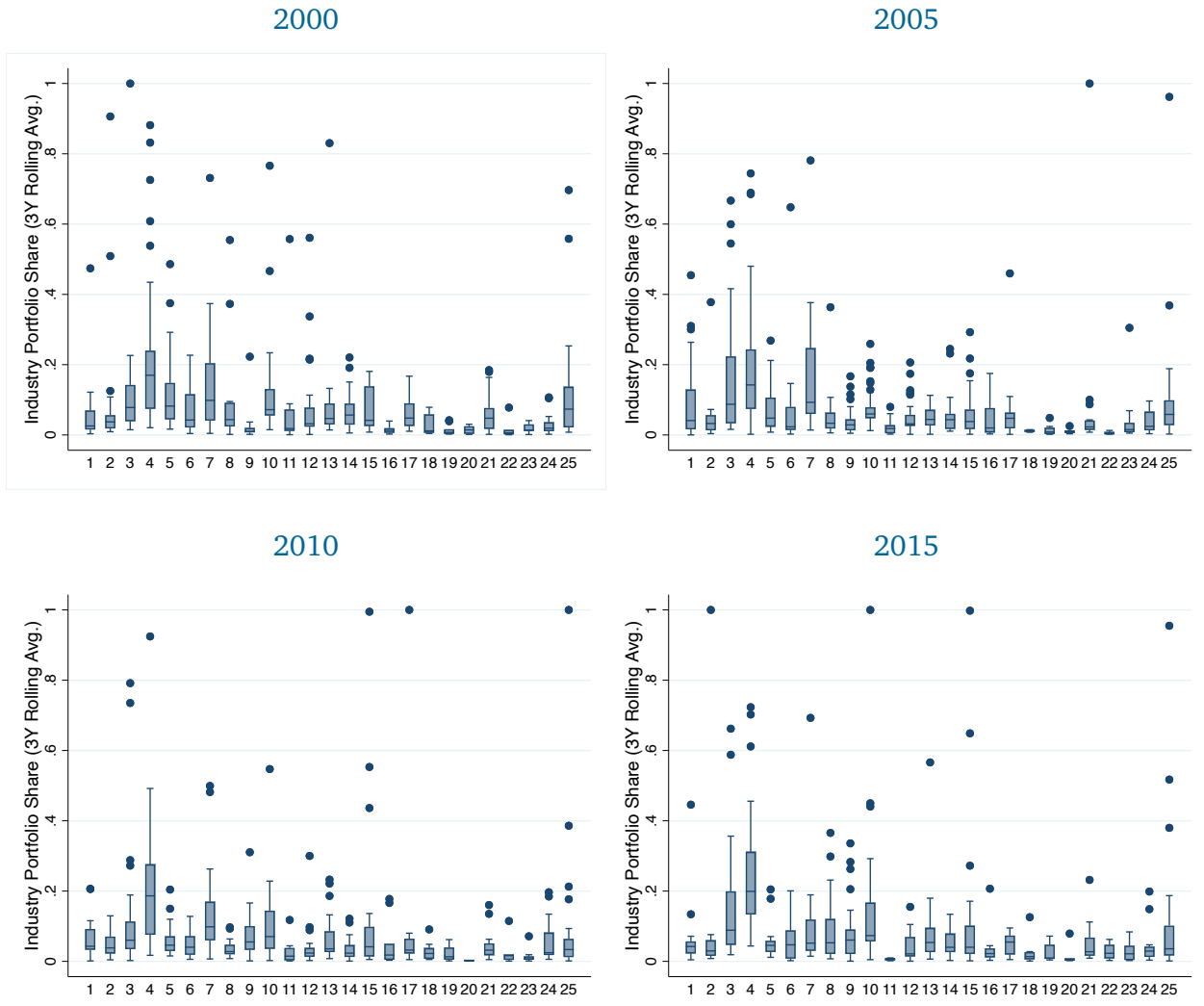
**Figure 1.** Comparison Between Portfolio Concentration of the Average Bank and the “Market”

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.



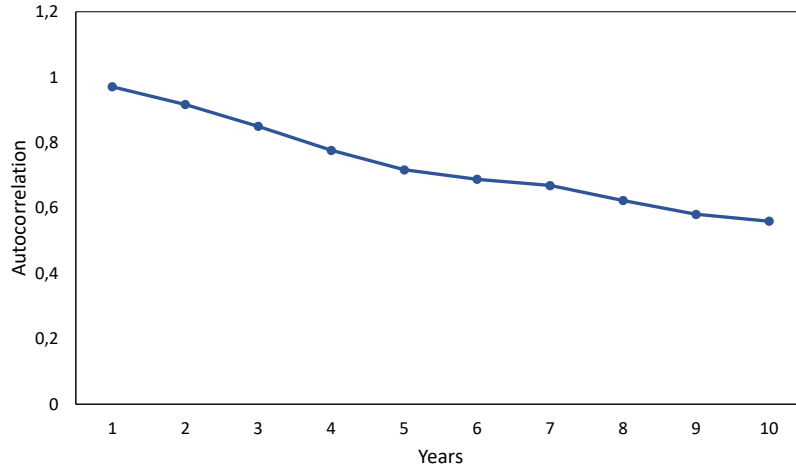
**Figure 2. Specialization Is Common Across Industries and Time**

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.



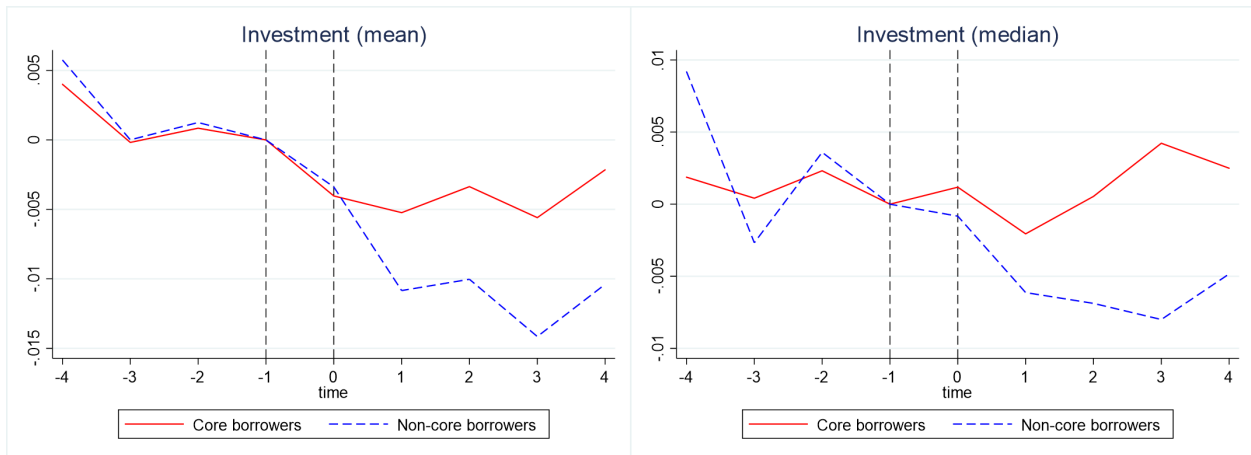
**Figure 3.** Specialization Is Persistent Over Time

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  $t - 1$ .



# Internet Appendix

**Table IA1.** 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 <a href="#">Bharath and Shumway (2008)</a> , 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	$(\text{dlttq} + \text{dlcq})/\text{Tangible Net Worth}$	Compustat	float
Current Ratio	actq/1ctq	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	$(\text{Equity Market Cap} - \text{Book Equity} + \text{Assets})/\text{Assets}$	Compustat	float
Capital Expenditures	$\text{capxy}(t, Q) - \sum_{q=1}^{Q-1} \text{capxy}(t, q)$ , 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 IA1.** 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 <a href="#">Demerjian and Owens (2016)</a>	Dealscan	float (%)
Covenant Strictness (Performance only)	Ex-ante probability of violating a performance covenant. See <a href="#">Demerjian and Owens (2016)</a>	Dealscan	float (%)
Covenant Strictness (Capital only)	Ex-ante probability of violating a capital covenant. See <a href="#">Demerjian and Owens (2016)</a>	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 <code>allindrawn</code> in package weighted by <code>facilityamt</code>	Dealscan	basis points
AISU (All-In Spread Undrawn)	Average of each facility's <code>allinundrawn</code> in package weighted by <code>facilityamt</code>	Dealscan	basis points
Spread over Libor	Average of each facility's <code>maxbps_libor</code> in package weighted by <code>facilityamt</code>	Dealscan	basis points
TCB	Total cost of borrowing (see <a href="#">Berg et al. 2016</a> )	Dealscan	basis points
I(PP)	Average of each facility's dummy equal to 1 if facility has performance pricing grid, weighted by <code>facilityamt</code>	Dealscan	float (%)
Loan Amount	$\text{Ln}(\text{dealamount})$	Dealscan	USD
Maturity	$\text{Ln}(\text{average of each facility's maturity in package weighted by facilityamt})$	Dealscan	months
Lenders	$\text{Ln}(\text{N. syndicate members})$	Dealscan	int
Revolver Fraction	Revolver credit amount in package / <code>dealamount</code>	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 IA2. 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 IA1.  $t$  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** (-2.76)	-9.58*** (-3.59)	-9.56*** (-3.61)	-10.50*** (-6.73)	-1.20 (-0.82)
$\mathbb{I}(Big3) \times$ Specialization	-0.85 (-0.21)	7.68* (1.71)	7.09 (1.68)	5.81* (1.71)	3.24 (1.12)
Bank $\times$ YearQtr FE	Yes	Yes	Yes	Yes	Yes
Industry $\times$ YearQtr FE	Yes	Yes	Yes	Yes	Yes
Bank $\times$ 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 IA4. 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:

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

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  $i$ ).  $\text{Specialization } (nY)_{b,i,t-1}$  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  $\times$  year-quarter, industry  $\times$  year-quarter, and bank  $\times$  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 $\times$ YearQtr FE	Yes	Yes	Yes	Yes	Yes
Industry $\times$ YearQtr FE	Yes	Yes	Yes	Yes	Yes
Bank $\times$ 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 IA5. 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 IA1.  $t$  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*** (-4.40)	-0.0078*** (-4.89)	-0.0082*** (-5.32)	-0.0087*** (-5.60)	-0.0080*** (-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			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 IA6.** 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	Doerr & Schaz	De Haas & Van Horen
	(1)	(2)	(3)	(2014)	(2021)	(2013)
Specialization	-6.7*** (-5.08)	-7.1*** (-4.31)	-7.08*** (-3.90)	-4.56*** (-3.62)	-4.82*** (-3.59)	-6.83*** (-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 IA7. 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 ("Fixed Effects" in the table).  $X_{f,t}$  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 IA1.  $t$  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.

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	CHANGE IN INVESTMENT					
	Starting Samples			Loan Share Attribution Methods		
	Amend/Restate	From 1996	No Term Loans B	Chodorow-Reich	Doerr & Schaz	De Haas & Van Horen
	(1)	(2)	(3)	(4)	(5)	(6)
Violation	-0.0079*** (-5.35)	-0.0082*** (-5.32)	-0.0085*** (-5.48)	-0.0089*** (-5.93)	-0.0090*** (-6.12)	-0.0081*** (-5.33)
Specialization	0.0012 (1.05)	0.0016 (1.17)	0.0016 (1.14)	0.0018 (1.31)	0.0017 (1.24)	0.0016 (1.25)
Violation × Specialization	0.0028*** (3.73)	0.0030*** (3.56)	0.0032*** (3.74)	0.0035*** (3.71)	0.0036*** (3.67)	0.0029*** (3.55)
Fixed Effects	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 IA8.** 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:

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

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). *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*** (−2.85)	−120.56*** (−6.82)	2.41 (0.12)
Adj. $R^2$	.576	.608	.386
Obs.	3,258	3,258	3,258
Portfolio Share	−93.91*** (−2.85)	−120.56*** (−7.03)	2.41 (0.12)
Adj. $R^2$	.576	.608	.386
Obs.	3,258	3,258	3,258
Favorite Industry	−11.24** (−2.69)	−9.33* (−2.01)	−4.51* (−1.81)
Adj. $R^2$	.576	.605	.387
Obs.	3,258	3,258	3,258

**Table IA9. 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:

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

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  $t$ . *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*** (3.11)	29.477** (2.09)	-4.556 (-0.51)	1.453** (2.26)	239.132*** (6.33)	35.611 (1.36)	43.483** (2.63)	1.827*** (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*** (3.11)	29.495** (2.08)	-4.546 (-0.51)	1.456** (2.26)	238.875** (6.31)	35.088 (1.34)	43.258** (2.62)	1.829*** (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* (1.89)	4.911* (1.73)	1.716 (0.98)	-0.107 (-1.27)	29.973*** (3.39)	4.304 (0.61)	2.976 (0.77)	0.344*** (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 IA10.** 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 IA1.  $t$  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*** (-4.27)	-0.0079*** (-4.43)	-0.0052*** (-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 IA12.** 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 IA1.  $t$  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*** (-5.38)	-0.0067*** (-3.11)	-0.0066*** (-2.98)	-0.0077*** (-4.79)	-0.0068*** (-3.10)	-0.0066*** (-2.77)
Specialization	-0.0001 (-0.26)	-0.0000 (-0.17)	-0.0000 (-0.11)	0.0158*** (3.29)	0.0016 (1.08)	0.0018 (0.20)
Violation×Specialization	0.0031*** (3.91)	0.0022* (1.89)	0.0022* (1.87)	0.0027*** (3.29)	0.0023* (1.81)	0.0022* (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 IA15. 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 IA1.  $t$  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** (-2.12)	-0.0114*** (-2.81)	-0.0118*** (-2.88)	-0.0107** (-2.63)	-0.0119*** (-2.82)	-0.0104** (-2.63)
Specialization	0.0001 (0.40)	0.0001 (0.25)	-0.0000 (-0.11)	-0.0001 (-0.25)	0.0022* (1.80)	0.0016 (1.14)
Violation (First) × Specialization		0.0063** (2.28)	0.0063** (2.25)	0.0059** (2.11)	0.0064** (2.20)	0.0056** (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

