Is Bond Financing Disintermediated? The Role of Bank Trading Networks

Abstract

We show that firms' access to bond financing is determined by the size of their banks' network of investors. Using a hand-collected dataset of aggregate transactions between a bank's securities dealer and its institutional clients, we map the trading networks of underwriting banks. Exploiting shocks to bank-issuer relationships and the capital supplied by investors in the bank's network, we find that access to a larger network through the relationship bank increases the probability and size of bond financing. Underwriting banks with a larger network can reach primary market investors more efficiently, allowing firms to issue cheaper bonds due to lower demand uncertainty. Our findings suggest that bond financing is not disintermediated from banks.

JEL-Classification: G12, G32

Keywords: trading relationships, corporate bonds, firm financing, disintermediation, institutional investors

1 Introduction

Corporate bond financing is often considered the most prominent alternative to bank loans for corporations that want to raise debt. Under this view, firms can use bonds to directly access a large number of investors in public markets, where they are not subject to monitoring from banks.[1] The recent growth of bond markets in developed economies is seen as a way for companies to alleviate their bank dependence, a phenomenon that is also known as credit disintermediation (Crouzet, 2021).

We challenge this view and argue that corporate bond financing is not disintermediated from banks. Besides giving loans to corporations, banks are often both corporate bond underwriters and dealers in the OTC secondary market where corporate bonds are traded. As such, they decide the bond offering price and the first allocation to investors in primary markets, while forming trading networks with the same investors in the secondary market. Since firm-bank and investor-dealer relationships are sticky, we hypothesize that firms' access to bond markets is determined by the size of their banks' network of investors. This paper develops an empirical strategy to assess this conjecture and shed light on its implications.

We start by creating a measure of bank-investor networks. To quantify the size of banks' network of investors, granular data on trading relationships between corporate bond dealers and bond investors are required. We use a unique hand-collected dataset of aggregate portfolio transactions between a bank's securities dealer and their institutional investors' clients. SEC Form N-SAR, item 22 requires the disclosure of bond dealers with whom investment companies do portfolio transactions and provide semi-annual information about the dollar amount purchases and sales of securities. We map trading networks of banks and mutual funds from 1995 through 2017.[2]

Armed with our measure, we test whether a firm's bond financing decisions are affected

[1]See, for example, Diamond (1991), Rajan (1992), Bolton and Scharfstein (1996), Crouzet (2018).

[2]Prior literature has mainly focused on trading relationships with insurance companies due to data limitations (Di Maggio et al., 2017; Nikolova et al., 2020; Hendershott et al., 2020). While our findings can be generalized to other types of investors, focusing on mutual funds has the advantage that such investors are not restricted to higher-rated bonds, allowing us to analyze the entire cross-section of securities.

by the connections to mutual funds that the firm enjoys through their relationship banks. We measure the firm's connections to bond investors by counting the number of bond mutual funds in the trading network of its relationship banks. A relationship bank is defined as one that gave loans or underwrote bonds for the firm at least once in the past five years. A bond mutual fund is in a bank's network of investors if the bank has been within the top 10 dealers of the fund's management company for the past five years. Our baseline specification accounts for firm and time fixed effects. We find that a one-standard-deviation increase in firm connections leads to an increase in the probability of issuing a bond equal to 18% of the unconditional average.

A firm's connections to bond investors and the decision to tap the bond market could be simultaneously determined by unobservable factors (e.g., growth prospects, managerial quality, or underwriter reputation). A higher-quality firm might have higher exposure to bond investors only because it is more likely to have business relationships with reputable banks. To address this concern, we exploit a natural experiment based on the mutual fund scandal that occurred in late 2003 and early 2004 (Anton and Polk, 2014; Falato et al., 2021). The scandal was unexpected and involved many asset managers facing allegations of illegal trading. By now, ample evidence shows that the scandal caused significant long-lasting outflows, arguably due to funds' reputation effects (McCabe, 2009; Kisin, 2011).

In the context of our analysis, the trading scandal constitutes a shock to the capital available to investors in the bank's network. Consequently, a firm's network deteriorates unexpectedly and exogenously upon the scandal. We use these negative shocks to the firms' networks to shed light on the causal impact of bank connections on firms' access to the corporate bond market. We find that an increase in the number of connections affected by the scandal significantly reduces the probability of bond issuances and the size of these issuances. In economic terms, we find that a one-standard-deviation increase in the number of mutual funds affected by the scandal causes a drop in the probability of issuing a bond of about 30% of the unconditional average.

Our findings are robust to using two alternative measures of connections. The first alternative measure defines firm connections as the total net assets under management by bond mutual funds in the trading network of its banks. The second alternative measure is constructed as the weighted sum of the number of bond mutual funds in the trading network of the firm's banks, where weights are the dollar transactions made by the fund as a fraction of the total trades made by the firm's bank in a given period.

We next investigate the role of a bank's trading relationships with institutional investors in determining a firm's underwriter choice. If corporate debt was disintermediated from banks, firms could access all investors, and underwriters would just be a pass-through. Hence, bank-investor networks should be irrelevant when choosing an underwriter. While there is evidence that bank-firm relationships are sticky due to several frictions (Petersen and Rajan, 1994; Darmouni, 2020; Degryse and Van Cayseele, 2000; Santos and Winton, 2008), the role played by bank's access to bond investors is not clear. To assess the importance of bank-investor networks in firms' choice of underwriters, we exploit the granularity of our data and do the empirical analysis at the firm-bank pair level. An important advantage of this setting compared to our baseline firm-level panel is that it allows to control for firm-time and underwriter-time fixed effects, thus absorbing any time-varying unobservables at the firm and bank-level (e.g., underwriter reputation, or firm investment opportunities).

We first show that banks are more likely to underwrite bonds of firms that were already clients in the past. This result thus confirms that the stickiness of firm-bank relationships extends to the underwriting process (Dick-Nielsen et al., 2021). Furthermore, we find that conditional on being a bank client; firms are more likely to issue bonds with better-connected banks. While a more extensive network of investors increases the probability of being chosen as the underwriter of the bank's clients, the importance of connections vanishes when the firm and the bank lack a past business relationship. This result suggests the presence of frictions that limit firms' ability to switch to new underwriters, even if those banks have an extensive network of investors.

One potential concern is that banks and firms form relations strategically. Thus the choice to establish a business relationship might be positively influenced by the likelihood of current or future firm access to the bond market. We identify the causal impact of bank-investors connections on firms' underwriter choice exploiting an instrumental variable (IV) estimation approach. To construct our instrument, we focus on a set of institutions initially established as commercial banks, which became universal banks only after the repeal of the Glass-Steagal act in August 1996. As these banks started engaging in corporate debt underwriting only after the deregulation, any relationship formed before that date is less likely to be established because of the firm's desire to access the corporate bond market. We show that firms already clients of the banks before the deregulation are significantly more likely to keep the business relationship years after the deregulation. The second stage of the IV approach confirms that bank connections increase the likelihood that such a bank is chosen to underwrite a bond issuance.

In sum, we find empirical evidence consistent with our hypothesis. Bank connections are of first-order importance for a firm's financing decision. This intriguing finding prompts a deeper analysis of the economic mechanism underlying this pattern. Why do firms connected to more investors through their relationship banks have easier access to bond markets? Corporate bonds are traded OTC, which means banks and bond investors are all subject to significant trading frictions (Schultz, 2001; Friewald and Nagler, 2019). In searching for investors and assessing their demand, underwriters must balance several different needs, which makes the process costly and time-consuming. For instance, while issuers prefer to raise funds with lower yields without worsening their credit ratings, primary investors' demand depends on whether they perceive the issue as overpriced (Bessembinder et al., 2022). Moreover, excessive flipping in the secondary market can push prices below offering levels and impose costs on underwriters. Underwriters often try to limit the occurrence of flipping by penalizing investors who flipped prior offerings (Nikolova and Wang, 2022). We argue that a more extensive network lowers the costs that banks incur in reaching investors in the primary market and assessing their demand. The lower frictions faced by banks with larger networks, in turn, allow firms to issue bonds at a lower cost. At the same time, if banks rely on investors' demand in their trading network to allocate bonds, we should expect larger positions of these bonds held by asset managers in the bank's network. Four tests provide clear empirical support for this mechanism.

First, we test the effect of connections on firms' cost of bond financing both in our baseline setting and around the mutual fund scandal. We measure the cost of bond financing with the yields on outstanding bonds and the effective offering yield at issuance. Regardless of the measure and the empirical test, we find that a more extensive network of investors leads to a lower cost of bond financing. A one-standard-deviation increase in firm connections decreases the issuer's yield spread between 6% and 14% of the average yield spread of the issuer.

Second, we exploit holdings data on bond funds to identify the link between bond allocations in primary markets and bank connections. The granularity of our data allows us to include asset manager $\times$ time fixed effects, thus taking out any effect due to unobservable demand from bond funds. Our findings are consistent with the proposed mechanism: an asset manager part of the underwriter trading network has a 13.4% higher probability (relative to the unconditional average) of purchasing a bond in the primary than a manager outside the underwriter's network. Similarly, a one-standard-deviation increase in the size of the underwriter network increases the percentage of issuance allocated to connected funds by 20%, relative to the unconditional mean.

Third, we exploit the cross-section of issuers and explore the following question: which firms benefit the most from connections to bond funds? All the costs highlighted above, which underwriters incur when assessing the demand for a given issue, are plausibly larger for issues characterized by higher demand uncertainty. Therefore, if the mechanism underlying our results is the one we propose, the companies benefiting the most from banks' connections should be those facing higher demand uncertainty for their securities. We test this argument by splitting our sample into firms facing different levels of demand uncertainty (i.e., difficulty to value). If connections are most beneficial for companies that face high demand uncertainty from institutional investors, we should expect the results to be stronger for more complex firms. We find that a one-standard-deviation increase in *Firm Connections* for high-demand uncertainty firms increases the probability of bond issuance by 27.2%, relative to the unconditional mean. In contrast, the effect of low-demand uncertainty firms is only 2.7%. In sum, our findings suggest that bank trading networks are an essential tool to ease access to bond financing for firms that would otherwise have difficulty attracting stable investor demand.

Fourth, and consistent with the results above, we show that a bank's network of investors also plays a significant role in firms accessing the bond market for the first time, a case in which the uncertainty of demand is exceptionally high. While a recent and growing literature has focused on the role of past ownership to study the relationship between investor flows and corporate and municipal bond issuances (Dass and Massa, 2014; Zhu, 2021; Adelino et al., 2022), we focus on the role of trading relationships between bonds underwriters and investors. Since there are no previous connections to bond investors when issuing bonds for the first time, these last set of tests also rule out the possibility that our channel is driven by other types of connections proxied by past ownership.

Lastly, we discuss the economic implications of our main empirical finding. First, we present evidence on the real effects of access to investor networks through the underwriting banks. We repeat our baseline regression and the test around the mutual fund scandal using as left-hand side variables measures of firms' real activity. We find that access to bank-investor networks increases long-term investment and intangibles, while decreasing short-term investment and cash. Taken together, our findings suggest that bank "intermediation" in bond financing does not involve limiting firm access to bond investors and, ultimately, investment opportunities but rather facilitating it through the mitigation of information frictions. Second, we discuss the broad implications of our results for theories of debt financing.

Specifically, we highlight how bank-investor networks could be important to shed light on both the link between corporate debt and the macroeconomy as well as the dynamics of debt structure at the firm level.

Relation to Literature. Broadly, we contribute to understanding what drives firms' access to public debt markets. We challenge the traditional view that corporate debt markets are disintermediated from banks (Diamond, 1991; Rajan, 1992; Bolton and Scharfstein, 1996) by showing that firm access to bond investors is largely shaped by banks' trading networks. The fact that firms are heterogeneously exposed to bond financing through their relationship banks has important implications for theoretical and empirical studies that link firms' financing decisions to macroeconomic outcomes (De Fiore and Uhlig, 2015; Crouzet, 2018; Chodorow-Reich, 2013; Lian and Ma, 2020) as well as monetary policy transmission (Ottonello and Winberry, 2020; Crouzet, 2021; Darmouni and Siani, 2022).

Further, our paper bridges the literature that studies the effect of bank frictions on firms' bond financing decisions with the one that focuses on the role of trading relationships in the corporate bond market. Previous evidence shows that banks' balance sheet frictions can affect bond issuance decisions, such as a contraction in bank credit supply (Becker and Ivashina, 2014) or banks' equity capital (Schwert, 2018). At the same time, the existing theoretical and empirical literature shows that trading relationships in the bond markets affect frictions both in secondary (O'Hara et al., 2018; Hendershott et al., 2020; Colliard et al., 2021; Babus and Hu, 2017; Chang and Zhang, 2021) and primary markets (Nagler and Ottonello, 2022; Nikolova et al., 2020). To the best of our knowledge, we are the first to identify and quantify the effect of a bank's trading network on a firm's decision to access bond financing.

Our paper also contributes to the emerging research on how networks of financial intermediaries affect firms' decisions to enter public markets. Most of this literature focuses on how investment banking networks affect equity issuances (e.g., Bajo et al., 2016). Our paper innovates on that literature since corporate bond offerings are substantially different. First, bond issuances are subject to a much higher demand uncertainty than equity offerings due to the lack of a depository trust company (DTC) initial public offering (IPO) tracking system and a much faster issuance process (Bessembinder et al., 2022). Second, corporate bonds are traded in OTC markets, where trading frictions and trading networks are more relevant than in the more liquid and centralized equity markets. Third, the corporate bond market is more institutional-dominated, where unlike in equity markets, households only hold about 6% of corporate bonds (Bessembinder et al., 2020), and hence, the network of institutional investors is more relevant in this setting.

Finally, our paper extends the literature that analyzes the effects of banks' concurrent lending and bond underwriting (Puri, 1996; Yasuda, 2005; Drucker and Puri, 2005; Gande et al., 1997, 1999) by focusing on a third important concurrent activity that banks do: secondary market intermediation of corporate bonds. Thanks to our granular data, we demonstrate that banks effectively render bond financing "intermediated" by shaping a firm's investor base also in public markets through their trading networks.

The paper is organized as follows. Section 2 details the data and explains the main measures of connections used throughout our analyses. Section 3 explores the firm-level consequences of a bank's networks of investors. In particular, it analyzes how a firm's ability to access the bond market and underwriter choice varies with its bank connections in the mutual fund industry. Section 4 investigates the economic mechanism behind the empirical findings, and Section 5 presents the economic implications of our results. Section 6 concludes and opens questions to be further explored in future research work.

2 Data and variable construction

In this section, we list the data sources, provide descriptive statistics, and describe the construction of our main variables.

2.1 Data sources

We use several databases in our analysis. First, we obtain balance sheet data for non-financial firms from Compustat. Second, we obtain corporate bond (loan) characteristics and bond (loan) underwriters' information from Mergent FISD (Dealscan). Following Bessembinder et al. (2018), we define corporate bond securities with type CDEB or USBN in Mergent. Third, we extract trading relationships between corporate bond dealers and bond funds through NSAR filings. The N-SAR filings provide information about investment companies' operations and finances. We are particularly interested in the identity of dealers with whom investment companies do the largest amount of securities transactions. The data list the ten largest dealers per investment company and provide the total amount of portfolio transactions (purchases and sales) done with each of them. We parse N-SAR reports filed between 1995 and 2017 in the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system. To the best of our knowledge, we are the first to measure trading relationships between corporate bond dealers and mutual funds at a granular level. Fourth, we collect information on bond fund characteristics and portfolio holdings from CRSP Mutual Fund Database and Morningstar. Lastly, we retrieve secondary markets corporate bond yields from Bloomberg (pre-2002) and TRACE (post-2002).

We match corporate bonds with bond issuers in Compustat using the CRSP-Mergent linking table provided in WRDS and our manual matching. We match corporate loans from Dealscan to Compustat with the Dealscan-Compustat Linking table provided by Michael Roberts. We link lenders in Dealscan with Compustat through the Dealscan lender linking table provided by Michael Schwert. Finally, we manually link asset management companies (bond dealers) from NSAR to Morningstar (Mergent). We include in our sample only banks that appear at least once in the NSAR filings. Our baseline firm-level sample runs from 1995 (the start of electronic NSAR filings) to 2017 (form NSAR was phased out beginning in 2018). We use a shorter version of our sample (2003-2017) when performing tests that require information on portfolio holdings of mutual funds from Morningstar, which was not well populated before 2003.

Table IA1 presents yearly statistics on our sample. We have 44 banks, 5,591 firms, and 509 asset management companies, which account for 4,794 mutual funds that managed up to $3.48 billion in 2017. While the number of firms and banks has been relatively stable over time, the number and size of the mutual fund industry have steadily increased over the years. The latter pattern is consistent with recent evidence on the development of fixed-income funds (Anand et al., 2020).

Table 1 displays the summary statistics of our firm-level variables and bank characteristics. We present statistics at the firm- and bank-quarter levels, respectively. We have 218,874 firm-quarter observations, with the average (median) firm connected through their banks to 556 (220) funds. The unconditional probability of issuing a bond (loan) during our sample period is 3,81% (10.37%). The average firm in our sample has $5.72 billion in total assets and 21.90% leverage. Our sample covers a broad cross-section of firms in credit risk; the yield spread on outstanding corporate bonds goes from less than 1% in the bottom decile to at least 6.85% in the top decile.

Our data cover 2,350 bank-quarter observations. Since we consider only institutions large enough to have a broker-dealer division operating in secondary corporate bond markets, the banks in our sample are large, with median total assets of $260.78 billion. On average, a bank in our sample underwrites $16.82 billion of bonds in a quarter. There is considerable heterogeneity in bond underwriting activity, which we explore in more detail in the following subsection. Considering that the average quarterly issuance over our sample period has been around $250 billion, our sample captures a significant amount of issuance activity.[3] Finally, the average bond transaction volume intermediated by banks in our sample is $56.33 billion. The distribution of the variable is highly skewed, consistent with past theoretical and empirical evidence of trading networks with a core-periphery structure (Di Maggio et al., 2017; Li and Schürhoff, 2019).

[3] See https://www.sifma.org/resources/research/fixed-income-chart/

2.2 Measuring connections

We consider a bank and a bond fund connected if the bank's broker-dealer is within the top 10 entities with whom the fund's asset manager did the largest amount of portfolio transactions in each of the previous five years. As we study firms' access to the bond market, our measure of connections only counts funds whose investment mandate indicates they may hold U.S. corporate bonds.[4] We call the variable that measures connections at the bank level *Bank Connections*. For firm-level analyses, we employ a firm-level version of our connections variable. For a given firm-quarter, *Firm Connections* is the sum of bank connections across all banks that have a business relationship with the firm. We define a firm-bank pair as having a business relationship if the firm has issued at least one bond using the bank as an underwriter or if the bank has extended at least one loan to the firm in the past five years. Alternative measures of connections discussed in Section 3.1.3 do not change our main findings. Next, we discuss the statistics and properties of both banks- and firm-level connections.

Table 1, Panel A reports key statistics about *Firm Connections*. On average, the firms in our sample are connected to 556 funds, with a median of 220 funds. The 90th percentile is 1,546 funds, while the 10th percentile is 0. A value of 0 in the firm-level number of connections may arise in two different scenarios: i) the firm has not issued bonds or obtained loans in the past five years, or ii) the firm has business relationships with banks with 0 connections in a given quarter. As illustrated by Figure 1, Panel A, our sample of firms appears to be divided between low and high connections firms. The large cross-sectional variation that emerges from Figure 1 suggests that there might be substantial heterogeneity among firms in our sample. We explore this possibility in Table IA2, Panel A. This table reports average firm characteristics by quartiles of *Firm Connections*. High connections firms issue larger bonds and obtain larger loans. Moreover, they benefit from a lower cost of bond financing.

[4] We use CRSP objective codes (*crsp_obj_cd*) to identify funds who hold U.S. corporate bonds, selecting corporate bond funds, either domestic or international (codes *IC* and *IF*), as well as mixed fixed income and equity funds (codes *M* and *MT*).

They also appear to be larger firms.

While it is interesting to understand the heterogeneity in our sample of firms, these differences might also raise the concern that more connected firms can differ from less connected firms along unobservable characteristics. Our first empirical choice to address this concern is to exploit within-firm variation in connectedness. With that in mind, in Figure 1, Panel B, we first purge firm fixed effects from our measure of connections and plot the distribution of the resulting variable. We find substantial within-firm variation, as the standard deviation of the connections variable purged of firm fixed effects (431) is roughly 70% of the standard deviation of the original *Firm Connections* variable.[5] Importantly, this enables us to control for firm fixed effects in our empirical tests, absorbing time-invariant firm heterogeneity. In addition, we address concerns of time-varying unobserved heterogeneity by exploiting exogenous variation in firm connections to mutual funds based on shocks to the available capital of these investors.

In Panel B of Table 1, we report statistics about the variable measured at the bank level. On average, the banks in our sample are connected to 173 funds, with a median of 23. The 90th percentile is 588 funds, while the 10th percentile is 0. While all banks in our sample appear as dealers in the NSAR data at least once during our sample period, the conditions that we impose to define a connection imply that a bank might have 0 connections if, for example, it does not meet the requirement of being continuously among the top 10 dealers of at least one asset manager over five years. In Figure 1, Panel C, the distribution of *Bank Connections* is highly positively skewed, with roughly 50% of banks having low values of connections and few banks exhibiting large numbers of connections.

We explore the heterogeneity among our sample of financial institutions in Table IA2, Panel B. In this table, we first divide our sample of banks into quartiles of *Bank Connections*,

[5] We also compute a different version of the residual connections variable by regressing *Firm Connections* on firm fixed effects, as well as on the number of banks with whom the firm has business relationships. We observe that the standard deviation of the residual variable is 60% of the standard deviation of the original *Firm Connections* variable. This exercise allows us to conclude that most of the variation in *Firm Connections* comes from variation in the number of fund connections of the banks with whom the firm does business rather than from changes in the set of banks with a relationship with the firm.

and then report average bank characteristics for each quartile and the result of a t-test for the difference between the bottom and the top quartiles. We observe that highly-connected banks underwrite more bonds and extend more loans than low-connected banks. Banks in the top quartile by connections also display larger intermediation volumes in the corporate bond market and are larger overall. Interestingly, highly-connected banks have lower ratios of deposits and loans to total assets and lower market equity. These statistics suggest a market segmentation where low-connected banks specialize in commercial lending. Next, we investigate the extent of within-bank variation in connectedness. In Figure 1, Panel D, we purge bank fixed effects from our measure of connections and plot the distribution of the resulting variable. There is substantial variation in the within-bank variable, as the standard deviation of the connections variable purged of bank fixed effects (180) is more than 50% of the standard deviation of the original *Bank Connections* variable (339).[6] As a result, we exploit this considerable within-bank variation in our analyses below.

3 Main results

In this section, we explore the firm-level consequences of the connections to the mutual fund industry that firms enjoy through their banks.

3.1 Access to the bond market

We start by relating the within-firm variation in connectedness to firms' access to the bond market. Section 3.1.1 discusses the results of our baseline specification. In Section 3.1.2, we illustrate the results of our quasi-natural experiment exploiting shocks to the available capital of mutual funds.

[6] In an additional effort to understand variation in *Bank Connections*, we also regress *Bank Connections* on bank fixed effects, as well as on the number of mutual funds connected to the banks. We observe that the standard deviation of the residual variable is 15% of the standard deviation of the original *Bank Connections* variable. Therefore, while most of the variation in *Bank Connections* comes from the number of connections banks have with asset managers, 15% of the variation stems from changes in the number of funds operated by the set of asset managers with whom a bank is connected.

3.1.1 Baseline results

To estimate how a firm's ability to access the bond market varies when its connections to the mutual fund industry increase, we run the following firm-level panel regression:

$$\textit{Bond Issuance}_{it} = \alpha_i + \alpha_t + \beta \textit{Firm Connections}_{it} + \gamma X_{it-1} + \epsilon_{it} \qquad (1)$$

we select as dependent variables measures of the probability and size of bond issuances of a firm: i) an indicator with value 1 for firms that issue a bond in quarter t; ii) the amount of firm i outstanding bonds as a fraction of firm i lagged total assets. $\textit{Firm Connections}_{it}$ is the variable that counts the number of connections to mutual funds that a firm has thanks to its banks, as described in Section 2.2. Our results are unaffected when using different measures of connections (see Section 3.1.3 for a discussion on alternative measures of connections). X_{it-1} is a matrix of firm controls, including lagged size, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short-term debt over total assets, and total debt over total assets (book leverage). Controlling for the fraction of short-term debt ensures that we are not picking up mechanical issuance activity due to the firm refinancing expired bonds. α_i and α_t are issuer and year-quarter fixed effects, respectively. Purging time-invariant firm heterogeneity with firm fixed effects is important because, as detailed in Section 2.2, the large cross-sectional dispersion in connectedness across firms could be correlated with unobserved differences that might confound our results. Time-fixed effects absorb economy-wide variation in access to the bond market due to, for example, business cycles or shocks to market liquidity. We double cluster standard errors at the firm and year-quarter levels, which allows for arbitrary correlation of the residuals across firms and times.

We report results in Table 2, Panel A. In columns 1 and 3, we also show a model that includes industry-time fixed effects to make sure time-varying industry trends do not drive our findings. Estimates show that β, our main coefficient of interest in Equation (1), is positive and highly statistically significant regardless of how we measure a firm's bond market activity and the fixed effects specification we choose. In column (2), the point estimate indicates that a one-standard-deviation increase in *Firm Connections* (610.5 as in Table 1, Panel A) leads to an increase in the probability of issuing a bond equal to 0.67%, which is roughly 18% of the unconditional mean bond issuance probability (3.81%). The last column shows that a one-standard-deviation increase in a firm number of connections leads to an increase in bonds outstanding as a fraction of total assets that is 2% of the unconditional average.

Results in Table 2, therefore, indicate that the fund connections that firms acquire through their banks have a first-order impact on firms' ease of accessing the bond market. High-connected firms are more likely to issue bonds and tend to have a larger fraction of their balance sheet in corporate bonds.

3.1.2 Identification: Exploiting the 2003 trading scandal

While economically relevant, the results in the previous section cannot be interpreted causally. A plausible concern for a causal interpretation is that other unobserved factors, such as growth prospects, managerial quality, or bank reputation, simultaneously determine a firm's connections and access to the bond market. A higher-quality firm might be more likely to display many connections because it is more likely to have several business relationships with large reputable banks. At the same time, the firm's higher quality also makes the firm access to the bond market easier. Including firm fixed effects does not solve this potential identification issue, as the unobserved factor might be time-varying. Similarly, including industry-time fixed effects considers time variation of unobservables only at the industry level.

Our solution to address the concern outlined above is to exploit a natural experiment based on the mutual fund scandal that occurred in late 2003/early 2004 (see, e.g., Anton and Polk (2014) and Falato et al. (2021)). The scandal was unexpected and involved a large set of asset managers facing allegations of illegal trading. There is, by now, ample evidence showing that the scandal caused significant long-lasting outflows, arguably due to reputation effects (see, e.g., Kisin (2011), McCabe (2009)). In the context of our analysis, the scandal constitutes a shock to the available capital of a firm's connected funds. Consequently, upon the occurrence of the scandal, a firm's network worsens unexpectedly and exogenously. We can, therefore, use the worsening of firms' networks to investigate the causal impact of mutual funds' connections on firms' bond market access. Specifically, we do so with the following difference-in-differences (DiD) estimation:

$$Bond\ Issuance_{it} = \alpha_i + \alpha_t + \beta Scandal\ Connections_i \times Post_t + \gamma X_{it-1} + \epsilon_{it} \tag{2}$$

where our main coefficient of interest is $Scandal\ Connections_i$, which counts the number of connections of firm i that are affected by the 2003 trading scandal. $Post_t$ is an indicator equal to 1 in the quarters after the first quarter of 2004, and 0 otherwise.[7] Therefore, instead of a canonical DiD setting with a bivariate treatment/control variable, our setting relies on variation in "dosing" across our treatment sample for identification, similar to a continuous treatment DiD. Firm fixed effects (α_i) make sure our estimates are not picking up time-invariant heterogeneity across firms. Year-quarter fixed effects (α_t) remove any difference in bond market conditions between the pre- and post-trading scandal. X_{it} includes the same controls of Equation (1) with the addition of i) the number of overall connections of a firm; ii) bond fire sales, defined as the fraction of a firm's bonds outstanding sold in aggregate by the mutual fund industry. The inclusion of the former controls for the mechanical link between the size of a firm's network and the number of connections affected by the 2003 scandal. Including the last variable addresses the concern that our results are driven by the adverse effect on a firm issuance activity from funds' fire sales activity. In estimating Equation (2) we restrict our sample to a period that goes from two years before to two years after the quarter of the scandal (first quarter of 2004).

[7]We use the list of 18 treated asset managers reported by Falato et al. (2021) to identify affected funds.

If firms with better mutual fund networks enjoy easier access to the bond market, we would expect to find a negative impact of the 2003 trading scandal on the bond market activity of the firms whose network was affected by the shock. Table 2, Panel B supports our hypothesis. The four columns of the table paint a consistent picture: an increase in the number of fund connections affected by the scandal has a significantly negative impact on the probability of bond issuances, as well as on the fraction of corporate bonds outstanding over total assets. The economic magnitude is similar, sometimes even stronger than the one reported in the previous section: one-standard deviation in $Scandal\ Connections_{it}$ (51.93) causes a drop in the probability of issuing a bond of 1.18%, which is 31% of the unconditional probability in our DiD sample. Similarly, one-standard-deviation in $Scandal\ Connections_{it}$ (51.93) causes a drop in bonds outstanding as a fraction of total assets of 0.10%, which is 1.6% of the unconditional probability in our DiD sample.

Overall, the results in this section are consistent with a causal interpretation of the findings from our baseline estimation. As the 2003 trading scandal constitutes a shock to the mutual fund's network of a firm and is plausibly exogenous to other firm-level factors, the results in this section allow us to rule out several alternative explanations for our findings. For example, explanations based on differences across firms in demand for credit cannot explain our results, as firms' credit demand does not change systematically around the occurrence of the trading scandal.

We perform two additional tests to strengthen the validity of our identification and interpretation. First, in Figure 2, we explore the dynamic effect of the scandal on the firms' bond market activity. The figure plots point estimates obtained by running the following modified version of Equation (2), where we allow the effect of the scandal to vary annually in event time:

$$Bond\ Issuance_{it} = \alpha_i + \alpha_t + \sum_{j=t-3}^{t+3} \beta Scandal\ Connections_i \times Year_j + \gamma X_{it-1} + \epsilon_{it} \qquad (3)$$

It is reassuring to see that the effect of the trading scandal on firms' bond market activity is mostly insignificant *before* the actual occurrence of the scandal, in line with the parallel trend assumption underlying our DiD estimation. We only observe a negative and statistically significant impact of the trading scandal on the bond market in our post-period. The negative effects appear to last as long as three years after the scandal, peaking in the second or third year, depending on the dependent variable. Second, we run the following placebo test. We start by randomizing the number of underwriter connections of each firm in our DiD sample and assign a number between 0 and the total observed number of bank connections (53). Then, we randomize each firm's underwriter connection's identity by assigning one of the banks in our sample. Next, we compute the new value of *Scandal Connections* using the randomized networks of firms. We run Equation 2 in the fourth step, saving the coefficients. We repeat the procedure 1000 times. Figure 3 displays the outcome of the simulation relative to columns (2) and (4) of Table 2 Panel B. As indicated by the vertical red arrow, we obtain the actual coefficients of columns (2) and (4) of Table 2 Panel B in less than 1% of simulations.

3.1.3 Alternative measures of connections

Next, we propose three alternative measures of connections and rerun (1) and (2) using the different measures. The first measure is based on the size of the connected funds and defines connections as the dollar sum of connected funds' total net assets (TNA). This measure is meant to capture the heterogeneity in size across connected funds, with the idea that larger funds provide greater access to the bond market than smaller ones. Instead, the second measure is meant to capture the relative importance of a connected fund within the underwriter network. To that end, we take a weighted sum of the number of connections, where the weights are the fraction of total transactions made by a connected fund in a reporting period with a given dealer. In this way, we allocate a larger weight to funds that are more relevant for the underwriter network. Third, we take our main measure based on the number of connected funds and standardize it in the cross-section at each point in time.

In this way, we can take care of time trends in the standard deviation of our connection measure that cannot be captured by our fixed effects specification. For example, we address the concern that the standard deviation of network size is increasing mechanically over time as the number of bond funds increases over our sample period. We report the results for these alternative measures in Tables IA3, IA4 and IA5 in the Internet Appendix. Independently of the measure, we find the same results in both the baseline and DiD regression with the mutual fund scandal. If anything, the coefficients get larger than in our main results. For simplicity and to be conservative, we keep the total number of funds connected to the firm as our main measure.

3.1.4 Leverage and loan issuance

A natural question is whether our results imply an overall increase in firm leverage or, instead, a substitution between bank loans and corporate bonds. To shed light on this issue, we repeat equations 1) and 2) by putting firm leverage or loan issuance on the left-hand side. The results are presented in Table IA7 and Table IA8 in the Internet Appendix. Firm connections positively and strongly affect firm leverage, whether we define it as book or market leverage. On the other hand, the effect on bank loans is less clear. The network of bond investors formed by underwriting banks does not seem to impact a firm's loan issuance probability positively. On the other hand, when looking at the DiD around the mutual fund scandal, a negative shock to connections seems to increase the likelihood of borrowing through bank loans. Overall, our evidence indicates that connections lead to an increase in firm leverage, meaning there is no complete substitution between bank loans and corporate bonds, with the latter reacting more than the former to a change in connections.

3.2 Underwriter choice

The previous section highlights that banks' connections to mutual funds ease firms' access to the bond market. Given those results, it becomes relevant to understand how firms are matched with banks operating in the corporate bond markets as underwriters, as it may have significant consequences for firms' financing decisions. In principle, firms interested in accessing the bond market should seek business relationships with highly connected banks. However, well-established frictions (see, e.g., Petersen and Rajan (1994), Darmouni (2020) for information frictions) and the existence of costs that companies must incur to switch to a new bank (see, e.g., Degryse and Van Cayseele (2000), Santos and Winton (2008)) might prevent firms from building relationships with any bank, or make it difficult to change underwriter. In this section, we move to the level of firm-bank relationships and investigate the matching between banks and firms in the corporate bond market. The analysis sheds light on the determinants of a firm's choice of underwriters. Besides, the granularity of the data we use for these tests allows us to rule out time-varying heterogeneity across firms and banks, further strengthening the validity of our findings in the previous section.

3.2.1 Baseline results

To study what drives firms' choice of underwriters, we exploit the granularity of our data and zoom in at the level of a firm-bank pair. Specifically, we construct a dataset in which firms issuing bonds are matched to all underwriters operating in the corporate bond market at the time of the issuance. We run the following regression:

$$\begin{aligned} \textit{Bond Issuance}_{ijt} = \alpha_{it} + \alpha_j + \beta_1 \textit{Bank Client}_{ijt} + \beta_2 \textit{Bank Connections}_{jt} \\ + \beta_3 \textit{Bank Client}_{ijt} \times \textit{Bank Connections}_{jt} + \epsilon_{ijt} \quad (4) \end{aligned}$$

The dependent variables are i) an indicator with value 1 when a firm i issues a bond with bank j in quarter t; ii) the size of firm i bond issuance with bank j as a fraction of firm i lagged total assets.[8] $\textit{Bank Client}_{ijt}$ is an indicator that identifies existing business relationships between firms and banks. This indicator takes the value of one for a firm-bank

[8] We do not use the amount of firm i outstanding bonds as a fraction of firm i lagged total assets, as it is a firm-level variable and does not vary at the firm-bank pair level.

pair if the firm has issued at least one bond using the bank as an underwriter in the past five years or if the bank has extended at least one loan to the firm in the past five years. $Bank\ Connections_{jt}$ is the variable that counts the number of connections to mutual funds of a bank, as described in Section 2.2. α_{it} are firm $\times$ time fixed effects, whose inclusion absorbs any time-varying heterogeneity among the firms in our sample. Including firm $\times$ time fixed effects implies that our coefficients are estimated out of variation in a firm's behavior at a given point across its potential underwriters. α_j are bank fixed-effects that purge our regressions from time-invariant differences among the financial institutions. In our most restrictive specification, we include bank $\times$ time fixed effects, effectively absorbing differences between banks, even if those differences are time-varying. This allows us to rule out, for example, that our findings are solely driven by the underwriter's reputation.

Results are reported in Table 3 Panel A. Point estimates on β_1 are always positive and statistically significant, which indicates that being a client of a given bank increases the likelihood of using the underwriting services of the same bank in the future. This result thus confirms the stickiness of firm-bank relationships in the corporate bond market (see, e.g., Yasuda (2005); Dick-Nielsen et al. (2021)). At the same time, coefficients on β_2 are never statistically different from 0. β_2 reflects the impact of bank connections on a firm's underwriter choice when the firm and the bank have not done business in the past. Therefore, this result suggests the presence of frictions that limit firms' ability to switch to new underwriters, even if those banks have extensive networks with the mutual fund industry. Finally, coefficients on the interaction term (β_3) are always positive and statistically significant. This indicates a positive impact of a bank's connections on the probability that a firm selects the bank as an underwriter, conditional on the firm being already a client of the bank. In terms of economic magnitude, a one-standard-deviation increase in bank connections (339) increases the probability of selecting the bank's underwriter by 0.64% (339 x 0.018%). This effect represents an increase of about 30% (0.0064/0.0217) relative to the unconditional probability.

3.2.2 Identification: Exogenous variation in firm-bank relationships

The analysis of the previous section does not allow a causal interpretation of the relationship between bank connections and firms' underwriter choices. The main concern relates to the endogenous formation of business relationships between firms and banks (see, e.g., Schwert (2018)). Banks and firms form relations strategically, and the likelihood of current or future firm access to the bond market might positively influence the choice of establishing a business relationship. If that is the case, the coefficient we estimate with Equation (4) could be positively biased.

Our solution to identify the impact of bank connections on firms' underwriter choice is based on an instrumental variable (IV) estimation. To construct our instrument, we rely on the fact that the final steps of the Glass-Steagal act repeal, which occurred between August 1996 and August 1997, translated into a significant expansion in the scope of universal bank activities. While it is true that, to some extent, banks were allowed to engage in investment-banking activities pre-1996 (for example, through the formation of Section 20 subsidiaries), we focus on a set of institutions that were established as universal banks only after August 1996.[9] We then use connections formed pre-1996 between firms and that small set of banks as an instrument for connections observed post-repeal of the Glass-Steagal act. As banks established as universal banks after the act repeal only started engaging in corporate debt underwriting after August 1996, any firm relationship formed before that date is unlikely to be established because of the firm's desire to access the corporate bond market. This argument forms the backbone of the exclusion restriction in our IV setting: connections established pre-1996 affect firms' underwriter choice only because, thanks to the Glass-Steagal repeal, those banks were allowed to build their network with the mutual fund industry. Therefore, we can use relationships formed pre-repeal of the Glass-Steagal act to extract plausibly exogenous variation in our $\textit{Bank Client}_{ijt}$ variable in the post-repeal

[9] We report the list of banks in our sample, indicating the ones found as universal post-August 1996, in Table IA9 in the Internet Appendix.

period.

We implement our IV estimation through a two-stage least squares model (2SLS). Our endogenous variable $\textit{Bank Client}_{ijt}$ appears both alone and in the interaction term with $\textit{Bank Connections}_{jt}$. Therefore, our 2SLS model features two first-stage equations, which are as follows:

$$\begin{aligned}\textit{Bank Client}_{ijt} = \alpha_{it} + \alpha_j + \delta_1 \textit{Pre-1996 Client}_{ijt} + \delta_2 \textit{Bank Connections}_{jt} \\ + \delta_3 \textit{Pre-1996 Client}_{ijt} \times \textit{Bank Connections}_{jt} + \eta_{ijt} \quad (5)\end{aligned}$$

$$\begin{aligned}\textit{Bank Client}_{ijt} \times \textit{Bank Connections}_{jt} = \alpha_{it} + \alpha_j + \gamma_1 \textit{Pre-1996 Client}_{ijt} + \\ \gamma_2 \textit{Bank Connections}_{jt} + \gamma_3 \textit{Pre-1996 Client}_{ijt} \times \textit{Bank Connections}_{jt} + \nu_{ijt} \quad (6)\end{aligned}$$

where $\textit{Pre-1996 Client}_{ijt}$ is an indicator variable that identifies firm-bank relationships established before August 1996 and involving one of the institutions that became universal banks only after August 1996. $\textit{Bank Connections}_{jt}$ is defined as in Equation (4). α_{it} and α_j are firm × time and bank fixed effects, respectively. In some specifications, we include bank × time fixed effects. Those high dimensional fixed effects absorb much of the unobserved heterogeneity that could confound our identification. For this IV estimation, we restrict our sample to the ten years between 1997 and 2007. Our starting point ensures we are modeling the firms' choice among a homogeneous set of universal banks. We end our sample in 2007 as relationships formed before August 1996 are less likely to be a significant predictor of relationships more than ten years later.[10]

Table 3, Panel B, presents the first stage results for the relationship between firm-bank connections established before August 1996 and the existence of firm-bank connections post-August 1996. Estimates in Panel B show that firm-bank pairs that were connected before the

[10] We repeat our estimation using the full sample and find results that are similar in magnitude and with higher statistical significance compared to the ones presented in Table 3.

repeal of the Glass-Steagal act are significantly more likely to display a business relationship in the remaining years of our sample period. The $F-$statistics, reported in the last line of the panel, indicate that the instrument is not weak.[11]

Table 3, Panel C reports the second stage results. The panel shows that all the results of our baseline estimation of Equation (4) carry over into the IV setting. A firm-bank relationship increases the probability that the firm will use the underwriting services of the same bank in the future. At the same time, higher *Bank Connections* further increases the likelihood that a bank is chosen to underwrite a firm's bond issuance. Since they address the concern about endogenous matching between firms and banks, results in this panel suggest a causal interpretation of the impact of *Bank Connections* on a firm's underwriter choice.[12]

4 Exploring the economic mechanism

In this section, we investigate the economic mechanism behind the empirical findings presented in Section 3. First, we show that a higher number of connections lowers the cost of financing for firms, justifying their higher issuance activity. Second, we provide evidence that this effect comes from the demand that connected funds guarantee to issuing firms. Third, we investigate the cross-section of firms and show that connections are most beneficial for companies that face high demand uncertainty from institutional investors. Consistently, we also show that connections to bond funds increase the likelihood of firms entering the bond market for the first time.

4.1 Financing costs

Why do firms with more fund connections through their relationship banks have easier access to bond markets? We propose that a large trading network lowers the frictions that

[11] An $F-$statistic above 10 is typically regarded as evidence against weak instruments (e.g., Stock and Yogo, 2002).

[12] Table IA6 shows that the results are robust to controlling for different proxies of bank reputation, including bank size and profitability.

banks face in searching for prospecting investors and assessing their demand for the issue. In turn, lower bank frictions mean that a higher number of connections can allow firms to issue bonds at lower costs. We measure bond financing costs in two different ways. First, we follow Badoer et al. (2019) and focus on secondary market yields of outstanding corporate bonds. This approach has several advantages: secondary market yields are available at each time for all firms with outstanding bonds. Further, they reflect the expected financing costs of the company, independently of whether the firm decides to issue a bond. However, they do not allow measuring firms' effective cost at issuance. Therefore, as a second way of measuring bond financing cost, we condition on firm-quarters where there is an issuance, and measure the average offering yield spread on the bonds issued by the company. The advantage of this measure is that it captures the effective cost paid by the issuer. The disadvantage is that it is only available when firms decide to issue, ignoring the effect of connection on companies that decide not to go on the market.

We collect secondary market yields from Bloomberg for 1995-2002 and TRACE for the remaining part of the sample (2003-2017). Offering yields are instead obtained from Mergent FISD. For each bond, we calculate the yield spread by subtracting the yield of a synthetic Treasury bond that matches the cash flow structure of the bond.[13] We consider only bonds with available yields in the last month of a quarter. We perform the analysis at the issuer level by calculating an issuer-level average yield spread. We start our analysis by running the following firm-level panel regression:

$$Yield\ Spread_{it} = \alpha_i + \alpha_t + \beta Firm\ Connections_{it} + \gamma X_{it-1} + \epsilon_{it} \tag{7}$$

$YieldSpread_{it}$ is either the value-weighted average secondary market yield spread on outstanding corporate bonds of firm i in quarter t (column 1) or the value-weighted average offering yield spread on newly issued corporate bonds of firm i in quarter t (column 3).

[13] We follow Gürkaynak et al. (2007) and model the zero-coupon yield curve with the Nelson-Siegel-Svensson functional form. Next, we obtain discount rates that match the corporate bond's cash flow structure.

$Firm\ Connections_{it}$ is the variable that counts the number of connections to mutual funds that a firm has thanks to its banks, as described in Section 2.2. X_{it-1} is a matrix of firm controls, including lagged size, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short-term debt over total assets, and total debt over total assets. We also control for the average bond rating and time to maturity. α_i and α_t are issuer and year-quarter fixed effects, respectively.

The results are presented in Table 4 in columns 1 and 3 for the secondary market and offering yield spread, respectively. The coefficient β is negative and significant (t-stat 1.9 and 2.01) in both cases, indicating that a larger number of connections lowers a firm's cost of bond financing. In terms of magnitudes, a one-standard-deviation increase in firm connections in the sample used in the first column (547.05) decreases the firm's secondary market yield spread by 0.26%. This effect represents a decrease of about 8% of the average traded yield spread. Similarly, a one-standard-deviation increase in firm connections in the sample used in the third column (577.42) decreases the firm's secondary market yield spread by 0.16%. This effect represents a decrease of about 6% of the average offering yield spread.

As with our baseline regression of section 3.1.1, we cannot interpret our results causally by estimating Equation (7). Therefore, we apply again the identification strategy based on the 2003 mutual fund scandal and estimate the following model:

$$Yield\ Spread_{it} = \alpha_i + \alpha_t + \beta Scandal\ Connections_i \times Post_t + \gamma X_{it-1} + \epsilon_{it} \qquad (8)$$

where $YieldSpread_{it}$ is either the value-weighted average secondary market yield spread on outstanding corporate bonds of firm i in quarter t (column 2) or the value-weighted average offering yield spread on newly issued corporate bonds of firm i in quarter t (column 4). Our main regressor of interest is $Scandal\ Connections_i$, which counts the number of connections of firm i that are affected by the 2003 trading scandal. $Post_t$ is an indicator equal to 1 in the quarters after the first quarter of 2004 and 0 otherwise. We include firm and quarter fixed effects while clustering SE a the firm level. The results are presented in the second and fourth columns of Table 4 for traded and offering yield spread, respectively. Consistent with our baseline results, negative shocks to firm connections triggered by the mutual fund scandal led to a higher cost of bond financing for companies. The economic magnitude is considerable, with a one-standard-deviation increase in scandal connections increasing the firm's secondary market (offering) yield spread by 0.41% (0.73%). This effect represents an increase of about 14% (12%) of the average traded (offering) yield spread.

In additional tests, we investigate the relationship between connections to bond funds and the fees that firms pay to underwriters when issuing bonds. Such an analysis is important for two reasons. First, it gives a complete picture of the effective costs paid by firms at issuance, as offering yields do not include such fees. Second, it sheds light on the revenues that banks obtain through their bond underwriting process. In our initial tests, we repeat the analysis of Table 4 by having fees as a dependent variable. We include the selling concession, the amount paid to other securities dealers in the offering syndicate for reselling the issue on behalf of the underwriter, and the underwriting/management fee. The gross spread is the sum of the underwriting fee and selling concession and represents the difference between the price the issuer receives for its securities and the price that investors pay for them. All such variables are obtained from Mergent FISD. The results are presented in Table IA11 in the Internet Appendix and show that underwriters neither decrease nor increase their fees as a function of their connections to institutional investors. This result has meaningful implications. First, it strengthens the idea that the underwriter's reputation (often proxied by fees) is unlikely to drive our results. Second, it indicates that an increase in firms' connections leads to an actual reduction in bond financing costs, as lower realized offering yields are not mitigated by higher bank fees.

A natural question that follows up from these results is what banks' incentives to build connections are if they do not charge higher fees. A possibility is that connections allow them to increase the underwriting volume while keeping fees constant. In the Internet Appendix Table IA12, we provide evidence consistent with this view. We use a bank-level sample and regress i) average fees on underwritten bonds and ii) total underwriting volumes on connections. We include in our regressions bank-level controls as well as time and bank fixed-effects. Bank connections to bond funds through secondary market intermediation have no significant impact on fees but positively affect the bond underwriting volume.

Next, we investigate whether connections affect the maturity and size of bond issuance. To that end, we repeat the tests of Table 4 with time to maturity and issuance size as the dependent variable. The results are reported in Table IA13. We find that the bank's trading network does not significantly impact the maturity or the size independent of whether we use the baseline regression or the DiD setup around the 2003 mutual fund scandal. Our findings indicate that higher exposure to bond investors through bank connections leads to a larger amount of corporate bonds in a company's debt structure due to more frequent issuances, not because of larger bond issuances. Interestingly, while the trading network of banks affects bond yields in the intensive and extensive margin, it does not affect other bond features or fees paid by firms to the underwriter. In the next section, we dig deeper into the mechanism behind the key result of bond financing costs.

4.2 Primary market allocations

Corporate bonds are traded OTC, which means banks/dealers and bond investors are all subject to significant trading frictions. Trading relationships between dealers and investors are the natural outcome of such constraints (Babus and Hu, 2017; Chang and Zhang, 2021). The costly search for investors could lead underwriters to avoid issuing bonds or lowering the offering price to attract buyers. A strong connection with investors in the secondary market through the dealership business would allow underwriters to easily find prospective investors, hence allowing for a higher offering price. Testing this implication is the goal of the current section, where we focus on the investment decisions of asset management companies at bond issuance.

Thanks to the information we gather from NSAR filings, we are able to define a connection between a bank and an asset management company when the bank is one of the top ten dealers reported by the asset manager. In the following analysis, we link bank-asset managers' connections to the investment behavior of asset management companies in the primary corporate bond market. Specifically, we first run the following regressions:

$$Holding\ Probability_{fit} = \alpha_{ft} + \alpha_i + \beta Connected\ AM_{fit} + \epsilon_{fit} \tag{9}$$

where $Holding\ Probability_{fit}$ is an indicator variable that takes the value of 1 if the asset manager f has the newly issued bond i in its portfolio in the month of the issue. $Connected\ AM_{fit}$ is an indicator with a value of one if at least one of the underwriters of issue i has been among the top ten dealers of asset manager f in each of the past five years. Since we only observe end-of-month holdings, while issues may occur on any day of the month, there is the concern that the holdings we observe do not stem from asset managers' activity in the primary market but from purchases in the secondary market. This would be a problem since secondary market purchases are less influenced by the relationship between an asset manager and its underwriter-dealer. To increase our confidence that we capture investment decisions in the primary market, we limit our sample of issues to those that occur in the last ten days of a month.

The inclusion of asset manager $\times$ time fixed effects (α_{ft}) allows us to control for any difference between asset management companies, even time-varying, that might confound our results, such as changing investment objective or quality of the managerial team. As a result, in our estimation, we only exploit variation coming from the different choices made by asset managers regarding different bond issues. α_i are bond issue fixed effects, which absorb characteristics of bond issues that might affect investment choices, such as bond spread, maturity, etc.

In a second test, our aim is to analyze how the number of connections with asset managers affects the fraction of a bond issue amount connected funds hold in aggregate. To that end, we run the following regression

$$Connected\ AM\ Investment_{it} = \alpha_t + \alpha_i + \beta N.\ Connected\ AM_{it} + \gamma X_{it-1} + \epsilon_{it} \qquad (10)$$

where $Connected\ AM\ Investment_{it}$ is the percentage of bond i offering dollar amount held at issuance by asset managers connected with at least one of the issue's underwriters. α_t and α_i are date (year-quarter) and issuer fixed effects, respectively. $N\ Connected\ AM_{it}$ is the number of asset managers connected to bond i issuer through its relationship banks. X_{it} is a vector of bond-specific controls, which include a dummy for the bond being in an index, credit rating, offering amount, maturity, and the total investment of all funds at time t.

Panel A of Table 5 reports the holding level tests following Equation (9). The point estimate in column (1) indicates that a connected asset manager is 6.05% more likely to hold the new bond issue in its portfolio than an unconnected asset manager. In our most restrictive specification, with both asset manager × time and issue fixed effects, the coefficient on $Connected\ Asset\ Manager_{fit}$ is still positive and statistically highly significant, indicating that a connected asset manager is 0.62% more likely to purchase the bond at issuance. This is an economically meaningful effect, as it represents 13.4% of the unconditional average. Panel B of Table 5 displays the results from Equation (10). In the first column, we only include time fixed effect. In the second, we add issuer FE, and in the third, we also include bond-specific controls. Our most conservative specification shows that a one standard deviation increase in *N. of Connected Asset Managers* leads to a 10% higher fraction of dollar issuance held by connected funds. This effect is equivalent to roughly 20% of the unconditional sample mean.

Results in this section show direct evidence of the reason why bank connections to mutual funds are beneficial for firms' bond market access through a lower expected cost of bond financing. Connected asset managers provide stable demand for a firm's bonds. This means that bonds of firms with a higher number of connections are ex-ante easier to place.

A natural question that arises from the results outlined above is: why are funds eager to place orders in first allocations underwritten by their connected banks? What may appear surprising is that funds are willing to place bids despite the lower yield of those issues. A plausible answer to that question comes from the well-established fact that bond funds are particularly worried about under-performing their benchmark due to the presence of a concave flow-to-performance relationship (Goldstein et al., 2017). Hence, funds are keener on minimizing their tracking error rather than trying to outperform the benchmark. Timely access to bonds in the primary markets could guarantee fund managers exactly that: a way to achieve a low tracking error. If that is the mechanism underlying our results of Table 5, we should be able to confirm that empirically in our data. Specifically, we should observe that bond funds with more connections to bond underwriters have a lower tracking error. We test for this possibility in Table IA14 by regressing fund-level tracking error on the number of fund connections, fund-level controls, and fund and time fixed effects. In all specifications, a larger number of fund connections is linked to a lower fund tracking error, consistent with our conjecture. In terms of economic magnitude, the coefficient in the first column indicates that a one-standard deviation increase in the number of mutual funds connections (61) leads to a reduction in tracking error, which is 8% of the unconditional tracking error in our sample (51.9%).

4.3 The role of demand uncertainty

Next, we explore which firms benefit the most from a bank's trading network. The following tests start from the premise that the frictions that banks face in assessing the demand for an issue are plausibly higher when the demand uncertainty surrounding the issue is higher. If the mechanism underlying our main results manifests through a reduction in bank frictions, then we expect the benefits of larger trading networks to be particularly pronounced when banks face high demand uncertainty from institutional investors. High demand uncertainty in our setting is meant to capture firms that are more complex to value; hence, investors disagree the most on how much to invest in them. We test for this possibility by splitting our sample into firms facing high vs. low demand uncertainty and repeating our main tests. We follow Jiang and Sun (2014) and proxy demand uncertainty for each firm in our sample as the standard deviation of equity mutual funds' active holdings of the firm's stock. The idea behind such a measure is the following. If active fund managers are more uncertain about how much a firm's stock to hold, then the company is facing a higher level of demand uncertainty from institutional investors.

In each quarter, we sort all firms in our sample on demand uncertainty (measured in the past quarter) and split the sample into high vs. low demand uncertainty companies based on the median. We then repeat our tests from Equation (1) and Equation (2) for each subsample. The results are displayed in Table 6, where Panel A refers to the full sample and Panel B to the mutual fund scandal. Our results are consistent with the idea that companies facing higher demand uncertainty from institutional investors benefit the most from connections. In both the full sample and the Diff-in-Diffs test exploiting the mutual fund scandal, the effect of connections is roughly double in firms with demand uncertainty relative to those with low. For example, a one-standard-deviation increase in Firm Connections (Scandal Connections) for high-demand uncertainty firms increases (decreases) the probability of bond issuance relative to the unconditional mean by 54.5% (33.9%).

In contrast, the effect of a low-demand uncertainty firm is 4.4% (9%). Our findings are not specific to the proxy we use for demand uncertainty. For example, In Table IA10 in the Internet Appendix, we show that our results are unaffected if we split the sample based on a firm's number of business segments, which is another popular proxy for issuer complexity (Cohen and Lou, 2012).

Our findings suggest that banks use their networks of investors to mitigate information frictions that prevent firms from accessing bond markets. In particular, firms that are more complex and hence face higher demand uncertainty from investors benefit the most from the stable demand guaranteed by underwriter networks of their relationship banks. We argue that because banks are not only the firm's underwriter but also its commercial bank, they have access to issuers' private information from past lending relationships that they are willing to share with their most valuable investors. It is worth noting that our channel differs from the possibility that banks use their networks to finance firms that are unlikely to repay their obligations, a practice known as zombie lending. First, firms with high demand uncertainty are not riskier than firms with low demand uncertainty. When looking at the splits based on the full sample, companies with high (low) demand uncertainty have an average rating of 9.2 (12.93). Moreover, there is a higher number of firms without a rating in the subsample of companies with low demand uncertainty. Second, the issuance of corporate bonds is a repeated game where banks interact multiple times with issuers and investors alike. Hence, it is unlikely that banks could keep a stable network by constantly offering zombie firms to investors, which would be incentivized to find a more reliable underwriter. The idea that reputation concerns shape underwriters' decisions is consistent with the findings of Fang (2005) for bond markets, and Blickle et al. (2021) for syndicated loans.

4.4 First issuances

What is the role of bank connections in firms' access to the bond market for the first time? This question is relevant for at least two reasons. First, it allows us to zoom into companies facing high uncertainty regarding investors' demand. If, as suggested by our previous tests, banks mitigate information frictions that limit firms' access to bond financing, connections should matter in this case. Second, first issuances provide a cleaner identification of our channel: as firms have never issued bonds before, there are no past company bond owners. This feature is particularly appealing as it allows us to isolate our channel from other types of connections proxied by past ownership, e.g., lower information costs (Dass and Massa, 2014; Zhu, 2021).

We modify our panel data by excluding firm quarters that follow the quarter of the first bond issuance. Our sample thus includes only firms that never issued bonds or firms that issued bonds up to and including the quarter of the first issuance. Overall, we identify 784 first issuance events between 1995 and 2017. In Table 7 Panel A (Panel B), we show the results of the baseline regression from Equation 1 (DiD around the mutual fund scandal, see Equation 2) for the modified sample. Our dependent variables are the probability of (first) issuance and the fraction of bonds outstanding over total assets. The latter in this sample is equivalent to 0 in all quarters except for the first issuance quarter, where it equals the dollar amount of bonds issued over total assets. When having as dependent variable the probability of first issuance, we report results both for logit model (column 1) and OLS (column 2). In the logit model, we follow Fee et al. (2017) and add firm age fixed effects, while in the OLS models, we include industry time fixed effects.

Despite the smaller sample of events and hence a much lower statistical power, the results are comparable or even larger than those in Table 2. Looking at the logit regression for the baseline model, we find that a one-standard-deviation increase in Firm Connections increases the probability of first bond issuance by 58% relative to the unconditional probability of bond issuance in our sample. Similarly, in the OLS model, a one-standard-deviation increase in Firm Connections increases the probability of first bond issuance by 62% relative to the unconditional average. A similar picture emerges in the DiD regression around the 2003 mutual fund trading scandal. In the logit (OLS) regression, a one standard deviation increase in Scandal Connections × Post leads to a decrease in the probability of issuing a bond for the first time equal to 48% (43%) of the unconditional average.

To further strengthen the evidence supporting our channel, we present in Table 8 the tests on asset managers' portfolio choices focusing only on first bond issuances. Panel A shows the holding probability of asset managers, while Panel B displays the holding quantity at the bond level. Again, the results are qualitatively the same as those in Table 5, with the magnitudes being even larger. In panel A, despite including bond FE and asset manager × time FE, a connected asset manager is 1.41% more likely to hold a bond underwritten by a relationship bank. This effect is large, as it represents 30% of the unconditional mean. Similarly, in panel B we show that a one standard deviation increase in the number of

Connected Asset Managers leads to an increase in the fraction of issuance held by connected funds by 5.7%. This is a large number, as it represents 10.7% of the unconditional mean.

Overall, our findings on first issuances reinforce the economic mechanism laid out in the previous section: firms with high demand uncertainty benefit the most from bond fund connections obtained through relationship banks. These results also rule out the possibility that previous bondholders completely overlap with connected funds and explain our results. To strengthen this argument, we also test the role of previous bondholders in the full sample. We rerun Equations (1) and (2), including among the controls the number of mutual funds that hold previously issued bonds by the issuer. The results are reported in Table IA15. While the number of past bondholders significantly impacts bond issuances, the effect of firm connections remains economically and statistically significant.

5 Economic implications

In this section, we present the economic implications of our main empirical finding. The goal is not to create an exhaustive list of implications, but rather explore the most interesting ones in light of the recent literature. First, we present evidence on the real effects of access to investor networks through the underwriting banks. Second, we discuss the implications of our results for models of debt financing.

5.1 Real effects of bank-investor networks

How are the firms in our sample using the bond financing obtained through bank-investor networks? It is well known that corporate bond markets are an essential source of financing for corporations, able to boost firms' investment and drive the business cycle (Gilchrist and Zakrajšek, 2012). On the other hand, recent evidence shows that corporations can also use bond financing to accumulate cash for liquidity needs (Acharya and Steffen, 2020; Darmouni and Siani, 2022). Are bank investor networks helping firms to increase their investment and, ultimately, long-term growth, or are they simply fueling cash hoarding? Answering these questions can shed light on the effect that the "intermediation" of bond financing we document in the paper has on the broad economy. Our analysis is a first step that can help evaluate whether the lack of disintermediation in bond financing is limiting or helping economic growth.

We repeat the analysis in Table 2 and re-estimate equations 1-2 while having on the left-hand side variables that measure real activities of firms. More specifically, we use as dependent variables log of total assets, long-term investments over assets, short-term investments over assets, intangibles over assets, tangibles over assets, net working capital over assets, and cash over assets. The results are presented in Table 9, where panel A shows the baseline regression model and panel B displays the DiD analysis around the 2003 mutual fund scandal.

When looking at the baseline model, firms with a higher number of connections to bond investors through bank networks tend to grow more and increase their long-term investment and the intangible assets on their balance sheet. On the other hand, they decrease their short-term investment and cash. The economic effect is sizable: the increase in total assets due to a one standard deviation increase in firm connections is close to 2% of the unconditional average size of firms in our sample. The effects grow up to 3% for long-term assets and close to 20% for intangible assets. The drop in short-term assets and cash is, respectively, 3% and 9% of the unconditional averages of the two variables. Taken together, these findings are consistent with bank-investor networks fueling productive long-term firm growth. This conclusion is strengthened by the findings in Panel B, where the DiD setup allows us to estimate the causal impact of firm connections to bond investors. Negative shocks to firm connections lead to lower firm growth, long-term investment, and intangible assets. Conversely, it pushes firms to increase their short-term investments and accumulate cash. Similarly to panel A, the magnitudes are economically relevant. Relative to the unconditional averages of the variables in our sample, one standard deviation increase in the number of connections affected by the scandals decreases total assets by close to 1%, long-term assets by 1.5% and intangibles by 5%; the same increase in *Scandal Connections* increases short-term assets by close to 2% and cash by 4%.

Overall, our evidence suggests that bank investor networks are helping firm growth through increasing long-term investment and intangible assets. This is consistent with our findings in section 4.3, where we show that banks are not exploiting their investor networks to finance zombie firms but rather help corporations to mitigate their information frictions and access bond markets. Taken together, our results indicate that bank ”intermediation” in bond financing is not limiting firm access to bond investors and, ultimately, investment opportunities but rather helping it through the mitigation of information frictions.

5.2 Theories of debt financing

Our results speak directly to models of corporate debt choice that include both corporate bonds and bank loans. Early theories of corporate debt structure describe bonds as arm's length debt, where investors can reach investors directly without intermediaries (Diamond, 1991; Rajan, 1992; Bolton and Scharfstein, 1996). Even in more recent models, where the bond underwriter is included, there is no role for bank-investor network as well as contemporaneous lending-underwriting-secondary market intermediation, which we observe in practice De Fiore and Uhlig (2015); Crouzet (2018); Geelen et al. (2022). In light of the results in our paper, it would be interesting to incorporate those features in state-of-the art models of firm debt financing. Doing so could lead to interesting implications and shed light on both the link between corporate debt and the macroeconomy as well as the dynamics of debt structure at the firm level.

For example, incorporating the bank-investor networks can help to understand better how shocks originated in the banking sector would propagate to firms. Crouzet (2018) develops a macro-financial model where firms endogenously choose their debt structure, and each firm faces the same cost of accessing bond investors. In response to a negative bank credit supply shock, corporate bond issuance increases as firms try to substitute the lost availability of bank loans. Including bank-investor networks could have important implications for the propagation of aggregate bank shocks. We demonstrate that bank-investor networks are a first-order determinant of access to bond markets as well as that firms are heterogeneously exposed to such networks through their underwriters. Hence, the propagation of bank shocks to the economy through firms' financing activities will be heterogeneous depending on their exposure to bank-investor networks. An equilibrium model could shed light on such transmission mechanism.

The heterogeneous propagation of aggregate shocks through bank investor networks does not need to be limited to shocks originated in the banking sector. For example, bank investor networks could have a role in the propagation of central bank policies. There are a few models that study the role of debt structure for the transmission of monetary policy, and none of them incorporates bank-investor networks (Bolton and Freixas, 2006; Crouzet, 2021). Considering that debt structure has an impact on monetary policy transmission, it would be interesting to model and empirically test whether bank-investor networks play a role in the heterogeneous transmission across firms.[14]

Last but not least, our findings could inform models of capital structure dynamics with endogenous relationship formation. In a recent paper, Geelen et al. (2022) model capital structure choice in the presence of endogenous relationship formation between a firm and bank lenders as well as corporate bond investors. The model abstracts from the role of bank-investor networks and the fact that bank lenders can be at the same time bond underwriters. Incorporating such features could enrich our understanding of how relationships between firm-investors-financial intermediaries affect capital structure choices.

[14]Siani (2022) focuses on international spillovers and provides empirical evidence that unconventional monetary policy in Europe can have an effect on firm financing in the US through underwriter networks.

6 Conclusion

Corporate bond markets have become an increasingly important source of debt financing for non-financial businesses. The rapid development of corporate bond markets has drawn increasing attention from academics, and it has been further supported by regulatory initiatives to promote the use of corporate bonds as a viable source of long-term funding. However, this paper challenges the view that corporate bond financing is disintermediated by showing that networks between banks and bond investors are a first-order determinant of firms' access to debt markets. We establish causality through multiple identification strategies that exploit shocks to bank-issuer relationships as well as the capital supplied by investors in the bank's network. Further tests indicate that banks use investor networks to alleviate information frictions preventing firms from accessing investment opportunities through bond financing. These results add to the debate on whether the existing process for raising corporate debt is an efficient mechanism for non-financial firms.

Besides being informative for theories of corporate debt structure, our results add to the discussion on the effect of banks on the efficiency of bond issuance, which has recently been scrutinized by regulators and industry participants. The result has been a general push towards a more centralized and transparent issuance process, which allows all investors to participate. We caution against the interpretation that increased transparency and participation would monotonically increase the efficiency of the issuance process. Our results imply that firms facing a high demand uncertainty benefit the most from connections of relationship banks to institutional investors. Thus it is unclear whether such benefits would persist if the issuance process were fully transparent and open to all investors. As recently shown by Axelson and Makarov (2022), the efficiency of the primary market might decrease if too many investors are allowed to participate.

References

Acharya, V.V., Steffen, S., 2020. The Risk of Being a Fallen Angel and the Corporate Dash for Cash in the Midst of COVID. The Review of Corporate Finance Studies 9, 430–471.

Adelino, M., Cheong, C., Choi, J., Oh, J.Y.J., 2022. Mutual fund flows and capital supply in municipal financing. Working paper, SSRN .

Anand, A., