Costs of Borrowing: The Role of Borrower Shareholders' Equity Holdings of the Lenders

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Abstract

We find that when shareholders of a borrower hold more equities of the borrower's lenders, loan spreads are reduced. We address endogeneity concerns by using borrower and lender fixed effects, examining borrower shareholders' equity holdings of all lending institutions (not just the borrower's actual lenders), investigating borrower-lender matching, and conducting a difference-in-differences analysis exploiting the mergers of institutional investors. Further tests on cross-holding shareholders' holding period, subsamples of borrowers subject to different degrees of shareholder-creditor conflicts, and the number of financial covenants lend support to the hypothesis that borrower shareholders' equity holdings of the lenders reduce agency costs of debt.

JEL classification: G32, G23

Keywords: Borrower shareholders' equity holdings of the lenders, Loan spreads, Shareholder-creditor conflicts of interest, Agency costs of debt, Institutional ownership

1. Introduction

The classical economic framework considers shareholders and creditors of a firm as two independent groups of investors, whose diverged interests are an important source of frictions in the capital market and have tangible effects on borrowing costs (e.g., Jensen and Meckling 1979; Myers 1977). However, in the syndicated loan market, it is common for a borrower's institutional shareholders to simultaneously hold substantial equities of the borrower's lenders. For example, on November 10, 2016, Pfizer Inc. obtained a $7 billion syndicated loan from lenders including Citibank, Goldman Sachs, JP Morgan, Morgan Stanley, and Bank of America. A group of Pfizer's institutional shareholders holds 66%, 63%, 70%, 55%, and 59% of the above-mentioned lenders' equities, respectively.[1] Based on information available in the DealScan database, we find that the borrower's shareholders cross hold equities of the lenders in 96% of the loans in the past three decades;[2] these borrowers' shareholders hold a staggering 37% of the lender's equities on average. Despite the prevalence of this phenomenon, there is little evidence on whether borrower shareholders' equity holdings of the lenders affect the financing frictions in the credit market and ultimately affect the borrowing costs.

As borrower shareholders hold more equities of the lenders, the cost of borrowing could either decrease or increase. On the one hand, the cost of borrowing could decrease because shareholders of the borrower may take into account of their stakes in the lenders and have to (at least partially) internalize the costs to the lenders if the borrower expropriates lender wealth, thereby reducing the shareholder-creditor conflicts of interest. Consistent with this argument, Jiang, Li, and Shao (2010) show that when shareholders directly provide loans to the firm, loan spreads decrease. *Ceteris paribus,* for a borrower whose shareholders hold significant equity interests of its lenders, the net benefit to the shareholders from expropriating lender wealth should be smaller than that for a borrower whose shareholders hold few equity interests of its lenders. If so, the extent to which borrower shareholders hold equities of the lenders should have a negative association with loan spreads (the interest alignment hypothesis).

On the other hand, the cost of borrowing could increase because lenders could take advantage of their connections with the borrower's shareholders to extract rents from the borrower,

[1] Appendix A presents the equity ownership of Pfizer Inc. and the lenders by four large borrower-lender cross-holding shareholders, including BlackRock Inc., Vanguard Group, State Street Corporation, and T. Rowe Price Group, Inc.
[2] The sample includes loans granted to U.S. public firms by at least one U.S. public lender between 1987 and 2016.

thereby exacerbating the hold-up problem (e.g., Sharpe 1990; Rajan 1992). Consistent with this argument, Ferreira and Matos (2012) show that when firms' institutional shareholders and the lead commercial bank lender belong to the same financial group, loan spreads increase. *Ceteris paribus*, as shareholders of the borrower own more equities of the lenders, they are more likely to promote the lenders' interest; as a result, the lenders may be better able to pressure the borrower to accept unfavorable lending terms. If so, the extent to which borrower shareholders hold equities of the lenders should have a positive association with loan spreads (the hold-up hypothesis).

To test whether the interest alignment hypothesis or the hold-up hypothesis prevails, we use a comprehensive set of syndicated loans granted to U.S. non-financial public firms between 1987 and 2016. We capture borrower shareholders' equity holdings of the lenders using two measures. The first measure is the *Proportion of the lenders held by borrower shareholders*, calculated as the number of the syndicated loan lenders held by the borrower's shareholders over the total number of lenders of the loan. The second measure is the *Percentage of the lenders' equities held by borrower shareholders*, calculated as the average of each syndicated loan lender's percentage equity held by the borrower's shareholders.

In our baseline analysis, supporting the interest alignment hypothesis, but not the hold-up hypothesis, we find a significant negative association between borrower shareholders' equity holdings of the lenders and loan spreads. With respect to the economic significance, a one-standard-deviation increase in the *Proportion of the lenders held by borrower shareholders* is associated with an 8.0 basis points (bps) reduction in loan spreads; a one-standard-deviation increase in the *Percentage of the lenders' equities held by borrower shareholders* is associated with a 10.3 bps reduction in loan spreads. This economic significance is comparable to those reported in recent studies on syndicated loan spreads.[3] We obtain these results with various fixed effects and an extensive set of control variables. First, we include borrower, lender, and year fixed effects to control for borrower-, lender-, and year-specific omitted variables. In particular, the borrower fixed effects mitigate the concern that some uncontrolled time-invariant firm characteristics may determine both borrower shareholders' equity holdings of the lenders and loan spreads. Second, we control for various measures of borrower credit quality, including distance-

[3] For example, Campello and Gao (2017) document that a one-standard-deviation increase in customer concentration is associated with a 10 bps increase in loan spreads; Bushman, Williams, and Wittenberg-Moerman (2017) show that a one-standard-deviation increase in media sentiment is association with a 6.9 bps decrease in loan spreads.

to-default and the existence of an investment-grade rating. Third, we control for borrower's total institutional ownership to address the concern that high-quality firms may have greater institutional ownership, which could be positively correlated with the borrower shareholders' equity holdings of the lenders and drive our results. Fourth, we control for the lenders' equity holdings of the borrowers (i.e., dual ownership) to address the concern that lenders whose equities are substantially held by their borrower's shareholders may also directly hold shares of the borrower.

Despite the various fixed effects and the careful inclusion of control variables, we are cautious about drawing a causal inference. In particular, borrower credit quality could be positively correlated with borrower shareholders' equity holdings of the lenders, leading to the results reported in the baseline analysis. We take three tests to address this concern.

First, a positive association between borrower credit quality and borrower shareholders' equity holdings of the lenders could arise if institutional portfolios that include equities of more (fewer) lending institutions are likely to hold high (low) credit quality firms, resulting in higher (lower) borrower shareholders' equity holdings of the actual lenders for high (low) credit quality borrowers. This argument is plausible considering that commercial banks and other lending institutions that are likely to be major lenders in the syndicated loan market typically have large capitalization. On the one hand, portfolios that hold more lending institutions are more likely to hold larger size and possibly higher credit quality firms, increasing the likelihood of high credit quality borrowers being in the same portfolios with their actual lenders. On the other hand, asset managers who specialize in low credit quality (even distressed) firms and are less likely to hold lending institutions, reducing the likelihood of low credit quality borrowers being in the same portfolios with their actual lenders. If so, the borrower shareholders' equity holdings of all lending institutions rather than their equity holdings of the actual lenders should drive our results. To evaluate this possibility, we add to our baseline regression a variable that captures the borrower shareholders' equity holdings of all public lending institutions. According to this alternative argument, we should not observe any significant effects of borrower shareholders' equity holdings of its actual lenders on loan spreads after controlling for the additional variable. We find that this is not the case – the coefficient on borrower shareholders' equity holdings of its actual lenders has similar economic and statistical significance as in the baseline results.

Second, a positive association between borrower credit quality and borrower shareholders'

equity holdings of the lenders could arise if high credit quality borrowers are more likely to take loans from lenders of which the borrowers' shareholders have higher equity ownership. This argument is plausible if the lenders' connections with the borrower through sharing the same institutional shareholders could help the lenders win loan businesses from high credit quality borrowers. Following this argument, the negative association between loan spreads and borrower shareholders' equity holdings of the lenders could be a result of the matching between high credit quality borrowers and their highly cross-held lenders. To evaluate this possibility, we examine whether a borrower's likelihood to obtain a loan from a more substantially cross-held lender is higher when the borrower's credit quality, proxied by the existence of an investment-grade rating or the distance-to-default, is higher. We find that this is not the case – although borrowers are in general more likely to obtain loans from lenders of which the borrowers' shareholders have higher equity ownership, this association is not affected by the credit quality of borrowers.

