

# Cross-Ownership and Corporate Debt Structure\*

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## Abstract

This paper investigates the relationship between the borrowing firm's cross-ownership and its choice between bank loans and public bonds when raising new debt capital. We find that cross-ownership significantly reduces the firm's use of bank loans when making debt issuance decisions. Evidence from a quasi-natural experiment based on financial institution mergers mitigates reverse causality concerns. Furthermore, the reduced likelihood of issuing bank loans is more pronounced for firms with more significant governance externality and information asymmetry. These findings highlight that the *ex ante* governance and *ex post* informational roles of cross-ownership have real effects on corporate debt structure.

**JEL Classification:** G14; G20; G32

**Keywords:** Cross-ownership, Corporate Debt Structure, Information Environment, Governance Substitution Hypothesis

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# 1 Introduction

The U.S. securities markets have recently experienced a shift to extraordinary ownership concentration, due to consolidation in the asset management industry and growth in index investing. Prior studies document that the cross-ownership<sup>1</sup> phenomenon, where an institutional investor cross-holds firm ownership in the same industry, is increasingly prevalent and exerts a non-trivial impact on firms' investment and operating strategies (e.g., Gutiérrez and Philippon, 2016; He and Huang, 2017; Azar et al., 2018; He et al., 2019; Kostovetsky and Manconi, 2020). However, how common institutional investors affect firms' debt decisions has been largely unexplored in the literature thus far. Given the important role of institutional investors in the debt market (e.g., Massa et al., 2013; Zhu, 2021; Kim and Li, 2022), the interconnections between the debt and equity markets (e.g., Fleming et al., 1998; Connolly et al., 2005; Bansal et al., 2014), and the real effects of equity ownership on corporate debt (e.g., McConnell and Servaes, 1995; Lin et al., 2011; Aslan and Kumar, 2012; Lin et al., 2013), we believe cross-ownership can play a significant role in firms' debt decisions.

Debt financing has become an increasingly important source of external financing for firms. From 1980 to 2020, Figure 1 shows the non-financial corporate debt of large U.S. companies increased from USD \$0.87 trillion to USD \$11.06 trillion. The amount of non-financial corporate debt in 2020 accounts for about 53% of U.S. GDP. Moreover, DeAngelo and Roll (2015) indicates that more than 50% of firm funding in the U.S. comes from debt. Therefore, understanding the determinants of debt structure is key for understanding capital allocation in the capital market. In this study, we attempt to fill this literature gap by examining whether and how cross-ownership influences debt structure.

Cross-ownership can affect firms' choice of bank loans or bonds when raising new debt capital through various channels. In particular, it can improve *ex ante* equity-centered governance. Edmans et al. (2019) use the pure trading model to show that, under cross-

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<sup>1</sup>Cross-ownership and common ownership are used interchangeably throughout this paper.

ownership, investors who hold multiple firms in the same industry tend to identify and sell low-quality firms upon a liquidity shock. This creates incentives for firm managers to actively work harder, given that the negative price impact of investor selling is greater under cross-ownership. In addition, their model shows that cross-owners have stronger incentives to monitor. They are not required to sell a monitored firm upon a liquidity shock, which increases the payoff for monitoring. Moreover, cross-owners play a stronger monitoring role. For each additional unit of monitoring effort spent on a firm, the cross-owner can benefit not only from an improvement in governance in the company itself, but also from the ensuing governance improvement in the company's portfolio peers. From this point of view, He et al. (2019) empirically find that institutional investors' holdings in peer firms are positively correlated with the probability investors will vote against management on shareholder-sponsored governance proposals. The authors' empirical findings show that cross-ownership can improve shareholder monitoring by internalizing governance externalities. Bank loans and public bond financing are two major debt financing instruments. Although the costs of public debt financing through arm's-length investors can be cheaper, banks provide stronger creditor governance because of their more concentrated ownership of debt claims and greater ability to renegotiate debt contracts (e.g., Diamond, 1991; Faulkender and Petersen, 2006; Schwert, 2020). Thus, the improvements in equity-centered governance associated with cross-ownership reduce the benefits and need for bank governance. Firms may switch from bank loans to public bonds to avoid bank governance when making debt issuance decisions.<sup>2</sup>

We investigate the second channel where cross-ownership can affect firms' debt structure by improving firms' *ex post* information environment. Prior research suggests boards that monitor management more effectively can improve the quality and frequency of different

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<sup>2</sup>Firm managers can be exposed to too much governance (Hermalin and Weisbach, 2012). They may try to attain an optimal governance structure dynamically by substituting between governance mechanisms, such as between market-based and government-sponsored governance (Avedian et al., 2015), external and creditor governance (Bharath and Hertz, 2019), or equity-centered and creditor governance (Nini et al., 2012).

types of information released by management (e.g., Klein, 2002; Ajinkya et al., 2005; Karamanou and Vafeas, 2005).<sup>3</sup> Furthermore, Kanagaretnam et al. (2007) provide a direct link between corporate governance and information asymmetry by finding that good governance reduces the information asymmetry around quarterly earnings announcements. Hence, we expect that the improvement in *ex ante* equity-centered governance associated with cross-ownership will improve firms' *ex post* information environments. A widely accepted view emerging from this literature is that banks enjoy "special" access to private information about borrowing companies. Due to banks' superior information processing capabilities, firms with greater information asymmetry who find it difficult to issue bonds publicly will turn to banks for debt financing (e.g., Rajan, 1992; Hadlock and James, 2002; Gomes and Phillips, 2012; Li et al., 2019; Chen et al., 2021; Cao et al., 2022; Kim and Li, 2022).<sup>4</sup> Thus, firms that can benefit from an increase in informational efficiency will be more willing to issue bonds, because public bond financing is cheaper than bank loans. We test whether cross-ownership can potentially reduce the use of bank loans through this information channel.

Despite predicting an increase in public debt usage, the third channel also predicts that cross-ownership may increase the use of bank loans by reducing external governance pressure. A growing literature has shown that cross-ownership can lead to a reduction in product market competition. Cross-owners have incentives to maximize returns across all portfolio firms, instead of just the returns of single firms. This leads them to actively encourage cooperation between firms, or to discourage firm managers from aggressively competing with their peers (He and Huang, 2017). The empirical work of Azar et al. (2018) shows that common ownership within the airline industry resulted in anti-competitive practices. And,

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<sup>3</sup>For example, actual reported earnings and voluntary disclosures (such as management forecasts and other information releases).

<sup>4</sup>In other words, the information asymmetry measures that are not specific to any one type of information in these empirical studies. For example, Li et al. (2019) use information provided by equity analysts, Chen et al. (2021) use credit default information from swap trades, Cao et al. (2022) use default information contained in options prices, and Kim and Li (2022) use information from bond fund herding.

according to the substitution of governance mechanisms hypothesis (Bharath and Hertzell, 2019), the reduction in governance provided by a competitive product market increases the demand for governance associated with bank borrowing. Therefore, we expect that firms with higher institutional cross-ownership will use more bank loans to raise new debt capital through the channel of reduced external governance pressure from product market competitiveness.<sup>5</sup> In sum, cross-ownership can affect debt issuance decisions via channels with counterbalancing effects. The net effect on corporate debt structure remains unclear, and is ultimately an open empirical question.

We use the incremental approach (e.g., Denis and Mihov, 2003; Bharath and Hertzell, 2019) by examining the debt issuance decisions in our analysis. This is because our priority is to examine the real effect of cross-ownership on firms' financing decisions rather than to build an optimal debt structure. Another key benefit is that we can facilitate natural experiments to identify the causal impact of cross-ownership on debt structure through the incremental approach.

Using a comprehensive sample of U.S. public firms from 1987 through 2018, we investigate the impact of institutional cross-holdings of same-industry firms on corporate debt structure. We begin by providing baseline results that cross-ownership reduces the use of bank loans when firms source new debt. We expand Denis and Mihov (2003)'s empirical model of debt choice by including cross-ownership as the explanatory variable. The dependent variable that captures debt choice is a binary variable that equals 1 if firms issue bank loans, and 0 if firms issue bonds in a given fiscal year. With both logit and linear probability estimation procedures, we find firms with higher cross-ownership use fewer bank loans when making new debt issuance decisions. In particular, a 1-standard deviation increase in cross-ownership (measured by *Numconnect*) can lead to a 3.2% decrease in the probability of using bank

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<sup>5</sup>Some recent papers argue that cross-ownership does not reduce product market competitiveness (e.g., Dennis et al., 2021; Koch et al., 2021). However, in this paper, we still account for it as a potential channel. We rule it out in our baseline results by showing the negative impact on bank loan usage.

loans when firms need debt financing. Our baseline results are robust to alternative empirical specifications and alternative measures of cross-ownership.

We employ the difference-in-differences (DiD) approach to solve the potential endogeneity problem. To this end, we use a quasi-natural experiment of financial institution mergers. When two institutions merge, a block-hold by one merging institution tends to increase in cross-ownership if one of its same-industry peers is block-held by the other merging institution just prior to the merger. Therefore, firms in the treatment group exogenously increase their cross-ownership with same-industry peers after the institutional merger. We find that, post-merger, the treatment group substitutes bank loans for bond financing when raising new debt capital, which suggests a causal impact of cross-ownership on debt structure.

We examine cross-sectional variations in the relationship between cross-ownership and debt choice to shed further light on the underlying mechanisms of the observed cross-ownership effect. We begin by obtaining cross-sectional evidence that cross-ownership affects debt structure through the governance channel. We use managerial labor market competition to create cross-sectional variations in firms' willingness to reduce bank governance. The intuition is that for firms that face a very competitive labor market, they are more likely to reduce the bank governance to attract talent in response to increasing governance by cross-owners (e.g., Acharya and Volpin, 2010; Dicks, 2012). We next use the industry homogeneity measure of Parrino (1997) and the number of peer firms in the industry as proxies for labor market competitiveness. We find that the negative effect of cross-ownership on the use of bank loans is more pronounced for firms with greater industry homogeneity, and more peer firms in the same industry. This is consistent with the prediction that cross-ownership affects debt issuance decisions by reducing the need for bank governance. Furthermore, we look at bank loan covenant strictness to provide direct evidence that cross-ownership reduces a firm's reliance on bank loan governance. We find that cross-ownership significantly reduces bank loan strictness.

Moreover, we consider cross-sectional firm characteristics that can generate different effects through the information channel. We use abnormal accruals and analyst forecast dispersion as proxies for information asymmetry. Consistent with our prediction that cross-ownership is more beneficial for firms with greater informational asymmetry, we find that the negative impact on firms' choice of bank loans is more pronounced for firms with greater abnormal accruals and analyst forecast dispersion. Second, we study the effect of cross-ownership on loan syndicate structure to provide further evidence in support of the informational channel. Due to the information asymmetry between lead arrangers and participants in a syndicated loan, participants may require lead arrangers to take a larger loan share. Because lead arrangers are better informed, they can provide an adequate level of monitoring and due diligence. Consistent with the view that cross-ownership reduces *ex post* information asymmetry, we find that the amount of shares held by lead arrangers is significantly reduced for firms with higher cross-ownership.

Our paper makes several key contributions to the literature. First, we contribute to research on how institutional investors affect the debt structure from the supply side. Institutional investors are the main capital suppliers in the credit market. Zhu (2021) finds that firms are less likely to issue bonds when suffering a capital supply shock. Massa et al. (2013) find that the supply uncertainty of the institutional investor base has a significantly negative effect on firm leverage. Moreover, the trading behaviour of institutional investors can also affect the optimal debt structure. Cao et al. (2022) find that option trading encourages the use of more public bonds through the enhanced information environment and governance. Kim and Li (2022) show that institutional herding positively affects corporate bond issuance by improving information efficiency. Chen et al. (2021) conclude that firms tend to shift to public bonds after initiating credit default swaps. Our paper is more closely related to the work of Lin et al. (2013). They find that the diversity between the control rights and cash flow rights of a borrowing firm's largest ultimate owner reduces firm reliance on bank debt

financing. This is due to the bank monitoring avoidance channel. We find, along a similar vein, that cross-ownership reduces bank loan usage by substituting bank governance with enhanced equity-centered governance.

Second, our paper contributes to a growing literature on the economic implications of cross-ownership. Hansen and Lott (1996) develop a model showing that cross-owners maximize their portfolio values by inducing underlying firms to internalize externalities. Recent studies explore the implications of cross-ownership on corporate governance (He et al., 2019), voluntary disclosure (e.g., Pawliczek and Skinner, 2018; Park et al., 2019), corporate investment decisions (Gutiérrez and Philippon, 2016), customer-supplier relationships (Freeman, 2019), diffusion of innovation (Kostovetsky and Manconi, 2020), acquisitions (e.g., Matvos and Ostrovsky, 2008; Harford et al., 2011), and product market performance (He and Huang, 2017). Findings regarding the impact of cross-ownership on product market competition are mixed. For example, as noted earlier, Azar et al. (2018) finds that common ownership within the airline industry resulted in anti-competitive practices. On the other hand, Gilje et al. (2020) and Lewellen and Lowry (2021) question whether institutions have incentives to encourage anti-competitive practices. These papers consider the real effect of cross-ownership on the equity side. To the best of our knowledge, our paper is the first to explore the implications of cross-ownership from the debt side, given the important role of equity ownership in corporate debt (e.g., McConnell and Servaes, 1995; Lin et al., 2011; Aslan and Kumar, 2012; Lin et al., 2013). We especially study how the governance and information roles affect the choice of new debt capital.

Third, we shed further light on the literature by examining how firms dynamically substitute between various governance mechanisms. Firm managers tend to be overly exposed to governance (Hermalin and Weisbach, 2012). The substitute of governance hypothesis posits that firms dynamically substitute the composition of different governance mechanisms in order to achieve an optimal level. Avedian et al. (2015) show that firms substitute away from



independent board governance in response to the added external governance pressure that arose from the creation of the Securities and Exchange Commission. Furthermore, Bharath and Hertzl (2019) find that an exogenous increase in external governance pressure has a significantly negative impact on the use of bank governance. More closely related to our study, Nini et al. (2012) report an increase in CEO turnover following covenant violations. They suggest that effective creditor interventions can substitute for equity-centered governance mechanisms. We provide evidence that the improvement in equity-centered governance associated with cross-ownership can substitute for bank governance.

The remainder of this chapter is organized as follows. Section 2 describes our data, key variables, and empirical specification. Section 3 discusses the empirical results. Our cross-sectional evidence is presented in Section 4. Section 5 concludes.

## 2 Data and Variable Construction

### 2.1 Data

Our primary data source on institutional holdings is Refinitiv (formerly Thomson Reuters). We obtain data from the Refinitiv 13F Institutional Holdings dataset. Issuance data of corporate bonds come from the Mergent FISD dataset, and bank loan data come from Dealscan.<sup>6</sup> Stock price information comes from CRSP, and we use Compustat for firm-level accounting data. Our sample contains 25,835 firm-year observations at debt issuance points for U.S.-listed firms with common stocks traded on the NYSE, NASDAQ, and AMEX during the period 1987-2018.<sup>7</sup>

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<sup>6</sup>The firm-level link between DealScan and Compustat is accomplished through the link table provided by Professor Michael Roberts. See Chava and Roberts (2008) for details on the data construction.

<sup>7</sup>We only include firm-year observations for firms that issued a bank loan or bond in our sample. We choose 1987 as our sample starting date because Dealscan began full coverage that year. Following standard procedures in the literature, we exclude financial firms (SIC codes: 6000-6999), utility firms (SIC codes: 4000-4999), and firms whose stock prices are lower than \$5.

## 2.2 Measuring Cross-ownership

We obtain institutional holding information from Thomson Financial’s 13F database for each quarter, and define a block holding if it exceeds 5% of outstanding shares. Cross-holdings arise when an institution simultaneously holds more than one block in the same four-digit SIC industry at a given quarter.

Following He and Huang (2017), we use four measurements to capture the cross-ownership status in a given fiscal year. First, *NumConnected* is the number of same-industry peers that share any common institutional blockholder with a firm. We use the number of unique institutions that cross-hold the firm as our second measure, namely, *NumCross*. The first two measures capture the extent to which a firm is connected to other same-industry peers through cross-ownership. The third measure, *Avgnum*, is the number of same-industry peers block-held by the average cross-holding institution. Specifically, we first calculate the number of same-industry firms (other than the one under consideration) block-held by each cross-holding institution during a particular quarter, and then average across all such institutions. This measure of incentive influences the corporate policies of the cross-held companies because it captures the intensity of cross-holding activities for the average institution. The last measure, *Totalcrossown*, is the sum of all cross-holding institutions’ percentage holdings in the firm itself. We calculate all four measures quarterly, and take the average across a fiscal year.

## 2.3 Control Variables

In examining the relationship between cross-ownership and the choice of debt instruments, we control for several firm characteristics widely used in the debt structure literature. These include *Blockown*, *Blockdummy*, *FirmSize*, *Leverg*, *Profitability*, *AltmanZ*, *BTM*, *Investgrade*, and *Norates*. *Blockown* is defined as the average percentage ownership by institutional

blockholders. *Blockdummy* is a binary variable that equals 1 if a firm is block-held in any of the four quarters prior to the fiscal year-end, and 0 otherwise. These two variables capture the difference in ownership structure. *FirmSize* is defined as the natural logarithm of the book value of assets. We control for firm size because it captures information asymmetry, which may influence debt issuance costs (Houston and James, 1996). *Leverg* is defined as the ratio of total liabilities to total assets. We use leverage to control for the potential difference between firms’ willingness to use debt financing. *Profitability* captures the creditworthiness of firms, which is important for debt choice (Blackwell and Kidwell, 1988). *AltmanZ* is Altman’s Z-score for financial distress risk. *BTM* is the book to market ratio, which captures firms’ growth opportunities. *Investgrade* is defined as a dummy variable that equals 1 if a firm is investment-grade, and 0 otherwise. *Norates* is a dummy variable that equals 1 if a firm has a credit rating, and 0 otherwise. These two variables control for credit ratings. See Appendix A for variable definitions.

## 3 Empirical Results

### 3.1 Summary Statistics

We provide the summary statistics in Table 1. There are 52,603 total debt issuances during 1987-2018, and 68% are sourced by bank loan.<sup>8</sup> This is consistent with the fact that bank loans are the main tools when making new debt issuance decisions (e.g., Denis and Mihov, 2003; Bharath and Hertz, 2019; Cao et al., 2022). We follow the model in Denis and Mihov (2003) and use *DummyBankIssue*, a binary variable that equals 1 if the firm issued a bank loan during the year and 0 if the firm issued a bond, as our dependent variable to capture incremental debt issuance decisions. In Panel A, the dependent variable *DummyBankIssue*

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<sup>8</sup>We show a slightly lower number of debt issuances than Bharath and Hertz (2019). We only select U.S. publicly traded firms with at least one blockholder, in order to ensure a significant impact on firms’ new debt issuance decisions.

shows that 84.400% of new debt issues over the sample period are bank loans. The magnitude is similar to that in Cao et al. (2022). Moreover, most of our variables in Panel A are comparable to those found in the current literature.

We then split our sample for cross-owned and non-cross-owned firms in Panel B. *DummyBankIssue* in cross-owned firms is 83.000%, which is significantly lower than in the non-cross-owned sample (90.500%) at a 1% significance level. Most firm characteristics are statistically different among these two samples. For example, cross-owned firms have significant larger firm sizes (*FirmSize*: 6.802 v.s. 5.305), higher profitability (*Profitability*: 0.016 v.s. -0.021), higher credit ratings (*Investgrade*: 0.239 v.s. 0.102), and lower default risk (*AltmanZ*: 1.536 v.s. 1.279) than non-cross-owned firms.

### 3.2 Baseline Results

We extend the empirical model in Denis and Mihov (2003) to obtain preliminary evidence on how cross-ownership affects the choice between bank loans and public bond issuance. Table 2 provides linear probability (Panel A) and logit (Panel B) estimates of the likelihood of a firm issuing a bank loan as a function of four different measures of cross-ownership and firm-level control variables. We include industry and year-fixed effects in estimation procedures for Panels A and B. The dependent variable *DummyBankIssue* is a binary variable that equals 1 if firms issue bank loans, and 0 if firms issue bonds in a given fiscal year. We use this variable to capture a firm’s tendency to switch from bank loans to public bond financing when raising new debt capital.<sup>9</sup>

In Panel A, consistent with the empirical predictions of both information and governance channels, we find that cross-ownership has a significantly negative effect (coefficient -0.032

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<sup>9</sup>Our dataset is constructed at debt issuance points. We do not include firm-fixed effects because the logit model would drop a significant number of sample observations for firms with only loan or bond issuances. In a robustness check, we show that our baseline results remain robust when the firm fixed effect is included in Panel B in Table 3.

with t-statistics -7.150 from Column 1) on the issuance probability of bank loans. This negative effect is robust when we use the four measures to capture the degree of cross-ownership through Columns 1 to 4. More specifically, a 1-standard deviation increase in cross-ownership, measured using *Numconnect* in Column 1, leads to a 3.200% decrease in the probability of using bank loans for debt financing. Taking this baseline evidence together, firms tend to substitute bank loans for public bond financing when making new debt issuance decisions.

The coefficients of these control variables are mostly consistent with current literature on debt structure. Consistent with the hypothesis that firms with severe informational asymmetry raise capital through bank borrowing, we find that the coefficient of *FirmSize* is negatively related to the issuance probability of bank loans. Firms facing a higher likelihood of bankruptcy (Altman Z-score lower than -1.81) are more likely to raise debt capital through bank loans. Moreover, investment-grade firms and those with available credit ratings choose public debt financing.

Our baseline results estimated from the logit model with industry and year fixed effects are in Panel B. The results from the logit model are mostly consistent with the linear model in Panel A, where cross-ownership has a negative impact on the likelihood of issuing a bank loan when sourcing new debt capital.

Figure 3 provides a time series plot for bond issuances at the aggregate market level for both cross-owned and non-cross-owned firms. Given the increasing trend of cross-ownership in Figure 2, we find that aggregate bond issuance increases over time for cross-owned firms in Figure 3.<sup>10</sup> However, aggregate bond issuance in non-cross-owned firms remains stable. Overall, Figure 3 also supports our baseline results where cross-ownership is positively associated with using bonds when firms raise new debt capital.

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<sup>10</sup>Note that the number of cross-owned firms does not linearly increase through time. This rules out the possibility that a number of firms are driving increases in aggregate bond issuance (these results are not reported here for the sake of space).

Collectively, the results in Table 2 and Figure 3 show that firms with higher levels of cross-ownership tend to have a lower likelihood of issuing bank loans when sourcing new debt. Instead, these firms use more bond financing. This finding is robust to controlling for firm characteristics and year/industry fixed effects.

### 3.3 Robustness Tests

Table 3 provides multiple robustness checks. First, to mitigate concerns that the impact of cross-ownership on debt issuance decisions is driven by unobserved factors in cross-owned and non-cross-owned firms, we provide our baseline results for a sample of cross-owned firms only in Panel A. We find that the regression coefficients across all four measurements for cross-ownership remain significantly negative for both the linear probability and the logit model. This confirms the negative impact of cross-ownership on the likelihood of issuing bank loans. For example, the coefficient of *Numconnect* is -0.032 with t-statistic of -6.864, which is negatively significant at a 1% significance level.

Our results in Panel B are also quantitatively similar when we include firm fixed effects to control for time-invariant unobservable differences among firms. The coefficient for *Numconnect* is -0.019 with t-statistic of -3.289, suggesting that cross-ownership is negatively correlated with bank loan issuance at a 1% significant level.

In Panel C, we create an alternative measurement *GGL* for cross-ownership developed by Gilje et al. (2020). This best captures managerial incentives to internalize externalities.<sup>11</sup> In particular, cross-ownership enhances equity-centered governance mechanisms by internalizing governance externalities (He et al., 2019). Our governance channel predicts that the negative impact of cross-ownership on the probability of borrowing from banks is driven by the substitution of creditor (bank) governance for equity-centered governance. The re-

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<sup>11</sup>We assumed the likelihood of investors being informed was linear when creating *GGL*. We also check that our results remain unchanged if we use a concave or convex assumption.

sult in Panel C shows that our baseline results remain unchanged even if the alternative measurement for cross-ownership accounts for these managerial incentives.

### 3.4 Identification Using Financial Institution Mergers

Although our results document a strong negative effect of cross-ownership on the likelihood of issuing bank loans when sourcing new debt capital, the findings are subject to endogeneity concerns. One possibility is that debt issuance decisions may be endogenous to the degree of cross-ownership. Thus, a negative relationship between cross-ownership and the choice of bank loan may indicate enhancement in *ex ante* equity-centered governance or *ex post* informational efficiency. But a negative relationship may also arise if the choice of bank loan affects the degree of cross-ownership. In addition, our baseline results may be affected by unobservable factors.

To resolve the reverse causality and omitted variable concerns, we follow He and Huang (2017), and use financial institution mergers as exogenous shocks to the degree of cross-ownership. Financial institutions, such as asset management companies, banks, security brokers, etc., usually make merging decisions that are unrelated to the fundamentals of individual firms in their portfolios. When two financial institutions merge, the portfolios of the target institution are taken over by the acquirer, creating an exogenous increase in the degree of cross-ownership. Therefore, these mergers provide a good quasi-experimental setting for analyzing the causal effect of cross-ownership on the debt issuance decision.

Our assumption here is that institutions merge for reasons unrelated to the debt issuance decisions of their individual firms. We obtain financial institution merger data from He and Huang (2017), and define treated firms in order to satisfy two conditions: 1:) The firm must be block-held by one of the merging institutions, and 2:) the other merging institution may not block-hold the same firm, but must block-hold at least one of its same-industry peers. We expect cross-ownership in the treatment group to exogenously increase after institutional

mergers. Firms in the control group also need to satisfy two conditions: 1:) The firm must be block-held by the same institution that block-holds a treated firm, and 2:) the other merging institution must not block-hold any peer firms from the same industry. Our DiD sample contains debt issuances for the five years before and after the shock.<sup>12</sup>

The key advantage of this identification is that there are multiple shocks that affect different companies at different times. Such identification with multiple shocks is helpful. It can mitigate any concerns about potential omitted variables coinciding with a shock that would directly affect the debt issuance decision if we use a single shock as identification.

Table 4 provides the results. We estimate the DiD regression using the linear probability (Columns 1-4) and the logit model (Columns 5-8). From Column 1, we find the coefficient of  $TREAT * POST$  estimated from the linear model with year and mergers fixed effect is -0.046 with t-statistic of -3.305, which is significant at 1%. This coefficient indicates that treated firms after institutional mergers tend to have a 4.6% lower probability of issuing bank loans when raising new debt capital. For robustness, our results continue to hold when estimating the DiD regression model by including firm- and industry-fixed effects in Columns 2-4. We find similar results when using the logit model to estimate the DiD regressions through Columns 5-8. Overall, we find consistent results that firms in the treatment group that suffer an exogenous increase in cross-ownership after a financial institution merger have a lower likelihood of issuing bank loans when raising new debt capital.

## 4 Cross-sectional Tests

Although our findings thus far exclude the possibility of a reduction in external governance pressure (the third channel), the results are consistent with both *ex ante* equity-centered governance and *ex post* enhanced information channels. In this section, we investigate the

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<sup>12</sup>We consider this long period event study to have sufficient observations before and after the shock because the average gap between two debt issuance in our sample is 2.3 years.



cross-sectional nature of our sample to shed further light on its potential mechanisms. In particular, we consider cross-sectional characteristics expected to generate different effects on managerial labor market competition and the informational environment to test the potential channels.

#### 4.1 *Ex Ante* Governance Channel

In this section, we investigate whether cross-ownership affects firms' debt issuance decisions through the *ex ante* governance channel. We consider two implications. Suppose the *ex ante* governance channel plays a role in determining the negative impact of cross-ownership on bank loans. In that case, we would expect this impact to be more pronounced for firms whose managers have better outside opportunities, i.e., greater managerial labor market competition (e.g., Acharya and Volpin, 2010; Dicks, 2012). The intuition here is that firms tend to adopt lower governance levels to attract talented managers if they face greater competition. They therefore have more incentives to trade off between creditor (bank) governance and cross-ownership governance. Furthermore, we test whether cross-ownership reduces the strictness of bank loan covenants, which are the direct measure of creditor governance from banks, in order to provide further evidence to support the channel.

Following He et al. (2019), we use two measures to capture managers' outside options in the labor market. The first is the industry homogeneity index developed by Parrino (1997). A higher industry homogeneity index indicates managers' industry skills are easier to transfer across firms in the same industry. The second,  $\ln NumPeers$ , is the natural logarithm of 1 plus the number of peer firms in the same industry. This denotes that managers have more opportunities to access outside options in the industry. We expect that the negative effect of cross-ownership on bank loan insurance will be more pronounced for firms whose managers have more outside options.

Table 5 gives the results. In Panel A, *HighHomo* is a dummy variable that equals

1 if the industry homogeneity index of 2-digit SIC codes in a given fiscal year is above-median. Consistent with the governance channel, the interaction terms estimated from the linear probability model with industry and year fixed effects through Columns 1-4 remain significantly negative. For example, in Column 2, the coefficient of  $Numcross * HighHomo$  is -0.018 with t-statistic 3.474, which is significant at a 1% significance level. Results remain unchanged if we use the logit model with the same fixed effects through Columns 5 to 8.

In Panel B, the interaction terms between  $LnNumPeers$  and all four measurements for cross-ownership remain significantly negative at a 1% significance level through Columns 1 to 8 for the linear probability and the logit models. Our results suggest that the negative relationship between cross-ownership and the probability of using bank loans is more pronounced when governance externalities associated with labor market competitiveness are larger.

In addition to the cross-sectional variation in managerial labor market competition, we provide more direct evidence to support the governance channel. We examine the effect of cross-ownership on bank loan covenant strictness. Lending banks use loan covenants as vital mechanisms with which to impose creditor governance and monitoring. If the negative effect of cross-ownership on firms' usage of bank loans is driven by the *ex ante* governance channel, we expect that bank loan contracts will have looser covenants for firms with a higher degree of cross-ownership.

We use  $PVIOL$ , as proposed by Demerjian and Owens (2016), to capture bank loan covenant strictness. It is the aggregate probability of covenant violation at loan inception date across all covenants included on a given loan package (from the total set of fifteen covenant categories). Except for firm characteristics, we further control for loan characteristics, including loan maturity, size, and whether a loan is secured. Moreover, we include loan purpose as an additional fixed effect to control for unobserved differences among loans

issued under different financing purposes.<sup>13</sup>

Table 6 gives the results. As the degree of cross-ownership increases, bank loan contracts have looser covenants. For example, the coefficient of *Avgnum* in Column 3 is -0.003 (with t-statistic -2.407), which is significant at the 5% level. This negative relationship continues to hold when we use alternative measurements to capture cross-ownership in Columns 1, 2, and 4. Consistent with the *ex ante* governance channel, covenant strictness reduces as the degree of cross-ownership increases.

## 4.2 *Ex post* Information Channel

If cross-ownership impacts a firm's debt issuance decision by enhancing the *ex post* informational environment, we expect more pronounced effects for firms with greater information asymmetry. We first provide results based on interacting cross-sectional measurements with variables that capture information asymmetry. Second, we provide additional evidence on the information channel by investigating the effect of cross-ownership on bank loan syndicate structure.

Through the information channel, we hypothesize that firms use less bank debt because institutional cross-holding improves the information environment. This in turn reduces the benefit of information production and the signalling role of bank debt. Therefore, we expect the negative impact of cross-ownership on bank loans to be more profound for firms with high asymmetric information. We use abnormal accruals and analyst forecast dispersion to proxy for information asymmetry. We follow Dechow et al. (1995) to construct abnormal accruals. A higher value of abnormal accruals implies a higher degree of earnings manipulation, thus a higher information asymmetry. We follow Mansi et al. (2011) to construct analyst forecast dispersion as the standard deviation of analysts' earnings estimates. A higher value implies a higher degree of disagreement among analysts.

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<sup>13</sup>Our results remain unchanged if we only include industry and year fixed effects.

Table 7 provides the results. We report results for abnormal accruals in Panel A and analyst forecast dispersion in Panel B. *HighAbn.Accr* is a dummy variable that equals 1 if abnormal accruals exceed the median in the fiscal year. *HighDisp* is a dummy variable that equals 1 if analyst forecast dispersion is above-median in a given fiscal year.

Columns 1 to 4 of Panel A show that the interactions of cross-ownership proxies and the high abnormal accrual dummy are all significant, except for the proxy of *Totalcrossown*. In line with our hypothesis, and consistent with the information channel, our results confirm that the effect of common institutional ownership on bank loans is stronger for firms with high abnormal accruals.

Columns 5 to 8 report the results for the logit model. We find qualitatively unchanged results. Panel B presents the results using the proxy of high analyst forecast dispersion. The interactions in all columns are significant, which further supports our hypothesis. For robustness, we also follow Brown and Hillegeist (2007) to use analyst forecast error and probability of informed trading as alternative information asymmetry proxies. Our results again remain qualitatively unchanged (untabulated). Overall, we provide strong evidence for the information channel prediction that institutional cross-holding improves the information environment and reduces the benefit of information production and the signalling role of bank debt.

Second, we provide further evidence for the information channel by examining the effect of cross-ownership on bank loan syndicate structure. Information asymmetry exists between lead arrangers and participants in syndicated bank loans, given that lead arrangers are usually more informed and closer to borrowers (Sufi, 2007). Studies find that syndicate participants require informed lead arrangers to take a larger share of the loan when the borrowing firm suffers from greater information asymmetry. In this way, they provide incentives for lead arrangers to engage in sufficient monitoring and due diligence (e.g., Amiram et al., 2017; Beatty et al., 2019). If cross-ownership reduces a firm's information asymmetry, we

expect that syndicate participants will require lead arrangers to take a lower share of the loan when cross-ownership is high. We construct this analysis following Cao et al. (2022) by investigating the effect of cross-ownership on the loan share of lead arrangers.

Table 8 provides evidence of this conjecture. The dependent variable *LoanShare* is the percentage of the loan taken by a participant. *Leader* is a binary variable that equals 1 if the participant is a lead arranger, and 0 otherwise. Except for firm characteristics, we further control for loan maturity, size, loan spread, and the number of lenders. From Columns 1-4, the interaction coefficients between *Leader* and measurements for cross-ownership are all significantly negative. For example, the coefficient of *Leader \* Numconnect* in Column 1 is -0.433 (with t-statistic -9.312), which is significant at a 1% significance level. The results suggest that the leaders' share of the loan is significantly reduced as the degree of cross-ownership increases. This confirms our conjecture that cross-ownership reduces the information asymmetry between participants and lead arrangers in a syndicated loan.

Overall, our results for the syndicate loan structure provide additional evidence that cross-ownership improves firms' *ex post* informational environment, and have a real effect on loan markets.

## 5 Conclusion

This paper investigates the impact of cross-ownership on corporate debt structure. We find it has a significantly negative impact on the likelihood of bank loan usage when sourcing new debt capital. To explore the underlying mechanisms of the observed effect, we find the negative correlation is also stronger for firms whose managers are more likely to have more outside job opportunities. In addition, cross-sectional evidence suggests this effect is more pronounced for firms with greater information asymmetry. These cross-sectional findings show that cross-ownership plays an *ex ante* governance and *ex post* informational role in

determining a firm's debt structure.

Current literature has largely studied the economic implications of cross-ownership on the equity side, including information efficiency, governance, and market competition. We believe our paper is the first one, to our best knowledge, to provide evidence of the real effect of cross-ownership on the credit side. Our results show that the enhanced governance and information associated with cross-ownership have a spillover effect from equity to debt. Moreover, cross-ownership affects loan covenant strictness and the syndicate loan structure through these underlying mechanisms. Collectively, our paper can guide future work on the implications of cross-ownership on bank loans. We also contribute to understanding the determinants of debt structure by showing how ownership structure affects firms' choice of debt. Finally, we complement the literature on the governance substitution hypothesis by showing that substitution between equity-centered governance and creditor governance is the main driver of the debt issuance decisions associated with cross-ownership.