Third, we use the mergers of institutional investors as an exogenous increase in borrower shareholders' equity holdings of the lenders and conduct a difference-in-differences analysis.[4] Specifically, consider the merger between two institutional investors A and B. The treatment group includes borrowers who are held by A but not B and whose lenders are held by B but not A.[5] For borrowers in the treatment group, the merger of A and B adds one more borrower-lender cross-holding shareholder, thus increasing the borrower shareholder's equity holding of the lenders. The control group includes all other borrowers held by the two merging institutions. The results from the difference-in-differences analysis show that the borrowers in the treated group experience a greater reduction in loan spreads after the merger than borrowers in the control group, supporting a causal interpretation.

The results so far are consistent with the prediction of the interest alignment hypothesis. We further conduct three tests to investigate whether the reduction in shareholder-creditor conflicts is likely to be the working mechanism through which borrower shareholders' equity holdings of the lenders reduce loan spreads. First, we explore the holding periods of cross-holding shareholders. Intuitively, if institutions cross hold the borrower and its lenders only for a short

[4]Similarly using the mergers of financial institutions in difference-in-differences analyses, He and Huang (2016) study how common block holders improve firms' coordination in the product market, Chu (2017) studies how dual holders reduce shareholder-creditor conflicts of interest as reflected in dividend payments, and He, Liang, Wang and Xia (2019) study the information hold-up problems in syndicated loans.

[5] We focus on the lead lenders rather than major lenders in this exercise because it is rare for firms to take two consecutive loan packages from exactly the same set of major lenders. Please see Section 4.3 for more details.

period after loan initiation, they are less likely to reduce the shareholder-creditor conflicts of interests during the course of the loan. We find that after the inception of the loan, close to 70% of the cross-holding shareholders continue to hold the equities of the borrower and its lenders for the average duration of the loans in our sample, making it possible for them to align the interests between borrowers and lenders over the duration of the loan.

Second, if borrower shareholders' equity holdings of the lenders reduce loan spreads through alleviating shareholder-creditor conflicts of interest, the effect should be more prominent for borrowers subject to a higher degree of shareholder-creditor conflicts. Consistent with this prediction, we find that the effect of borrower shareholders' equity holdings of the lenders on loan spread reductions exists exclusively within borrowers without an investment-grade rating, and is much stronger for borrowers with a below-median distance-to-default than for borrowers with an above-median distance-to-default.

Third, we explore whether borrower shareholders' equity holdings of the lenders are associated with fewer financial covenants included in the debt contract. If borrower shareholders' equity holdings of the lenders reduce shareholder-creditor conflicts, they should reduce the need for intense creditor control through financial covenants. Supporting this conjecture, we find that borrower shareholders' equity holdings of the lenders have a significant negative association with the number of financial covenants included in the loan contracts. Taken together, the evidence from the above three tests lends support to the interest alignment hypothesis that borrower shareholders' equity holdings of the lenders reduce loan spreads because of the reduced shareholder-creditor conflicts.

Our paper contributes to two strands of literature. First, our paper is related to the literature that examines the situations in which the interest of shareholders and that of creditors are intertwined. Previous studies focus on dual ownership – lenders' direct equity holdings of their borrowers (e.g., Jiang et al. 2010; Ferreira and Matos 2012; Santos and Wilson 2007; Chu 2017; Bodnaruk and Rossi 2018). By examining dual ownership in various settings, previous studies provide evidence that dual ownership could either decrease loan spreads due to alleviated shareholder-creditor conflicts of interest (Jiang, Li, and Shao 2010) or increase loan spreads due to a more severe hold-up problem (Ferreira and Matos 2012). Given that borrower shareholders' equity holdings of the lenders are a prevalent phenomenon that has not been systematically analyzed in the literature, it is important to provide evidence on their effects on financing terms.

Second, our results complement recent studies on the effects of cross-owners/common-owners in various settings, including product market competition and coordination (e.g., He and Huang 2017; Azar, Schmalz, and Tecu 2018), mergers and acquisitions (e.g., Matvos and Ostrovsky 2008; Harford, Jenter, and Li 2011), shareholder voting and governance (e.g. Kempf, Manconi, and Spalt 2016; He, Huang, and Zhao 2018), executive compensation (e.g., Antón, Ederer, Giné, and Schmalz 2018), and corporate disclosure (Park, Sani, Shroff, and White 2019). Our evidence suggests that shareholders' simultaneous holdings of borrowers and lenders has a positive externality in the syndicated loan market by reducing agency conflicts between borrowers and lenders.

In a contemporaneous work, He et al. (2019) study the blockholders of the borrower who also block hold banks *other than* its current lenders. They focus on the role of blockholders in preventing the informational hold-up problem in a lending relationship. We examine borrower shareholders' equity holdings of the actual lenders and show that they reduce agency costs of debt. The evidence in both studies together allows us to have a more comprehensive understanding of the effects of institutional cross-holding in the equity market on the credit market.

2. Sample construction, measures, and summary statistics

2.1 Sample construction

We begin our sample construction by obtaining all loan facilities granted to U.S. non-financial and non-utility borrowers between 1987 and 2016 available in the Loan Pricing Corporation's (LPC) DealScan database.[6] We exclude loan facilities that are not denominated in U.S. dollars or with a missing loan spread (i.e., all-in-drawn). We require that both the borrower and at least one of the lenders are U.S. public firms, such that it is possible for borrowers' shareholders to hold equities of the lenders.[7] Following Jiang et al. (2010), the lenders of each facility refer to the major participants.[8]

We obtain data on institutional holdings from the Thomson Reuters 13F database to

[6] The starting year of our sample is 1987 because DealScan's coverage of syndicated loans is sparse before 1987.
[7] We use the lender file compiled by Schwert (2018) to identify lenders' GVKEY. Because Schwart (2018) collects information only on lead lenders, we manually collect GVKEY for the lenders that have not assumed a lead lender role in DealScan,.
[8] Major participants include "Admin agent," "Agent," "Arranger," "Bookrunner," "Co-agent," "Co-arranger," "Co-lead arranger," "Co-lead manager," "Co-manager," "Co-syndications agent," "Documentation agent," "Lead arranger," "Lead bank," "Lead manager," "Manager," "Managing agent," "Senior co-arranger," "Senior lead manager," "Senior managing agent," "Sole lender," and "Syndications agent."

construct the borrower shareholders' equity holdings of the lenders.[9] The U.S. Securities and Exchange Commission (SEC) requires any institutions with over $100 million in assets under management to file a Schedule 13F form to disclose their U.S. equity holdings every quarter.[10] The reporting institutions of the Schedule 13F form are asset managers. We manually group filing asset managers into manager groups using institution names and calculate the equity ownership at the manager group level.

We obtain borrowers' accounting information from the Compustat database and stock information from the Center for Research in Security Prices (CRSP). We exclude observations with missing data on the variables specified in Appendix B. Our final sample consists of 18,581 loan facility-level observations.

2.2 Measuring borrower shareholders' equity holdings of the lenders

We capture borrower shareholders' equity holdings of the lenders using two measures. The first measure is the *Proportion of the lenders held by borrower shareholders*, calculated as the number of lenders held by borrower shareholders over the total number of lenders of the loan facility:

$$Proportion\ of\ the\ lenders\ held\ by\ borrower\ shareholders_i = \frac{\sum_{k=1}^{n} Dummy{:}\ lender\ k's\ \ equity\ is\ held\ by\ \ borrower\ shareholders}{n}, \quad (1)$$

where i indexes the loan facility, k indexes the lenders of the loan facility, and n is the total number of lenders for the loan facility.

The second measure is the *Percentage of the lenders' equities held by borrower shareholders*, calculated as the sum of the percentage of each lender's equity ownership held by borrower shareholders over the total number of lenders of the loan facility:

$$Percentage\ of\ the\ lenders' equities\ held\ by\ borrower\ shareholders_i$$

[9] The data in the current version of the paper is retrieved in August 2018.

[10] We do not consider the institutional ownership of foreign lenders, because the SEC requires institutions to report their holdings of "shares of a foreign issuer only if those shares are traded on a United States exchange (e.g., NYSE, AMEX) or are quoted on the NASDAQ National Market System (this excludes "pink sheet" ADRs)." "Shares of securities that trade on non-United States exchanges (e.g., Toronto Stock Exchange, London's FTSE, Tokyo's Nikkei) should not be reported on Form 13F." Please see the details at https://www.sec.gov/divisions/investment/13ffaq.htm. As a result, if a foreign lender issues ADRs that are traded on a United States exchange, we observe institutional ownership of the foreign lender in the Thomson Reuters 13F database, but such ownership is very small compared to the total market capitalization of the foreign lender. For example, Barclays, a prominent lender in the DealScan database, is a lender based in the United Kingdom; as of December 2016, the total institutional ownership reported in the Thomson Reuters 13F database accounts for only 2% of its total market capitalization.

$$= \frac{\sum_{k=1}^{n} lender\ k's\ percentage\ equity\ held\ by\ borrower\ shareholders}{n}, \quad (2)$$

where i indexes the loan facility, k indexes the lenders of the loan facility, and n is the total number of lenders for the loan facility.[11]

We use Pfizer Inc.'s loan originated on November 10, 2016 to illustrate these two measures. Following the definition in Jiang et al. (2010), major lenders of this loan facility include JP Morgan as the "Admin agent," Barclays, Bank of America, and Citibank as the "Syndications agents," and Goldman Sachs, HSBC, Deutsche Bank, Credit Suisse, Royal Bank of Canada, and Morgan Stanley as the "Documentation agents." Among these ten major lenders, Bank of America, Citibank, Goldman Sachs, JP Morgan, and Morgan Stanley are U.S. public firms. As of September 30, 2016 (i.e., the quarter-end preceding the origination date of the loan), Pfizer's shareholders own equity interests in all these five public U.S. lenders. Specifically, they together hold 59% of Bank of America, 66% of Citibank, 63% of Goldman Sachs, 70% of JP Morgan, and 55% of Morgan Stanley. For this loan facility, the *Proportion of the lenders held by borrower shareholders* equals 0.5 (i.e., 5/10), and the *Percentage of the lenders' equities held by borrower shareholders* equals 31.3% (i.e., (59%+66%+63%+70%+55%)/10).

2.3 Summary statistics

It is common for borrower shareholders to hold equities of the lenders. We find that, for 96% of the loan facilities in our sample, at least one borrower shareholder holds equities of the lenders. For these loans, Panel A of Table 1 presents the summary statistics. For each loan facility, there are 161 borrower shareholders who cross-hold equities of the lenders on average. These cross-holding shareholders hold a substantial fraction of the lenders – on average, they hold equities of three out of four lenders of a loan, and their equity ownership of each of the cross-held lenders is 37%. Cross-holding shareholders' equity holdings of the borrower are also substantial – on average, they hold 47% of the borrower's equities, and their equity holdings constitute 75% of the borrower's total institutional ownership.

Panel B of Table 1 provides the summary statistics of variables used in the regressions. All variables are winsorized at the 1% and 99% level to mitigate the influence of outliers. For all 18,581 loans in our sample, on average, borrower shareholders hold equities of 78% of the lenders,

[11] We do not explicitly consider loan allocations to each lender in these two measures because such information is only available for 43% of the loans in our sample. The implicit assumption in the two measures is that all major lenders of a syndicated loan provide equal amount for the loan.

and these shareholders' equity interests accounts for 22% of each lender's equities. The large extent of borrower shareholders' equity holdings of the lenders highlights the importance of understanding their effects on the credit market. On average, institutional investors hold 58% of the borrowers' equities. For the majority of the sample observations, lenders do not own equities of the borrowing firms. On average, loans in our sample have four lenders, the majority of which are commercial bank lenders. The average loan spread is 182 bps, the average loan size is $473 million, and the average maturity is 47 months.

3. Baseline results

To assess the association between borrower shareholders' equity holdings of the lenders and loan spreads, we estimate the following equation:

$$Loan\ spread_{i,t} = \alpha + \beta\ Borrower\ shareholders'\ equity\ holdings\ of\ the\ lenders_{i,t-1} + \delta\ Other\ ownership\ characteristics_{i,t-1} + \gamma\ Borrower\ characteristics_{i,t-1} + \mu\ Loan\ characteristics_{i,t} + Loan\ type_k + Borrower_i + \sum_{j=1}^{n} Lender_j + Year_t + \varepsilon_{i,t}, \quad (3)$$

where i indexes borrowers, t indexes loan initiation years, k indexes loan types, j indexes lenders, and n is the total number of lenders. The dependent variable *Loan spread* is the "all-in-drawn" reported in DealScan. As discussed in Section 2.2, our main variable of interest, *Borrower shareholders' equity holdings of the lenders*, is measured either as the *Proportion of the lenders held by borrower shareholders* or as the *Percentage of the lenders' equities held by borrower shareholders*. Both measures are calculated at the end of the quarter immediately before loan initiation. *Other ownership characteristics* include total institutional ownership of the borrower, and whether there is a commercial bank or a non-commercial bank dual holder that directly holds equities of the borrower. *Borrower characteristics* include distance-to-default, a dummy variable indicating whether the borrower has an investment-grade rating, the natural logarithm of borrower assets, book leverage, market-to-book, return on assets, tangibility, stock volatility, and the natural logarithm of the number of financial analysts covering the borrower. Detailed definitions of these variables are listed in Appendix B. *Loan characteristics* include the total number of lenders, a dummy variable indicating whether there is at least one non-commercial bank lender, facility amount, and maturity. Loan type includes dummy variables indicating the following categories reported in DealScan: 364-day facility, revolvers, term loan, and others. We include borrower, lender, and year fixed effects to mitigate the concern that some borrower-, lender-, and year-

specific omitted variables may affect both loan spreads and borrower shareholders' equity holdings of the lenders. We estimate ordinary least squares (OLS) regressions and cluster robust standard errors at the borrower level.

We report our baseline results in Table 2. Consistent with the interest alignment hypothesis but inconsistent with the hold-up hypothesis, we find that the coefficients on the two measures of borrower shareholders' equity holdings of the lenders are both negative and significant at the 1% level, suggesting that an increase in borrower shareholders' equity holdings of the lenders is associated with a decrease in loan spreads. In terms of economic significance, the estimation results in column (1) suggest that a one-standard-deviation increase in the *Proportion of the lenders held by borrower shareholders* (28%) is associated with an 8.0 bps decrease in the loan spread, which is 6.2% of its standard deviation (129.2 bps); the estimation results in column (2) suggest that a one-standard-deviation increase in the *Percentage of the lenders' equities held by borrower shareholders* (14.2%) is associated with a 10.3 bps decrease in the loan spread, which is 8.0% of its standard deviation (129.2 bps).

As for the control variables, the coefficients are consistent with those documented in prior literature. Borrowers with a higher level of institutional ownership borrow at a lower loan spread, suggesting that institutions are likely to either select high-quality firms or increase firm quality through improved corporate governance (e.g., McCahery, Sautner, and Starks 2016). Loan spreads are lower when there exists a non-commercial bank dual holder, consistent with the findings in Jiang et al. (2010). Loan spreads are higher when there are non-commercial bank lenders, consistent with the findings in Lim, Minton, and Weisbach (2014). Loan spreads decrease with proxies of the borrower's credit quality, including the existence of an investment-grade rating, distance-to-default, firm size, market-to-book ratio, and return on assets. Loan spreads increase with measures of the borrower's risk, such as the leverage ratio and stock volatility. A greater number of analysts covering the borrower is associated with a lower loan spread, possibly due to the resultant information transparency (e.g., Brown and Rozeff 1978). With respect to other loan characteristics, a larger facility amount and a longer maturity are associated with a lower loan spread.

4. Endogeneity

Our baseline analysis supports the interest alignment hypothesis rather than the hold-up hypothesis, but the results obtained from the baseline analysis might be subject to endogeneity

concerns. In particular, borrowers whose shareholders hold more equities of the lenders may be of higher credit quality; if this is case, the lower loan spread is due to the borrower's high credit quality, instead of the specific connection between the borrower and its lenders through borrower shareholders' equity holdings of the lenders. In the baseline analysis, we mitigate this concern by including borrower, lender, and year fixed effects and an extensive list of control variables. To further address the endogeneity concern, we conduct three tests in this section: the first test examines the borrower shareholders' equity holdings of all public lending institutions (not just the borrower's actual lenders), the second test investigates the matching between high credit quality borrowers and their highly cross-held lenders, and the third test exploits the mergers of institutional investors in a difference-in-differences analysis.

4.1 Borrower shareholders' equity holdings of any (or the largest twenty) public lenders

Borrower shareholders' equity holdings of the lenders may be positively associated with borrower credit quality if institutions that hold more (fewer) equities of commercial banks and other lending institutions are more likely to hold borrowers of high (low) credit quality, resulting in higher (lower) borrower shareholders' equity holdings of the lenders for high (low) credit quality borrowers. This argument is plausible considering that commercial banks and other lending institutions that are likely to be major lenders in the syndicated loan market typically are of large capitalization. On the one hand, it may be the case that institutional portfolios that invest more in lending institutions are more likely to invest in larger size and possibly higher credit quality firms, resulting in a higher likelihood for these borrowers to be in the same portfolios with their actual lenders. On the other hand, it may be the case that asset managers who specialize in low credit quality (even distressed) firms are less likely to hold lending institutions, resulting in a lower likelihood for these borrowers to be in the same portfolios with their actual lenders.

Following this argument, the borrower shareholders' equity holdings of all lending institutions rather than the actual lenders should drive our results; the association between borrower shareholders' equity holdings of the actual lenders and loan spreads that we observe in the baseline regression may merely capture the effect of borrower shareholders' equity holdings of all lending institutions. If so, borrower shareholders' equity holdings of the actual lenders should not have any additional effects on loan spreads after controlling for borrower shareholders' equity holdings of all lending institutions.

To assess this alternative argument, we add to the baseline regression borrower

shareholders' equity holdings of all public lending institutions. Following the measures of borrower shareholders' equity holdings of the actual lenders, we capture borrower shareholders' equity holdings of all public lending institutions in two forms. The first measure is the number of public lending institutions held by the borrower shareholders over the total number of public lending institutions in our sample; the second measure is the average percentage equity holdings of all U.S. public lending institutions by the borrower shareholders. Because the largest twenty public lending institutions account for 86% of the loans in our sample, we repeat the same exercise using borrower shareholders' equity holdings of the largest twenty public lending institutions.

Table 3 reports the results. We find that after controlling for borrower shareholders' equity holdings of all (or the largest twenty) public lending institutions, the coefficients on the two measures of borrower shareholder' equity holdings of its actual lenders have similar statistical and economic significance as in the baseline analysis.[12] These results indicate that the unique connection between a borrower and its actual lenders through the borrower shareholders' equity holdings of the actual lenders is important in explaining the observed loan spreads. This evidence also suggests that our baseline results are unlikely due to an alternative explanation: shareholders of high credit quality borrowers hold more lenders other than the borrower's actual lenders, reducing the hold-up by its existing lenders and lowering loan spreads (He et al., 2019).

4.2 Borrower-lender matching

Borrower shareholders' equity holdings of the lenders may be positively associated with borrower credit quality if high credit quality borrowers, compared to low credit quality borrowers, are more likely to take loans from lenders of which the borrowers' shareholders have high equity ownership. This argument is plausible considering that higher credit quality borrowers are likely to have more borrowing options, possibly making it more difficult for lenders to win the loan business from high credit quality borrowers than from other borrowers. In this case, lenders' connections with the borrower through having the same shareholders could facilitate establishing a lending relationship with high credit quality borrowers. If so, the negative association between loan spreads and borrower shareholders' equity holdings of the lenders may be a result of the matching between high credit quality borrowers and their highly cross-held lenders.

However, low credit quality firms, rather than high credit quality borrowers, may be more

[12] Our results are robust to controlling for borrower shareholders' equity holding of the largest five public lending institutions.

likely to take loans from their highly cross-held lenders, because low credit quality firms are in greater need to reduce shareholder-creditor conflicts of interest and to lower loan spreads through cross-holding shareholders. If this is the case, our baseline estimates could be downward biased.

To assess these arguments, we examine whether a borrower's credit quality affects its likelihood to obtain a loan from a lender of which the borrower's shareholders have greater equity ownership. Specifically, we estimate the following probit model:

$$Prob(Loan_{i,j,\tau}) = \alpha + \beta\ Percentage\ held\ by\ borrower\ shareholders_{\ i,j,\tau-1} + \theta\ \text{Borrower credit quality}_{\text{i},\tau-1}$$
$$+ \kappa\ Percentage\ held\ by\ borrower\ shareholders_{\ i,j,\tau-1} \times \text{Borrower credit quality}_{\text{i},\tau-1}$$
$$+ \mu\ Loan_{i,j,\tau-1} + \gamma\ X_{i,t} + Borrower_i + Lender_j + Period_\tau + \varepsilon_{i,j,\tau}. \quad (4)$$

We pair each borrower with each lender in every non-overlapping 5-year period in our sample. The dependent variable is a dummy variable that equals one if firm i has at least one loan facility from lender j during period τ – a non-overlapping 5-year period, and zero otherwise. The main variable of interest is the interaction between the percentage of the lender's equities held by the borrower's shareholders and the borrower's credit quality, proxied by whether the borrower has an investment-grade rating or whether the borrower's distant-to-default is above the cross-sectional median. If high credit quality borrowers are more likely to borrow from their highly cross-held lenders, we expect that κ should be significantly positive. To further control for unobserved factors that might lead to the lending relationship, we include "*Loan*," which is a dummy variable indicating the existence of a loan between firm i and bank j in the preceding period τ-1. To make sure that the information on the past lending relationship is available for all observations, the sample period for this test starts from 1992. Other control variables include the natural algorithm of borrower's assets, borrower leverage, the natural logarithm of lender capitalization, borrower's total institutional holdings, and lenders' total institutional holdings. We include borrower, lender, and 5-year-period fixed effects, to control for borrower-, lender-, and time period-specific unobserved variables. All the right-hand side variables, except for the fixed effects and the lagged lending relationship, are measured at the quarter preceding the beginning of each 5-year period. Robust errors are clustered at the borrower level.

We report the results in Table 4. Column (1) shows that borrowers, in general, are more likely to obtain loans from lenders whose equities are more substantially held by the borrowers' shareholders. However, this association is not affected by the borrower's credit quality, as the coefficient on the interaction term is not significant in columns (2) or (3). Therefore, the potential

matching between borrowers and their highly cross-held lenders does not likely drive our results.

4.3 The difference-in-differences analysis: exploiting the mergers of institutional investors

To further strengthen our identification, we use the mergers of institutional investors as an exogenous increase in borrower shareholders' equity holdings of the lenders and conduct a difference-in-differences analysis. Specifically, if an institutional shareholder of a borrower does not hold equities of the borrower's lenders, but merges with an institution that holds equities of the lenders but not the borrower, this merger event will increase the number of cross-holding shareholders for the borrower-lender pair. The resulting increase in borrower shareholders' equity holdings of the lenders is plausibly exogenous to borrower and lender characteristics because institution mergers are unlikely to be determined by these two individual companies in the institutions' portfolios.

This difference-in-differences analysis requires that the borrower obtain loans from the same set of lenders before and after the merger of institutions. However, because syndicate loans involve many lenders, it is rare for a firm to borrow from the same set of major lenders for two consecutive syndicated loans, preventing us from obtaining a large enough sample to conduct the difference-in-differences analysis.[13] To overcome this obstacle, we focus on borrowers that obtain loans from the same lead lenders both before and after the merger of institutions, as lead lenders typically play the most important role in setting loan terms (Ivashina 2009). Specifically, consider the merger between two institutions A and B. The treatment group includes borrowers who are held by A but not B and whose lead lenders are held by B but not A. The merger of A and B convert a non-cross-holding shareholder into a cross-holding shareholder. The control group includes all other borrowers held by the two merging institutions. The difference-in-differences analysis allows us to examine whether the reduction in loan spreads is greater for the treated group than that for the control group. The sample period for institution mergers is from 1986 to 2016. To be included in this exercise, both firms in the treated group and the control group are required to have at least one loan within two years before and one loan within two years after the institution merger. In the sample for this exercise, there are 122 borrowers in the treated group and 420 borrowers in the control group.

[13] For example, for the 9,888 loan packages in our sample of which the borrower has previously taken a loan package, 72% of these loan packages include at least one major lender that is not included in the previous loan package.

The identification of the difference-in-differences analysis relies on the satisfaction of the parallel trend condition. That is, before the merger event, loan spreads – the outcome variable – should have parallel trends for the treated group and the control group. To check if the parallel trend condition is satisfied, we compare the trends of loan spreads (measured as the change in loan spreads) before the merger events for the borrowers in the treated group with those for the borrowers in the control group. The results are reported in Panel A of Table 5. The evidence suggests that prior to the mergers, loan spread trends are not significantly different between the two groups, and therefore, the parallel trend condition is likely satisfied in this sample.

For the difference-in-differences regression, we estimate the following model:

$$Loan\ spread_{i,t} = \alpha + \beta_1\ Treated_{i,m} \times Post_{m,t} + \beta_2\ Treated_{i,m} + \beta_3\ Post_{m,t} + \delta\ Other\ ownership\ characteristics_{i,t-1} + \gamma\ Borrower\ characteristics_{i,t-1} + \mu\ Loan\ characteristics_{i,t} + Loan\ type_k + Borrower_i + Lender_j + Year_t + Merger_m + \varepsilon_{i,t}, \quad (5)$$

where i indexes borrowers, j indexes lead lenders, t indexes loan initiation years, m indexes institution mergers, and k indexes loan types. The dependent variable *Loan spread* is the "all-in-drawn" reported in DealScan. *Treated* is a dummy variable that equals one if a borrower is in the treated group for merger *m*, and zero otherwise. *Post* is a dummy variable that equals one if a loan is originated within two years after merger *m*, and zero otherwise. The main variable of interest is the interaction term *Treated*×*Post*. If the interest alignment hypothesis prevails, this interaction term should be significantly negative. *Merger* indicates merger fixed effects. Other model specifications are the same as in equation (3).

Panel B of Table 5 reports the estimation results. Columns (1) and (2) report the estimation results without and with merger fixed effects, respectively. In each column, the coefficient on the interaction term *Treated*×*Post* is negative and significant at 5% level, suggesting that after institution mergers, the loan spread reduction for borrowers in the treated groups is significantly larger than that for borrowers in the control group. The economic magnitude of the effect is considerably large. Using the estimations with merger fixed effects, on average, loan spreads for borrowers in the treated groups experienced a 24 bps more reduction than those for borrowers in the control group. Thus, the results from the difference-in-differences analysis support a causal effect of borrower shareholders' equity holdings of the lenders on loan spreads.

5. Evidence of the reduction of shareholder-creditor conflicts of interest

Supporting the interest alignment hypothesis, we have established that the borrower

shareholders' equity holdings of the lenders reduce loan spreads. In this section, we conduct three tests to investigate whether the reduction in shareholder-creditor conflicts is likely to be the underlying mechanism that drives the results. Specifically, we examine cross-holding shareholders' holding period, subsamples of borrowers subject to different degrees of shareholder-creditor conflicts, and the number of financial covenants included in the debt contract.

5.1 Holding period of borrower-lender cross-holding shareholders

The interest alignment hypothesis suggests that cross-holding shareholders reduce agency costs of debt because borrower-lender cross-holding shareholders have to, at least partially, internalize costs to lenders when there is a wealth transfer from lenders to borrowers. An implicit assumption in this hypothesis is that these cross-holding shareholders should continue to hold both the borrower and its lenders for an extended period or even for the duration of the loan.

To assess whether this is the case, in Table 6, we report the percentage of cross-holding shareholders that continue to hold the borrower and its lenders four-quarter, eight-quarter, twelve-quarter, and sixteen-quarter after loan initiation.[14] We find that the holding period of two-thirds of the cross-holding shareholders is beyond the average duration (i.e., 47 months) of the loans in our sample, as they remain shareholders of the borrower and its lenders for sixteen quarters after loan inception. If we focus on large cross-holding shareholders who own at least 1% of the borrower and 1% of the lender, 87% of these shareholders continue to hold the borrower and its lenders for at least sixteen quarters after loan initiation. This evidence lends support to the argument that cross-holding shareholders are able to align the interests between borrowers and lenders during the life of the loan.

5.2 Subsamples analysis

Following the interest alignment hypothesis, the underlying mechanism of the negative association between loan spreads and borrower shareholders' equity holdings of the lenders is the reduction of agency costs of debt. If this is the case, this effect should be more pronounced for borrowers with more severe borrower-lender conflicts of interest than for other borrowers.

To examine whether this is the case, we partition our sample based on whether the borrower faces severe borrower-lender conflicts of interest, proxied by the lack of an investment-grade rating or having a below-median distance-to-default. Non-investment-grade borrowers or

[14] If the borrower or the lender is no longer held by any 13F filing institution or the intuitional owner exits the sample four-, eight-, twelve-, or sixteen-quarters after loan initiation, we exclude them from the respective samples.

borrowers with a small distance-to-default have a higher probability of default and thus a higher degree of shareholder-creditor conflicts of interest (e.g., Bharath and Shumway 2008; Campbell, Hilscher, and Szilagyi 2008).

We re-estimate equation (3) for these subsamples, and the results are reported in Table 7. For subsamples based on the existence of an investment-grade rating, we find that the effect of borrower shareholders' equity holdings of lenders on loan spread reductions is concentrated within borrowers without an investment-grade rating (columns (2) and (4)); for borrowers with an investment-grade rating, borrower shareholders' equity holdings of the lenders have no significant effect on loan spreads (columns (1) and (3)). For the subsamples based on the distance-to-default, the impact of borrower shareholders' equity holdings of the lenders on loan spread reductions is much stronger for borrowers who are closer to default (i.e., borrowers with a below-median distance-to-default). For example, by comparing columns (7) and (8), our results show that for borrowers with an above-median distance-to-default, a one-standard-deviation (14.2%) increase in the *Percentage of lenders' equities held by borrower shareholders* is associated with a 5.1 bps decrease in loan spreads, which is 5.0% of its standard deviation (101.2 bps); for borrowers with a below-median distance-to-default, a one-standard-deviation (13.1%) increase in the *Percentage of lenders' equities held by borrower shareholders* is associated with a 10.4 bps decrease in loan spreads, which is 7.8% of its standard deviation (133.8 bps). These results show that the effect of borrower shareholders' equity holdings of the lenders on loan spread reduction is much stronger for borrowers with more severe borrower-lender conflicts of interest than for other borrowers, supporting the interest alignment hypothesis.

5.3 The number of financial covenants

Because of information related problems, debt contracts are inherently incomplete and cannot fully prevent borrowers from expropriating lender wealth ex-ante (e.g., Hart and Moore1988; Aghion and Bolton 1992). As a result, the debt contracting literature highlights the role of financial covenants through which lenders could obtain control rights ex-post to overcome agency conflicts (e.g., Smith and Warner 1979; Aghion and Bolton 1992). Specifically, when the borrower encounters difficulties in complying with these covenants and triggers covenant violations, lenders effectively gain control rights of the borrower so that they can protect their value ex-post (e.g., Aghion and Bolton, 1992; Chava and Roberts 2008; Roberts and Sufi 2009; Denis and Wang 2014; Wang 2017). The prior literature presents ample evidence supporting that

borrowers with more shareholder-creditor conflicts receive more financial covenants in debt contracts (e.g., Rauh and Sufi 2010; Demiroglu and James 2010).

However, the costs of designing, monitoring, and enforcing detailed financial covenants can be substantial (Hart and Moore 1988). If borrower shareholders' equity holdings of the lenders alleviate shareholder-creditor conflicts of interest as suggested by the interest alignment hypothesis, lenders should be willing to include fewer financial covenants in the loan contract when the borrower's shareholders hold more equities of the lenders. To shed light on this conjecture, we re-run equation (3), but replace the dependent variable with the number of financial covenants, which we obtain from DealScan for loan contracts originated between 1995 and 2012.

Table 8 presents the estimation results. We find that borrower shareholders' equity holdings of the lenders are significantly and negatively associated with the number of financial covenants included in a loan contract. In terms of economic significance, a one-standard-deviation increase in the *Proportion of the lenders held by borrower shareholders* (28%) is associated with a 0.11 decrease in the number of covenants, which is 7.8% of its standard deviation (1.38); a one-standard-deviation increase in the *Percentage of lenders' equities held by borrower shareholders* (13.8%) is associated with a 0.08 decrease in the number of covenants, which is 6.1% of its standard deviation (1.38). These results are consistent with the notion that borrower shareholders' equity holdings of the lenders alleviate shareholder-creditor conflicts of interest, reducing the need for intense creditor control through financial covenants included in the debt contract.

6. Conclusion

We study the effects of borrower shareholders' equity holdings of the lenders on the costs of borrowing. We consider two competing hypotheses. On the one hand, the interest alignment hypothesis suggests that the increase in borrower shareholders' equity holdings of the lenders leads to better alignment of shareholder-creditor interests, thereby reducing loan spreads. On the other hand, the hold-up hypothesis suggests that the increase in borrower shareholders' equity holdings of the lenders leads to an exacerbation of the hold-up problem, thereby increasing loan spreads. Consistent with the interest alignment hypothesis, we find that when borrower shareholders' equity holdings of the lenders increase, loan spreads are reduced.

We take four approaches to address endogeneity concerns. Specially, we include borrower and lender fixed effects in the regressions, examine the effect of borrower shareholders' equity holdings of all lending institutions (not just the borrower's actual lenders), investigate borrower-

lender matching, and conduct a difference-in-differences analysis exploiting institution mergers. The evidence suggests that the relation between borrower shareholders' equity holdings of the lenders and loan spreads is likely causal.

By examining three implications of the interest alignment hypothesis, we find evidence consistent with the notion that the reduction of shareholder-creditor conflicts is likely to be the working mechanism through which borrower shareholders' equity holdings of the lenders reduce loan spreads. Specifically, we find that the majority of the cross-holding shareholders hold the borrower and its lenders over the duration of the loan, making it feasible for them to alleviate shareholder-creditor conflicts of interest; the effect of borrower shareholders' equity holding of the lenders on loan spread reductions is more pronounced for borrowers with more severe shareholder-creditor conflicts; the number of financial covenants decreases with the borrower shareholders' equity holdings of the lenders. Overall, our study suggests that the connections between borrowers and lenders through the same group of equity holders have a positive externality in the syndicated loan market.

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Table 1. Summary statistics

Panel A reports the summary statistics for sample loans with at least one borrower shareholder who holds equities of the lenders. Panel B reports the sample summary statistics of variables used in the regression analyses. All variables in Panel B are defined in Appendix B. The sample period is between 1987 and 2016.

Panel A. Summary statistics of the cross-holding shareholders

Variables	Mean	Median	Std Dev	Obs
Number of cross-holding shareholders per loan	160.57	95.00	196.18	17,826
Number of lenders held by all cross-holding shareholders	2.58	2.00	1.89	17,826
Number of lenders held by all cross-holding shareholders/Total number of lenders	81%	100%	24%	17,826
Percentage of each lender held by all cross-holding shareholders	37%	39%	17%	46,414
Percentage of borrower held by all cross-holding shareholders	47%	50%	27%	17,826
Percentage of borrower held by cross-holding shareholders/borrower total institutional ownership	75%	81%	22%	17,826

Panel B. Summary statistics of variables

Variables	Mean	Median	Std Dev	Obs
Proportion of the lenders held by borrower shareholders	78%	100%	28%	18,581
Percentage of the lenders' equities held by borrower shareholders	22%	22%	14%	18,581
Other ownership variables				
The borrower's total institutional ownership	0.58	0.63	0.30	18,581
Dummy: commercial bank dual holder	0.35	0.00	0.48	18,581
Dummy: non-commercial bank dual holder	0.10	0.00	0.30	18,581
Borrower characteristics				
Dummy: investment-grade rating	0.27	0.00	0.44	18,581
Distance-to-default	6.50	5.68	4.51	18,581
Log(Assets)	6.90	6.93	1.94	18,581
Age	22.61	18.00	16.71	18,581
Book leverage	0.30	0.28	0.20	18,581
Market-to-Book	1.73	1.45	0.95	18,581
Return on assets	0.14	0.13	0.09	18,581
Tangibility	0.31	0.25	0.23	18,581
Stock volatility	0.12	0.11	0.07	18,581
Log(Number of analysts)	1.52	1.79	1.15	18,581
Loan characteristics				
Total number of lenders	3.86	3.00	3.69	18,581
Dummy: non-commercial bank lenders	0.33	0.00	0.47	18,581
Loan spread (in bps)	182.18	155.00	129.29	18,581
Facility amount (in millions)	473.00	175.00	1116.00	18,581
Maturity (in months)	46.66	57.00	22.52	18,581
Number of financial covenants	1.61	2.00	1.38	12,805
Lender characteristics and past lending relationship (used in the borrower-lender matching tests)				
The lender's total institutional ownership	0.55	0.55	0.25	315,415
Log(Lender capitalization)	15.27	15.22	1.82	315,415
Past lending relationship	0.03	0.00	0.18	315,415

Table 2. Baseline regressions

This table reports the results of the OLS regressions that estimate the effect of borrower shareholders' equity holdings of the lenders on loan spreads. All variables are defined in Appendix B. Robust errors clustered at the borrower level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is between 1987 and 2016.

	(1)	(2)
Proportion of the lenders held by borrower shareholders	-28.537***	
	(7.439)	
Percentage of the lenders' equities held by borrower shareholders		-72.066***
		(14.619)
The borrower's total institutional ownership	-24.513***	-14.305*
	(7.999)	(8.442)
Dummy: commercial bank dual holder	2.817	3.444
	(2.880)	(2.889)
Dummy: non-commercial bank dual holder	-11.777***	-11.532***
	(4.040)	(4.026)
Total number of lenders	-0.775	-0.869
	(0.766)	(0.730)
Dummy: non-commercial bank lenders	11.436***	11.216***
	(3.122)	(3.107)
Dummy: investment-grade rating	-24.189***	-23.131***
	(4.647)	(4.629)
Distance-to-default	-0.705*	-0.659*
	(0.386)	(0.387)
Log(Assets)	-14.143***	-12.022***
	(2.603)	(2.650)
Age	4.637	5.279
	(5.354)	(5.331)
Book leverage	66.692***	65.486***
	(10.445)	(10.464)
Market-to-Book	-5.862***	-5.001***
	(1.949)	(1.935)
Return on assets	-188.239***	-185.362***
	(21.743)	(21.775)
Tangibility	2.546	2.715
	(17.858)	(17.964)
Stock volatility	345.324***	343.483***
	(30.910)	(30.853)
Log(Number of analysts)	-5.462***	-4.975***
	(1.645)	(1.635)
Log(Facility amount)	-6.868***	-6.572***
	(1.278)	(1.276)
Maturity	-0.279***	-0.274***
	(0.073)	(0.073)

Constant	297.869*** (47.912)	255.586*** (46.194)
Borrower fixed effects	Yes	Yes
Lender fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Loan type fixed effects	Yes	Yes
Obs	18,581	18,581
R-squared	0.736	0.736

Table 3. Borrower shareholders' equity holdings of all (or the largest twenty) lending institutions

This table reports the results of the OLS regressions that estimate the effect of borrower shareholders' equity holdings of the lenders on loan spreads controlling for borrower shareholders' equity holdings of all (or the largest twenty) public lending institutions. Variables are defined in Appendix B. Robust errors clustered at the borrower level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is between 1987 and 2016.

	All lending institutions		The largest 20 lending institutions	
	(1)	(2)	(3)	(4)
Proportion of the actual lenders held by borrower shareholders	-34.851***		-33.853***	
	(7.981)		(7.880)	
Proportion of all (the largest 20) lending institutions held by borrower shareholders	33.881*		27.914	
	(19.665)		(18.607)	
Percentage of the actual lenders' equities held by borrower shareholders		-60.759***		-54.747***
		(15.552)		(15.593)
Percentage of all (the largest 20) lending institutions' equities held by borrower shareholders		-46.293*		-61.736**
		(25.973)		(26.194)
The borrower's total institutional ownership	-27.762***	-7.455	-27.157***	-4.895
	(8.013)	(9.095)	(7.970)	(9.109)
Dummy: commercial bank dual holder	2.722	4.253	2.715	4.420
	(2.878)	(2.884)	(2.878)	(2.901)
Dummy: non-commercial bank dual holder	-11.813***	-11.071***	-11.845***	-10.807***
	(4.039)	(4.035)	(4.040)	(4.031)
Total number of lenders	-1.294	-0.478	-1.211	-0.312
	(0.787)	(0.753)	(0.780)	(0.745)
Dummy: non-commercial bank lenders	11.357***	11.258***	11.386***	11.222***
	(3.126)	(3.099)	(3.125)	(3.100)
Dummy: investment-grade rating	-23.800***	-22.685***	-23.882***	-22.438***
	(4.634)	(4.606)	(4.639)	(4.619)
Distance-to-default	-0.701*	-0.641*	-0.702*	-0.643*
	(0.386)	(0.387)	(0.386)	(0.387)
Log(Assets)	-14.271***	-10.800***	-14.240***	-10.345***
	(2.616)	(2.796)	(2.613)	(2.811)

Age	4.628	5.329	4.637	5.230
	(5.332)	(5.320)	(5.334)	(5.300)
Book leverage	66.986***	64.318***	66.919***	63.873***
	(10.401)	(10.519)	(10.411)	(10.507)
Market-to-Book	-5.824***	-4.533**	-5.842***	-4.337**
	(1.947)	(1.950)	(1.946)	(1.961)
Return on assets	-188.989***	-183.793***	-188.889***	-183.207***
	(21.752)	(21.683)	(21.740)	(21.690)
Tangibility	2.640	1.880	2.667	2.126
	(17.902)	(17.938)	(17.896)	(17.988)
Stock volatility	344.041***	343.978***	344.388***	343.778***
	(31.019)	(30.826)	(31.000)	(30.783)
Log(Number of analysts)	-5.589***	-4.660***	-5.576***	-4.553***
	(1.647)	(1.645)	(1.648)	(1.644)
Log(Facility amount)	-6.964***	-6.544***	-6.941***	-6.493***
	(1.277)	(1.279)	(1.278)	(1.275)
Maturity	-0.281***	-0.273***	-0.280***	-0.271***
	(0.073)	(0.073)	(0.073)	(0.073)
Constant	277.191***	247.989***	280.812***	245.692***
	(49.096)	(46.643)	(48.951)	(46.338)
Borrower fixed effects	Yes	Yes	Yes	Yes
Lender fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Loan type fixed effects	Yes	Yes	Yes	Yes
Obs	18,581	18,581	18,581	18,581
R-squared	0.736	0.736	0.736	0.736

Table 4. Borrower shareholders' equity holdings of lenders and the probability of a lending relationship: the effect of borrower credit quality

This table reports the results of probit regressions that estimate if the effect of borrower shareholders' equity holdings of a lender on the existence of a lending relationship between the borrower-lender pair varies across borrowers with different credit quality. The dependent variable is a dummy variable that equals one if the borrower takes at least one loan from the lender during the five-year period, and zero otherwise. Variables are defined in Appendix B. Robust errors clustered at the borrower level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is between 1992 and 2016.

	(1)	(2)	(3)
Percentage of the lender's equities held by the borrower shareholders	1.631***	1.587***	1.446***
	(0.155)	(0.193)	(0.213)
Dummy: investment-grade rating		0.130	
		(0.112)	
Percentage of the lender's equities held by the borrower shareholders × Dummy: investment-grade rating		0.044	
		(0.217)	
Distance-to-default			0.023
			(0.072)
Percentage of the lender's equities held by the borrower shareholders × Distance-to-default			0.272
			(0.201)
The borrower's total institutional ownership	-0.019	-0.015	-0.009
	(0.115)	(0.118)	(0.115)
The lender's total institutional ownership	-0.169**	-0.163*	-0.166**
	(0.084)	(0.084)	(0.084)
Past lending relationship	2.390***	2.389***	2.391***
	(0.040)	(0.040)	(0.040)
Log (Borrower assets)	-0.008	-0.022	-0.004
	(0.043)	(0.045)	(0.043)
Log (Lender capitalization)	0.042*	0.042*	0.042*
	(0.025)	(0.025)	(0.025)
Borrower fixed effects	Yes	Yes	Yes
Lender fixed effects	Yes	Yes	Yes
5-year fixed effects	Yes	Yes	Yes
Obs	314,557	314,557	314,557
Pseudo R-squared	0.378	0.378	0.378

Table 5. Difference-in-differences around institution mergers

This table reports the results of the difference-in-differences analysis using institution mergers as a shock to borrower shareholders' equity holdings of the lenders. As two institutions A and B merge, the treatment group includes the borrowers who are held by A but not B and whose lead lenders are held by B but not A; the control group includes all other borrowers held by the two merging institutions. Panel A reports the tests for parallel trends in loan spreads before institution mergers. We compare the average change in loan spreads for borrowers in the treated and control group during a time window before institution mergers. We use t to indicate the year of institution mergers. The t-statistics of the differences in the trend of loan spreads between borrowers in the treated and control groups are reported. Panel B reports the results of the difference-in-differences analysis. The dependent variables are loan spreads. *Treated* is a dummy variable that equals one if a borrower is in the treatment group, and zero if the borrower is in the control group. *Post institution merger* is a dummy variable that equals one for two years after the institution merger, and zero for the two years before the institution merger. Variables are defined in Appendix B. Robust errors clustered at the borrower level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is between 1987 and 2016.

Panel A. The parallel trends in loan spreads pre-institution mergers

Loan period	Treated		Control		t-statistic of the difference
	Mean (bps)	Obs	Mean (bps)	Obs	
Year t-2 to Year t-1	-16.07	35	-5.23	102	0.96
Year t-3 to Year t-1	-4.24	99	-0.49	334	0.66
Year t-4 to Year t-1	-2.38	158	-1.32	601	0.18
Year t-5 to Year t-1	-1.25	213	-5.17	794	-0.61
Year t-3 to Year t-2	2.43	64	2.84	232	0.05
Year t-4 to Year t-2	2.5	123	-0.02	499	-0.33
Year t-5 to Year t-2	2.6	178	-5.08	692	-1.01

Panel B. Results of the difference-in-differences analysis

	(1)	(2)
Treated × Post institution merger	-21.465**	-23.919**
	(9.462)	(10.272)
Treated	8.912	7.839
	(10.221)	(12.086)
Post institution merger	11.368	17.899*
	(8.055)	(10.430)
The borrower's total institutional ownership	-30.239	-27.134
	(30.485)	(28.400)
Dummy: commercial bank dual holder	-0.394	-1.718
	(8.607)	(8.907)
Dummy: non-commercial bank dual holder	-9.120	-7.959
	(18.180)	(19.236)
Total number of lenders	0.476	0.662
	(1.298)	(1.282)
Dummy: non-commercial bank lenders	28.814**	25.698**
	(11.637)	(11.995)
Dummy: investment-grade rating	-28.677*	-29.098*
	(17.034)	(16.724)
Distance-to-default	-0.387	-0.476
	(1.119)	(1.127)
Log(Assets)	-14.903*	-14.438*
	(8.142)	(7.677)
Age	15.621*	16.499*
	(9.329)	(9.460)
Book leverage	53.118	54.835
	(34.089)	(35.890)
Market-to-Book	-9.012*	-8.545
	(4.640)	(5.369)
Return on assets	-219.205***	-216.134***
	(67.460)	(67.113)
Tangibility	56.098	83.746*
	(49.591)	(48.358)
Stock volatility	274.951**	276.498**
	(125.567)	(135.958)
Log(Number of analysts)	-4.512	-4.804
	(3.361)	(3.410)
Log(Facility amount)	-8.110*	-8.174*
	(4.605)	(4.344)
Maturity	-0.288	-0.273
	(0.220)	(0.216)
Constant	121.698	103.548
	(153.668)	(146.322)

Borrower fixed effects	Yes	Yes
Lender fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Loan type fixed effects	Yes	Yes
Merger fixed effects	No	Yes
Obs	1,978	1,978
R-squared	0.813	0.817

Table 6. Cross-holding shareholders' holding period of borrower-lender pairs after loan origination

This table reports the number and percentage of cross-holding shareholders that continue to hold the borrower-lender pairs after loan initiation for longer than four-quarter, eight-quarter, twelve-quarter or sixteen-quarter. The observations are at the loan-shareholder level. The upper panel reports the holding period of all cross-holding shareholders; the lower panel reports the holding period of cross-holding shareholders who hold at least 1% of the borrower's equity and 1% of the lender's equity.

Holding period	Number of shareholders	Percentage out of all shareholders
All cross-holding shareholders		
≥ Four-quarter	5,904,392	78%
≥ Eight-quarter	4,516,008	71%
≥ Twelve-quarter	3,515,686	67%
≥ Sixteen-quarter	2,753,438	64%
>1% cross-holding shareholders		
≥ Four-quarter	189,138	95%
≥ Eight-quarter	157,764	91%
≥ Twelve-quarter	131,122	89%
≥ Sixteen-quarter	109,410	87%

Table 7. Borrower shareholders' equity holdings of the lenders and loan spreads: subsample analysis

This table presents the results of the OLS regressions that estimate the effect of borrower shareholders' equity holdings of the lenders on loan spreads for different subsamples. In columns (1)-(4), we split loan facilities into those by borrowers with and without an investment-grade rating; in columns (5)-(8), we split loan facilities into those by borrowers with a distance-to-default that is below or above the cross-sectional median. Fixed effects and other controls are the same as in Table 2. Robust errors clustered at the borrower level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is between 1987 and 2016.

	Investment-grade rating				Distance-to-default			
	With	Without	With	Without	Above-median	Below-median	Above-median	Below-median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Proportion of the lenders held by borrower shareholders	-6.182	-33.438***			-19.262**	-26.514**		
	(10.054)	(10.048)			(9.452)	(11.903)		
Percentage of the lenders' equities held by borrower shareholders			-15.379	-95.723***			-35.591**	-79.327***
			(16.573)	(22.093)			(17.018)	(28.613)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	5,014	13,567	5,014	13,567	9,297	9,284	9,297	9,284
R-squared	0.697	0.685	0.697	0.686	0.790	0.714	0.790	0.714

Table 8. Borrower shareholders' equity holdings of the lenders and covenant restrictions

This table presents the results of the regressions that estimate the effect of borrower shareholders' equity holdings of the lenders on the number of financial covenants. The dependent variable is the number of financial covenants obtained from DealScan during 1995-2012. Variables are defined in Appendix B. Robust errors clustered at the borrower level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is between 1995 and 2012.

	(1)	(2)
Proportion of the lenders held by borrower shareholders	-0.380***	
	(0.122)	
Percentage of the lenders' equities held by borrower shareholders		-0.607**
		(0.251)
The borrower's total institutional ownership	0.134	0.207
	(0.139)	(0.148)
Dummy: commercial bank dual holder	-0.045	-0.041
	(0.061)	(0.061)
Dummy: non-commercial bank dual holder	-0.074	-0.074
	(0.078)	(0.078)
Total number of lenders	0.006	0.017
	(0.013)	(0.012)
Dummy: non-commercial bank lenders	0.371***	0.369***
	(0.052)	(0.052)
Dummy: investment-grade rating	-0.071	-0.064
	(0.072)	(0.072)
Distance-to-default	0.000	0.000
	(0.007)	(0.007)
Log(Assets)	-0.168***	-0.146***
	(0.054)	(0.055)
Age	-0.017	-0.009
	(0.206)	(0.204)
Book leverage	0.126	0.125
	(0.242)	(0.242)
Market-to-Book	-0.068**	-0.059*
	(0.034)	(0.033)
Return on assets	0.857**	0.883**
	(0.373)	(0.371)
Tangibility	-0.191	-0.184
	(0.312)	(0.313)
Stock volatility	0.124	0.078
	(0.548)	(0.548)
Log(Number of analysts)	0.026	0.031
	(0.032)	(0.031)

Log(Facility amount)	0.096***	0.099***
	(0.017)	(0.017)
Maturity	0.002	0.002
	(0.001)	(0.001)
Constant	0.379	-0.204
	(3.090)	(3.070)
Borrower fixed effects	Yes	Yes
Lender fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Loan type fixed effects	Yes	Yes
Obs	12,805	12,805
R-squared	0.595	0.595

Appendix A. An example

For selective shareholders of Pfizer Inc., this table presents borrower shareholder's equity holdings of the lenders for the $7 billion syndicated loan granted to Pfizer Inc. on November 10, 2016. Borrower% is the institution's percentage equity holdings of the borrower, and Lender% is the institution's percentage equity holdings of the lender. Following the definition of major lenders in Jiang et al. (2010), major lenders of this loan facility include: JP Morgan as the "Admin agent," Barclays, Bank of America Merrill Lynch, and Citibank as the "Syndications agents," and Goldman Sachs, HSBC, Deutsche Bank, Credit Suisse, Royal Bank of Canada, and Morgan Stanley as the "Documentation agents." Among these ten major lenders, Bank of America, Citibank, Goldman Sachs, JP Morgan, and Morgan Stanley are U.S. public firms.

Institution	Borrower%	Lender	Lender%
BlackRock, Inc.	7.0%	Bank of America	6.2%
		Citibank	6.7%
		Goldman Sachs	5.8%
		JP Morgan	6.4%
		Morgan Stanley	5.1%
Vanguard Group	6.5%	Bank of America	6.1%
		Citibank	6.1%
		Goldman Sachs	5.6%
		JP Morgan	6.5%
		Morgan Stanley	4.6%
State Street Corporation	5.1%	Bank of America	4.2%
		Citibank	4.4%
		Goldman Sachs	5.0%
		JP Morgan	4.4%
		Morgan Stanley	8.2%
T. Rowe Price Group, Inc.	1.5%	Citibank	1.5%
		JP Morgan	1.8%
		Morgan Stanley	7.6%

Appendix B. Variable definitions

Variable name	Definition	Data source
Borrower-lender cross-ownership variables		
Proportion of the lenders held by borrower shareholders	The number of lenders held by the borrower shareholders over the total number of lenders of the syndicated loan	DealScan and Thomson Reuters' 13f
Percentage of the lenders' equities held by borrower shareholders	The average of each lender's percentage equity ownership held by borrower shareholders	DealScan and Thomson Reuters' 13f
Other ownership variables		
Borrower total institutional ownership	The amount of borrower's equities held by institutions, scaled by its market capitalization.	Thomson Reuters' 13f
Dummy: commercial bank dual holder	A dummy variable that equals one if one of the lenders is a commercial bank and it holds more than 1% or more than $2 million in deflated dollars of the borrower's equity in the quarter immediately before the loan origination, and zero otherwise.	DealScan and Thomson Reuters' 13f
Dummy: non-commercial bank dual holder	A dummy variable that equals one if one of the lenders is a non-commercial bank and it holds more than 1% or more than $2 million in deflated dollars of the borrower's equity in the quarter immediately before the loan origination, and zero otherwise.	DealScan and Thomson Reuters' 13f
Borrower characteristics		
Dummy: investment-grade rating	A dummy variable indicating whether the firm has an S&P credit rating that is equal to or better than BBB-.	Compustat

Distance-to-default	Calculated following Bharath and Shumway (2008)	Compustat/CRSP
Log(Assets)	Log (AT)	Compustat
Age	Years since the first year reported in Compustat	Compustat
Book leverage	(DLC+DLTT)/AT	Compustat
Market-to-Book	(PRCC_f×CSHO+ LT)/AT	Compustat
Return on assets	(OIBDP-XINT-TXT)/AT	Compustat
Tangibility	PPENT/AT	Compustat
Stock volatility	Monthly stock volatility in the past 24 months	CRSP
Log(Number of analysts)	log(1+NUMEST)	I/B/E/S
Loan characteristics		
Total number of lenders	The number of major participants of a loan facility.	DealScan
Dummy: non-commercial bank lenders	A dummy variable that equals one if at least one lender is not a commercial bank, and zero otherwise	DealScan
Loan spread	All-in-drawn	DealScan
Facility amount	Total dollar amount borrowed in the facility	DealScan
Maturity	Number of months between facility start and end dates	DealScan
Number of financial covenants	The total number of financial covenants	DealScan
Lender characteristics		
Lender total institutional ownership	Total lender equity held by institutions, scaled by its market capitalization	Thomson Reuters' 13f
Log(Lender capitalization)	Log(PRC×SHROUT) for the lender	CRSP
Past lending relationship	A dummy variable that equals one if the borrower has obtained a loan from the lender in the preceding 5-year period	DealScan