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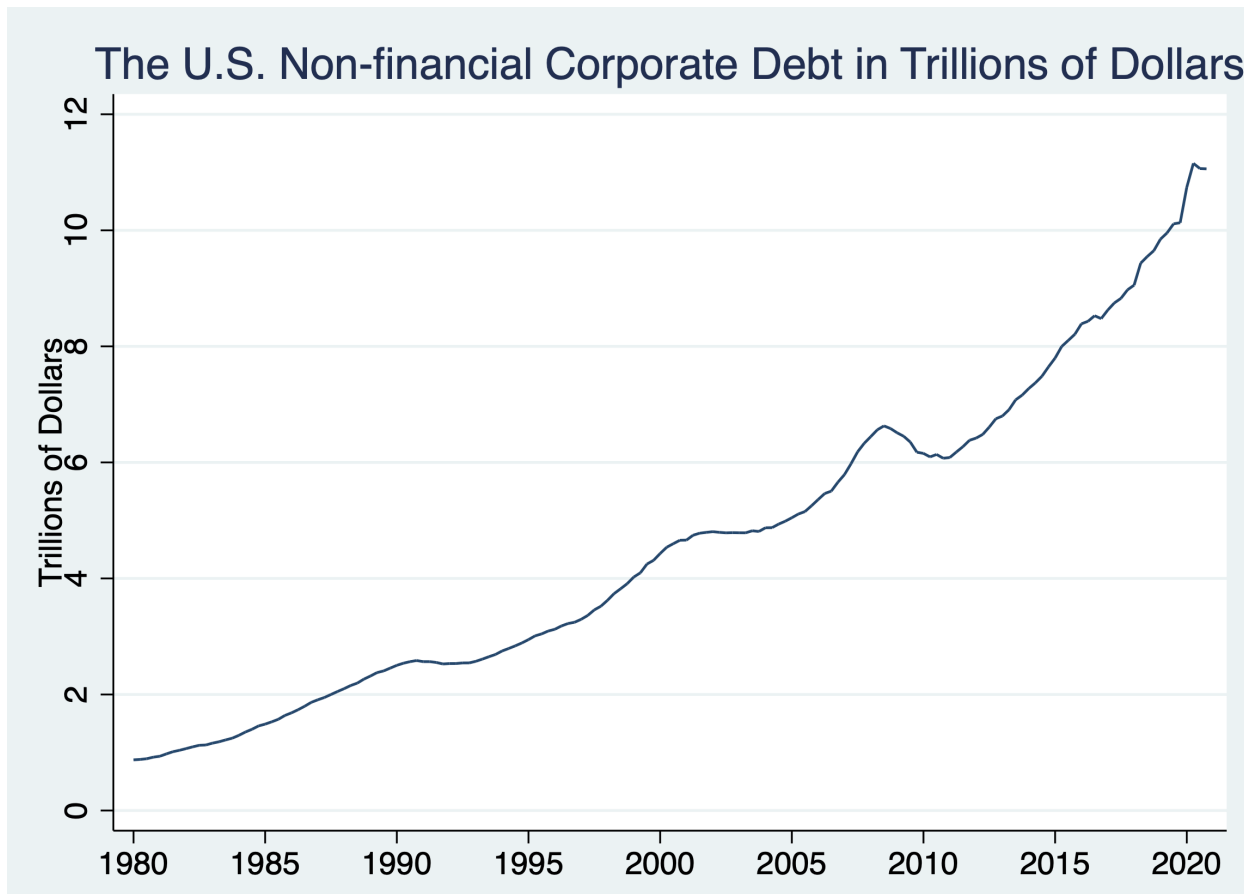
## Appendix A: Variable Definitions

Variable	Definition
<i>DummyBankIssue</i>	Binary variable that equals 1 if a firm issues bank loans, and 0 if a firm issues bonds in a given fiscal year.
<i>NumConnected</i>	Number of same-industry peers that share any common institutional blockholder with the firm.
<i>NumCross</i>	Number of unique institutions that cross-hold the firm.
<i>Avgnum</i>	Number of same-industry peers block-held by the average cross-holding institution.
<i>Totalcrossown</i>	Sum of all cross-holding institutions' percentage holdings in the firm itself.
<i>Blockown</i>	Average percentage ownership by institutional blockholders.
<i>Blockdummy</i>	Binary variable that equals 1 if a firm is block-held in any of the four quarters prior to the fiscal year-end, and 0 otherwise.
<i>FirmSize</i>	Natural logarithm of the book value of assets.
<i>Leverg</i>	Ratio of long-term debt (DLTT) plus short-term debt (DLC) over book value of total assets (AT).
<i>Profitability</i>	Ratio of income before extraordinary items (IB) over book value of total assets (AT).
<i>AltmanZ</i>	Altman's Z-score. $(3.3 * \text{Operating income (IOADP)} + \text{Sales (SALE)} + 1.4 * \text{Retained earnings (RE)} + 1.2 * (\text{Current assets (ACT)} - \text{Current Liability (LCT)})) / \text{Book Assets (AT)}$ .
<i>BTM</i>	Book to Market Ratio, the ratio between book value of equity and market value of equity.
<i>Investgrade</i>	Dummy variable that equals 1 if a firm is investment-grade, and 0 otherwise.
<i>Norates</i>	Dummy variable that equals 1 if a firm has a credit rating, and 0 otherwise.
<i>HighAbn.Accr</i>	Dummy variable that equals 1 if abnormal accrual proposed by Dechow et al. (1995) is above-median in a given fiscal year, and 0 otherwise.
<i>HighDisp</i>	Dummy variable that equals 1 if analyst forecast dispersion is above-median in a given fiscal year, and 0 otherwise.

<i>HighHomo</i>	Dummy variable that equals 1 if industry homogeneity index of 2-digit SIC codes developed by Parrino (1997) is above-median in a given fiscal year, and 0 otherwise.
<i>LnNumPeers</i>	Natural logarithm of 1 plus the number of peer firms in the same industry.
<i>LoanShare</i>	Percentage of the loan taken by a participant.
<i>Leader</i>	Binary variable that equals 1 if the participant is a lead arranger, and 0 otherwise.
<i>PVIOL</i>	Aggregate probability of covenant violation at loan inception date across all covenants included on a given loan package from the the total set of fifteen categories proposed by Demerjian and Owens (2016).

**Figure 1**  
**Non-financial U.S. Corporate Debt**

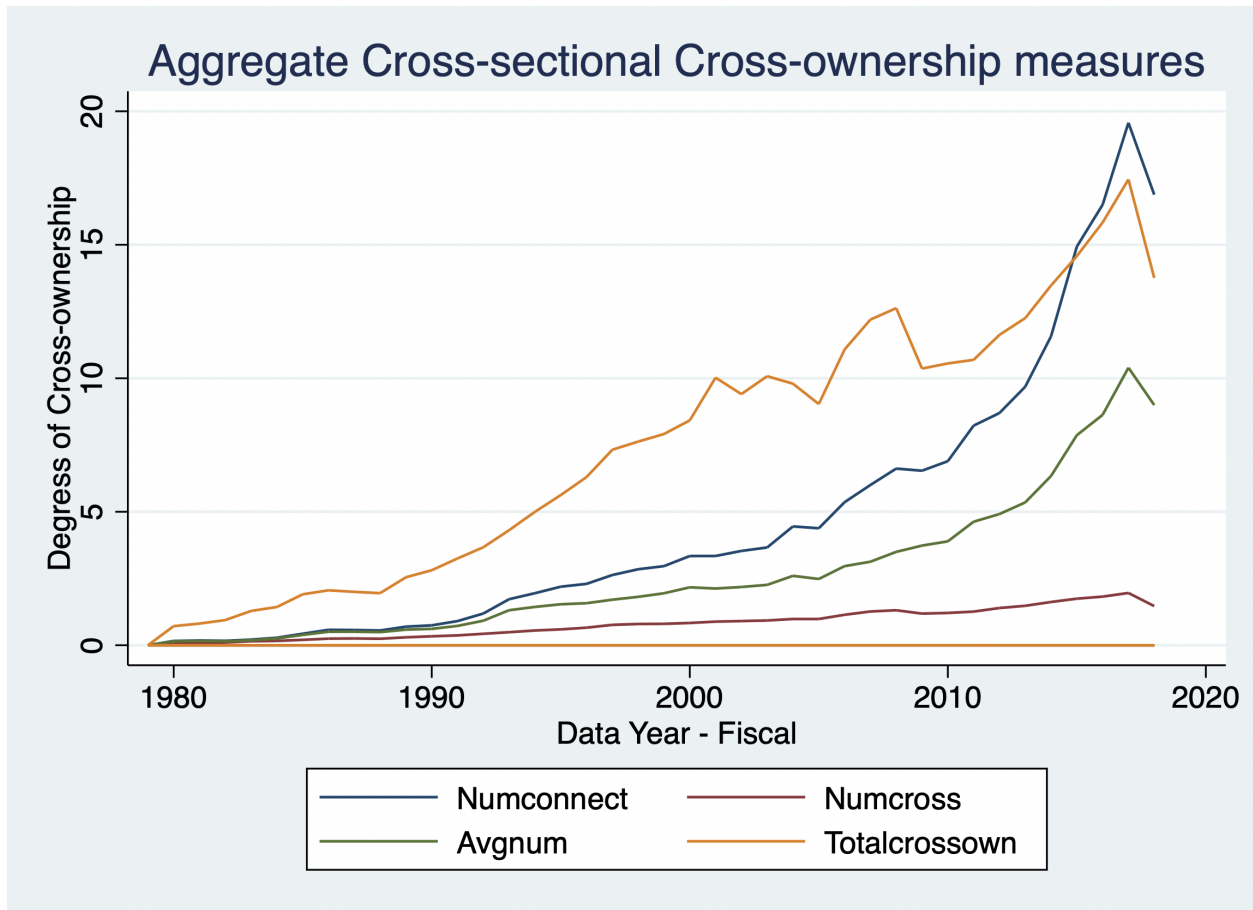
This figure plots the non-financial U.S. corporate debt includes debt securities and loans sourced from Federal Reserve Board of Governors.



Source: Federal Reserve Board of Governors.

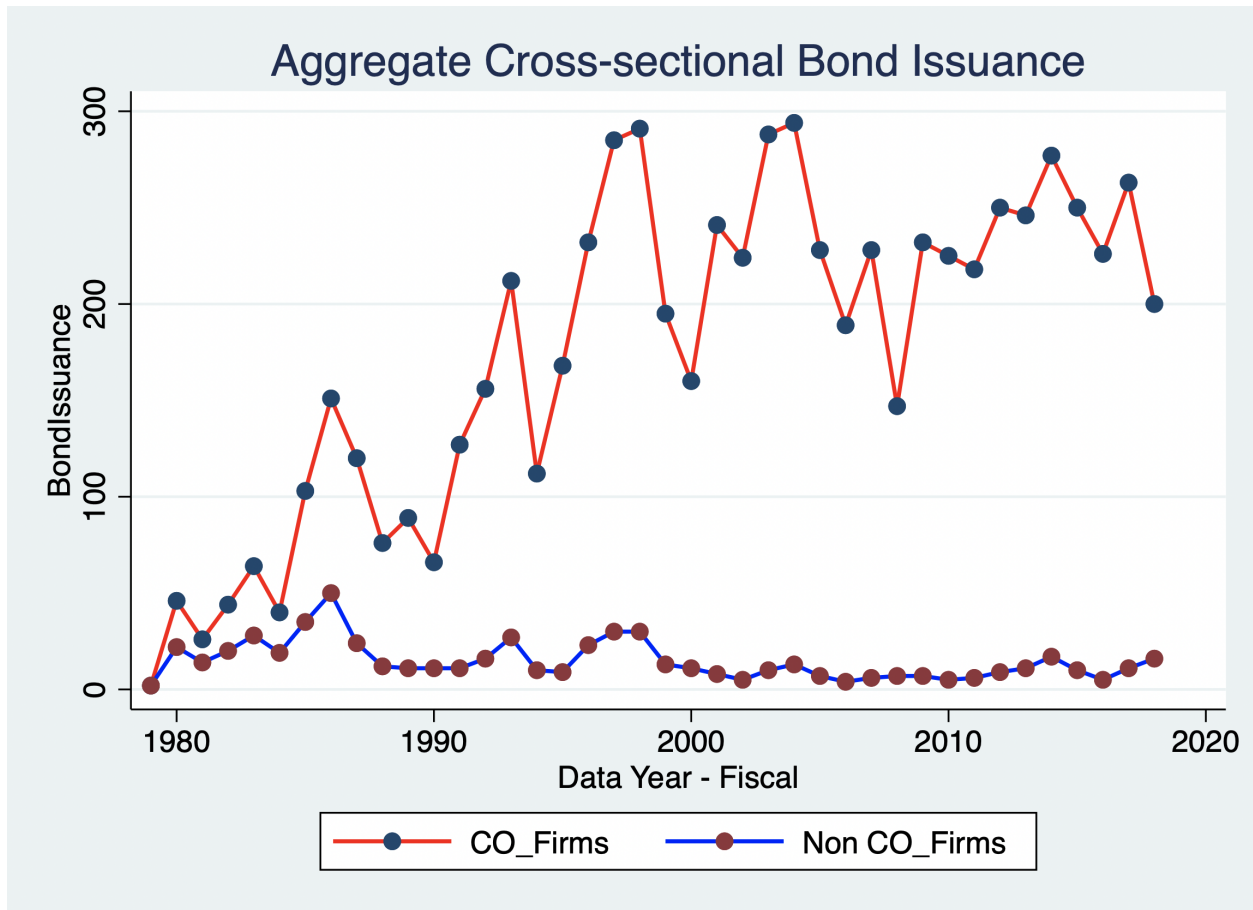
**Figure 2**  
**Cross-sectional Average of Cross-ownership Measures**

This figure plots the cross-sectional average of cross-ownership measures weighted by firm size.



**Figure 3**  
**Aggregate Number of Bond Issuance**

This figure plots the aggregate number of bond issuance for cross-owned and non-cross-owned firms.





**Table 1**  
**Summary Statistics**

This table provides summary statistics for variables used in the paper. Panel A reports summary statistics in the full sample, panel B reports summary statistics for cross-owned and non-cross-owned firms. Definitions of variables are in Appendix A.

		Total Debt Issues	52,603			
		Loans	68%			
		Bonds	32%			
		Time Period	1987-2018			
Panel A: Full Sample	N	Mean	Std. Dev.	p25	Median	p75
DummyBankIssue	25,835	0.844	0.363	1.000	1.000	1.000
Numconnect	25,835	3.716	8.450	0.000	0.500	3.250
Numcross	25,835	0.823	1.037	0.000	0.500	1.250
Avgnum	25,835	2.248	4.486	0.000	0.500	2.375
Totalcrossown	25,835	7.020	9.465	0.000	2.758	11.123
Blockown	25,835	16.956	15.321	5.760	13.619	25.278
Blockdummy	25,835	0.800	0.400	1.000	1.000	1.000
FirmSize	25,835	6.516	1.982	5.080	6.505	7.884
Leverg	25,835	0.314	0.209	0.164	0.296	0.431
Profitability	25,835	0.009	0.133	-0.001	0.035	0.068
AltmanZ	25,835	1.487	1.514	0.678	1.561	2.384
BTM	25,835	0.901	1.800	0.273	0.536	0.931
Investgrade	25,835	0.212	0.409	0.000	0.000	0.000
Norates	25,835	0.163	0.370	0.000	0.000	0.000
Panel B:	CO_Firms		Non CO_Firms		Difference	
	N	Mean	N	Mean		
DummyBankIssue	20,886	0.830	4,949	0.905	-0.075***	
Blockown	20,886	18.997	4,949	8.342	10.654***	
Blockdummy	20,886	0.871	4,949	0.500	0.371***	
FirmSize	20,886	6.802	4,949	5.305	1.497***	
Leverg	20,826	0.308	4,940	0.342	-0.034***	
Profitability	20,885	0.016	4,946	-0.021	0.037***	
AltmanZ	20,886	1.536	4,949	1.279	0.257***	
BTM	20,886	0.908	4,949	0.874	0.033	
Investgrade	20,886	0.239	4,949	0.102	0.137***	
Norates	20,886	0.141	4,949	0.259	-0.118***	

**Table 2**  
**Baseline Results**

This table provides baseline results for the impact of cross-ownership on the issuance of bank loans. The dependent variable is *DummyBankIssue*. We use four measures to capture cross-ownership: *Numconnect*, *Numcross*, *Avgnum*, and *Totalcrossown*. All these four measures for cross-ownership are normalized at mean 0 and variance 1. We control for firm characteristics including *Blockown*, *Blockdummy*, *FirmSize*, *Leverg*, *Profitability*, *AltmanZ*, *BTM*, *Investgrade*, and *Norates*. All independent variables are lagged by one year. Panel A reports regression results using the linear model with a 2-digit SIC industry and year fixed effects. Panel B reports regression results using the logit model with 2-digit SIC industry and year fixed effects. Standard errors are clustered by firms. t-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. Definitions of variables are in Appendix A.

Panel A: OLS Model				
Dependent var: <i>DummyBankIssue</i>	(1)	(2)	(3)	(4)
<i>Numconnect</i>	-0.032*** (-7.150)			
<i>Numcross</i>		-0.022*** (-5.228)		
<i>Avgnum</i>			-0.026*** (-6.129)	
<i>Totalcrossown</i>				-0.024*** (-5.665)
<i>Blockown</i>	0.001*** (2.636)	0.001*** (3.250)	0.000 (1.475)	0.001*** (4.068)
<i>Blockdummy</i>	0.000 (0.011)	0.000 (-0.001)	0.005 (0.556)	-0.004 (-0.487)
<i>FirmSize</i>	-0.033*** (-12.099)	-0.034*** (-12.283)	-0.034*** (-12.232)	-0.034*** (-12.251)
<i>Leverg</i>	-0.027 (-1.630)	-0.024 (-1.432)	-0.025 (-1.481)	-0.025 (-1.481)
<i>Profitability</i>	0.040 (1.456)	0.029 (1.040)	0.039 (1.411)	0.03 (1.063)
<i>AltmanZ</i>	0.030*** (10.226)	0.032*** (10.898)	0.031*** (10.467)	0.032*** (10.812)
<i>BTM</i>	0.014*** (9.296)	0.014*** (9.410)	0.015*** (9.566)	0.015*** (9.804)
<i>Investgrade</i>	-0.100*** (-8.345)	-0.098*** (-8.174)	-0.098*** (-8.175)	-0.098*** (-8.175)
<i>Norates</i>	-0.013* (-1.919)	-0.015** (-2.193)	-0.013* (-1.898)	-0.015** (-2.131)
Observations	21,138	21,138	21,138	21,138
R-squared	0.203	0.200	0.201	0.200
Year FEs	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes

Panel B: Logit Model				
Dependent var: <i>DummyBankIssue</i>	(1)	(2)	(3)	(4)
<i>Numconnect</i>	-0.188*** (-6.681)			
<i>Numcross</i>		-0.158*** (-4.810)		
<i>Avgnum</i>			-0.154*** (-5.585)	
<i>Totalcrossown</i>				-0.182*** (-5.319)
<i>Blockown</i>	0.003 (1.272)	0.005* (1.917)	0.001 (0.235)	0.007*** (2.699)
<i>Blockdummy</i>	-0.079 (-0.955)	-0.076 (-0.915)	-0.044 (-0.525)	-0.111 (-1.342)
<i>FirmSize</i>	-0.328*** (-13.386)	-0.332*** (-13.563)	-0.330*** (-13.523)	-0.330*** (-13.524)
<i>Leverg</i>	-0.292* (-1.944)	-0.253* (-1.686)	-0.268* (-1.786)	-0.264* (-1.758)
<i>Profitability</i>	0.158 (0.637)	0.062 (0.252)	0.151 (0.610)	0.066 (0.267)
<i>AltmanZ</i>	0.308*** (11.360)	0.325*** (12.196)	0.312*** (11.546)	0.321*** (12.070)
<i>BTM</i>	0.144*** (6.504)	0.145*** (6.510)	0.147*** (6.655)	0.152*** (6.777)
<i>Investgrade</i>	-0.626*** (-7.309)	-0.605*** (-7.105)	-0.610*** (-7.156)	-0.607*** (-7.137)
<i>Norates</i>	-0.097 (-1.128)	-0.103 (-1.208)	-0.089 (-1.041)	-0.100 (-1.176)
Observations	20,892	20,892	20,892	20,892
R-squared	0.188	0.186	0.187	0.186
Year FEs	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes

### Table 3 Robust Tests

This table provides several robust tests of baseline results for the impact of cross-ownership on the issuance of bank loans. The dependent variable is *DummyBankIssue*. We use four measures to capture cross-ownership: *Numconnect*, *Numcross*, *Avgnum*, and *Totalcrossown*. All these four measures for cross-ownership are normalized at mean 0 and variance 1. We control for firm characteristics including *Blockown*, *Blockdummy*, *FirmSize*, *Leverg*, *Profitability*, *AltmanZ*, *BTM*, *Investgrade*, and *Norates*. All independent variables are lagged by one year. Panel A reports the baseline results in cross-owned firms only. Panel B includes a firm fixed effect. Panel C use alternative cross-ownership measure *GGL* proposed by Gilje et al. (2020). Except for Panel B, regression results using either the linear model with 2-digit SIC industry and year fixed effects or the logit model with 2-digit SIC industry and year fixed effects. Standard errors are clustered by firms. t-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. Definitions of variables are in Appendix A.

Panel A: CO_Firms		OLS			Logit		
Dependent Var:	<i>DummyBankIssue</i>	Coefficient	N	R-square	Coefficient	N	R-square
<i>Numconnect</i>		-0.032*** (-6.864)	17,124	0.208	-0.193*** (-6.620)	16,929	0.185
<i>Numcross</i>		-0.022*** (-4.827)	17,124	0.205	-0.156*** (-4.457)	16,929	0.182
<i>Avgnum</i>		-0.026*** (-5.910)	17,124	0.207	-0.158*** (-5.594)	16,929	0.183
<i>Totalcrossown</i>		-0.024*** (-5.271)	17,124	0.205	-0.178*** (-4.887)	16,929	0.182
Panel B: Firm Fixed Effect		OLS			Logit		
Dependent Var:	<i>DummyBankIssue</i>	Coefficient	N	R-square	Coefficient	N	R-square
<i>Numconnect</i>		-0.019*** (-3.289)	18,923	0.475	-0.069* (-1.735)	7,467	0.053
<i>Numcross</i>		-0.016*** (-3.417)	18,923	0.475	-0.071* (-1.629)	7,467	0.053
<i>Avgnum</i>		-0.016*** (-3.265)	18,923	0.475	-0.064* (-1.839)	7,467	0.053
<i>Totalcrossown</i>		-0.017*** (-3.545)	18,923	0.475	-0.102** (-2.157)	7,467	0.053
Panel C: Alternative Measure		OLS			Logit		
Dependent Var:	<i>DummyBankIssue</i>	Coefficient	N	R-square	Coefficient	N	R-square
<i>GGL</i>		-0.019*** (-3.819)	11,823	0.225	-0.096*** (-3.224)	11,646	0.187

**Table 4**  
**Diff-in-Diff Results**

This table provides the DiD results using institution mergers. The dependent variable is *DummyBankIssue*. We obtain financial institution merges information from He and Huang (2017). We define treated firms satisfy two conditions: (i) the firm is blockheld by one of the merging institutions, (ii) the other merging institution does not blockhold the same firm but blockholds at least one of its same-industry peers. Firms in the control group need to satisfy two conditions: (i) the firm has to be blockheld by the same institution that blockholds a treated firm, and (ii) the other merging institution does not blockhold any peer firms from the same industry. *TREAT* is binary variable equals to 1 if firms are in the treatment group, otherwise zero. *POST* is a binary variable equals one if the fiscal year is after the shock, otherwise zero. Our DiD sample contains any debt issuance five years before and Five years after the shock. We control for firm characteristics, including *Blockown*, *Blockdummy*, *FirmSize*, *Leverg*, *Profitability*, *AltmanZ*, *BTM*, *Investgrade*, and *Norates*. All independent variables are lagged by one year. Standard errors are clustered by institution merger. t-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. Definitions of variables are in Appendix A.

Dependent Var:	OLS				Logit			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>DummyBankIssue</i>								
<i>TREAT * POST</i>	-0.046*** (-3.305)	-0.047*** (-2.888)	-0.048*** (-3.227)	-0.059*** (-3.452)	-0.332*** (-2.612)	-0.972*** (-2.677)	-0.385*** (-3.290)	-0.772*** (-2.779)
<i>TREAT</i>	0.063 (1.406)	0.037 (0.933)	0.055** (2.341)	-0.028* (-1.719)	0.698 (1.635)	1.449 (1.471)	0.500** (2.351)	-0.350 (-1.527)
<i>POST</i>	-0.036 (-1.474)		-0.030 (-1.126)		-0.317 (-1.541)	0.744* (1.826)	-0.232 (-1.018)	1.005** (2.512)
Observations	2,786	2,625	2,788	2,626	2,718	879	2,549	886
R-squared	0.153	0.546	0.201	0.527	0.168	0.251	0.204	0.163
Year FEs	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Merger FEs	Yes	No	No	Yes	Yes	No	No	Yes
Firm FEs	No	Yes	No	Yes	No	Yes	No	Yes
Industry FEs	No	No	Yes	No	No	No	Yes	No

Table 5  
The *Ex ante* Governance Channel

This table provides cross-sectional tests of baseline results for the impact of cross-ownership on the issuance of bank loans through the *ex ante* governance channel. The dependent variable is *DummyBankIssue*. We use four measures to capture cross-ownership: *Numconnect*, *Numcross*, *Avgnum*, and *Totalcrossown*. All these four measures for cross-ownership are normalized at mean 0 and variance 1. *HighHomo* is a dummy variable takes one if the industry homogeneity index of 2-digit SIC in the given fiscal year is above the median. *LnNumPeers* is the natural logarithm of one plus the number of peer firms in the same industry. We control for firm characteristics, including *Blockown*, *Blockdummy*, *FirmSize*, *Leverg*, *Profitability*, *AltmanZ*, *BTM*, *Investgrade*, and *Norates*. All independent variables are lagged by one year. Panel A reports the baseline results interacted with *HighHomo*. Panel B reports the baseline results interacted with *LnNumPeers*. Columns 1 to 4 use the linear model with 2-digit SIC industry and year fixed effects. Columns 5 to 8 use the logit model with a 2-digit SIC industry and year fixed effects. Standard errors are clustered by firms. t-statistics are reported in parentheses. t-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. Definitions of variables are in Appendix A.

Panel A	OLS				Logit				
	Dependent Var: <i>DummyBankIssue</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Numconnect</i>	-0.025*** (-4.801)					-0.152*** (-4.396)			
<i>Numconnect*HighHomo</i>	-0.014** (-2.380)					-0.066* (-1.907)			
<i>Numcross</i>		-0.013*** (-2.800)					-0.097** (-2.509)		
<i>Numcross*HighHomo</i>		-0.018*** (-3.474)					-0.120*** (-3.154)		
<i>Avgnum</i>			-0.018*** (-3.629)					-0.101*** (-3.039)	
<i>Avgnum*HighHomo</i>			-0.016*** (-2.906)					-0.097*** (-2.788)	
<i>Totalcrossown</i>				-0.017*** (-3.551)					-0.134*** (-3.387)
<i>Totalcrossown*HighHomo</i>				-0.014*** (-2.753)					-0.093*** (-2.400)
<i>HighHomo</i>	0.000 (-0.079)	-0.001 (-0.276)	0.000 (-0.084)	-0.001 (-0.234)	-0.006 (-0.143)	-0.006 (-0.142)	-0.006 (-0.142)	-0.003 (-0.078)	-0.010 (-0.232)
Observations	21,138	21,138	21,138	21,138	20,892	20,892	20,892	20,892	20,892
R-squared	0.203	0.200	0.202	0.200	0.189	0.186	0.187	0.187	0.187
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



Panel B	OLS				Logit				
	Dependent Var: <i>DummyBankIssue</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Numconnect</i>	-0.019** (-2.237)				0.026 (0.530)				
<i>Numconnect*LnNumPeers</i>	-0.000** (-2.272)				-0.005*** (-5.154)				
<i>Numcross</i>		-0.009 (-1.166)				0.060 (1.182)			
<i>Numcross*LnNumPeers</i>		-0.000*** (-2.984)				-0.006*** (-6.719)			
<i>Avgnum</i>			-0.014* (-1.769)				0.050 (1.072)		
<i>Avgnum*LnNumPeers</i>			-0.000*** (-2.740)				-0.005*** (-5.960)		
<i>Totalcrossown</i>				-0.011 (-1.485)				0.017 (0.320)	
<i>Totalcrossown*LnNumPeers</i>				-0.000*** (-2.937)				-0.005*** (-6.356)	
<i>LnNumPeers</i>	0.000*** (-2.936)	0.000*** (-3.252)	0.000*** (-3.085)	0.000*** (-3.306)	0.000*** (-3.306)	-0.001 (-0.414)	-0.001 (-0.583)	-0.001 (-0.478)	-0.001 (-0.523)
Observations	17,517	17,517	17,517	17,517	17,517	17,392	17,392	17,392	17,392
R-squared	0.195	0.192	0.194	0.192	0.192	0.218	0.217	0.218	0.217
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

**Table 6**  
**Bank Loan Covenant Strictness**

This table provides the impact of cross-ownership on bank loan covenant strictness. The dependent variable *PVIOL* proposed by Demerjian and Owens (2016) to capture the bank loan covenant strictness, which is the aggregate probability of covenant violation at the loan inception date across all covenants included on a given loan package from the total set of fifteen covenant categories. We use four measures to capture cross-ownership: *Numconnect*, *Numcross*, *Avgnum*, and *Totalcrossown*. All these four measures for cross-ownership are normalized at mean 0 and variance 1. We control for firm characteristics, including *FirmSize*, *Leverg*, *Profitability*, *AltmanZ*, *BTM*, *Investgrade*, and *Norates*. Except for firm characteristics, we further control for loan characteristics, including the log of loan maturity, the log of loan size, and whether a loan is secured or not. All independent variables are lagged by one year. We use the linear model with 2-digit SIC industry and year fixed effects. Standard errors are clustered by firms. t-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. Definitions of variables are in Appendix A.

Dependent Var: <i>PVIOL</i>	(1)	(2)	(3)	(4)
<i>Numconnect</i>	-0.001* (-1.638)			
<i>Numcross</i>		-0.009* (-1.654)		
<i>Avgnum</i>			-0.003** (-2.407)	
<i>Totalcrossown</i>				-0.001* (-1.689)
<i>FirmSize</i>	0.002 (0.423)	0.002 (0.419)	0.003 (0.463)	0.002 (0.396)
<i>Leverg</i>	0.466*** (14.911)	0.466*** (14.923)	0.466*** (14.902)	0.466*** (14.935)
<i>Profitability</i>	-0.585*** (-9.784)	-0.589*** (-9.881)	-0.585*** (-9.775)	-0.589*** (-9.884)
<i>AltmanZ</i>	-0.017*** (-3.123)	-0.016*** (-3.041)	-0.017*** (-3.111)	-0.017*** (-3.057)
<i>BTM</i>	0.016*** (3.152)	0.016*** (3.187)	0.016*** (3.157)	0.016*** (3.225)
<i>Investgrade</i>	-0.061*** (-3.723)	-0.061*** (-3.731)	-0.060*** (-3.682)	-0.061*** (-3.739)
<i>Norates</i>	0.009 (0.500)	0.008 (0.426)	0.008 (0.455)	0.008 (0.437)
<i>Log(LoanSize)</i>	-0.028*** (-5.729)	-0.027*** (-5.668)	-0.028*** (-5.753)	-0.027*** (-5.648)
<i>Log(LoanMaturity)</i>	-0.007 (-0.759)	-0.007 (-0.745)	-0.007 (-0.750)	-0.006 (-0.737)
<i>Secured</i>	0.123*** (9.713)	0.123*** (9.703)	0.123*** (9.694)	0.123*** (9.713)
Observations	12,695	12,695	12,695	12,695
R-squared	0.275	0.276	0.276	0.276
Year FEs	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes
Loan Purpose FEs	Yes	Yes	Yes	Yes

Table 7  
The *Ex post* Information Channel

This table provides cross-sectional tests of baseline results for the impact of cross-ownership on the issuance of bank loans through the *x post* information channel. The dependent variable is *DummyBankIssue*. We use four measures to capture cross-ownership: *Numconnect*, *Numcross*, *Avnum*, and *Totalcrossown*. All these four measures for cross-ownership are normalized at mean 0 and variance 1. *HighAbn.Accr* is a dummy variable takes one if the abnormal accrual proposed by Dechow et al. (1995) is above the median. *HighDisp* is a dummy variable takes one if the analyst forecasting dispersion is above the median. We control for firm characteristics, including *Blockown*, *Blockdummy*, *FirmSize*, *Leverg*, *Profitability*, *AltmanZ*, *BTM*, *Investgrade*, and *Norates*. All independent variables are lagged by one year. Panel A reports the baseline results interacted with *HighAbn.Accr*. Panel B reports the baseline results interacted with *HighDisp*. Columns 1 to 4 use the linear model with 2-digit SIC industry and year fixed effects. Columns 5 to 8 use the logit model with 2-digit SIC industry and year fixed effects. Standard errors are clustered by firms. t-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. Definitions of variables are in Appendix A.

Panel A	OLS				Logit				
	Dependent Var: <i>DummyBankIssue</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Numconnect</i>	-0.025*** (0.005)					-0.137*** (0.034)			
<i>Numconnect * HighAbn.Accr</i>	-0.013** (0.006)					-0.091** (0.037)			
<i>Numcross</i>		-0.016*** (0.005)					-0.101*** (0.038)		
<i>Numcross * HighAbn.Accr</i>		-0.012** (0.005)					-0.123*** (0.042)		
<i>Avgnum</i>			-0.017*** (0.005)					-0.089*** (0.033)	
<i>Avgnum * HighAbn.Accr</i>			-0.018*** (0.006)					-0.128*** (0.038)	
<i>Totalcrossown</i>				-0.020*** (0.005)					-0.138*** (0.039)
<i>Totalcrossown * HighAbn.Accr</i>				-0.009 (0.005)					-0.091** (0.042)
<i>HighAbn.Accr</i>	-0.002 (0.005)	-0.003 (0.005)	-0.003 (0.005)	-0.003 (0.005)	0.001 (0.048)	0.005 (0.048)	0.004 (0.048)	0.001 (0.048)	-0.001 (0.048)
Observations	21,138	21,138	21,138	21,138	21,138	20,892	20,892	20,892	20,892
R-squared	0.199	0.196	0.198	0.196	0.196	0.189	0.187	0.188	0.187
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B	OLS				Logit				
	Dependent Var: <i>DummyBankIssue</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Numconnect</i>	-0.016*** (0.006)					-0.100** (0.039)			
<i>Numconnect * HighDisp</i>	-0.028*** (0.007)					-0.140*** (0.045)			
<i>Numcross</i>		-0.007 (0.005)					-0.058 (0.041)		
<i>Numcross * HighDisp</i>		-0.030*** (0.006)					-0.185*** (0.047)		
<i>Avgnum</i>				-0.008* (0.005)				-0.047 (0.037)	
<i>Avgnum * HighDisp</i>				-0.034*** (0.006)				-0.187*** (0.044)	
<i>Totalcrossown</i>					-0.009* (0.005)				-0.080* (0.043)
<i>Totalcrossown * HighDisp</i>					-0.030*** (0.006)				-0.177*** (0.047)
<i>HighDisp</i>		-0.017*** (0.006)	-0.016** (0.006)	-0.018*** (0.006)	-0.016** (0.006)	-0.179*** (0.056)	-0.171*** (0.056)	-0.181*** (0.056)	-0.171*** (0.056)
Observations	21,138	21,138	21,138	21,138	21,138	20,892	20,892	20,892	20,892
R-squared	0.199	0.196	0.198	0.201	0.201	0.190	0.188	0.189	0.189
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

**Table 8**  
**Bank Loan Syndicate Structure**

This table provides results for the impact of cross-ownership on the bank loan syndicate structure. The dependent variable *LoanShare* is the percentage of the loan taken by a participant. We use four measures to capture cross-ownership: *Numconnect*, *Numcross*, *Avgnum*, and *Totalcrossown*. All these four measures for cross-ownership are normalized at mean 0 and variance 1. *Leader* is a binary variable that equals one if the participant is a lead arranger, and otherwise zero. We control for firm characteristics including *FirmSize*, *Leverg*, *Profitability*, *AltmanZ*, *BTM*, *Investgrade*, and *Norates*. Loan characteristics control variables include the log of loan maturity, the log of loan size, loan spread, and the number of lenders. All independent variables are lagged by one year. We use the linear model with a 2-digit SIC industry and year fixed effects. Standard errors are clustered by firms. t-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. Definitions of variables are in Appendix A.

Dependent Var: <i>LoanShare</i>	(1)	(2)	(3)	(4)
<i>Numconnect * Leader</i>	-0.433*** (-9.312)			
<i>Numconnect</i>	0.132*** (4.092)			
<i>Numcross * Leader</i>		-3.710*** (-9.696)		
<i>Numcross</i>		0.534*** (2.617)		
<i>Avgnum * Leader</i>			-0.699*** (-8.486)	
<i>Avgnum</i>			.22*** (4.526)	
<i>Totalcrossown * Leader</i>				-0.428*** (-9.218)
<i>Totalcrossown</i>				0.046* (1.934)
<i>Leader</i>	15.966*** (27.060)	17.894*** (23.712)	16.011*** (26.840)	17.582*** (23.914)
<i>NumLenders</i>	-0.096*** (-4.127)	-0.097*** (-4.170)	-0.095*** (-4.096)	-0.098*** (-4.229)
Firm Controls	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes
Observations	50,902	50,902	50,902	50,902
R-squared	0.571	0.575	0.571	0.575
Year FEs	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes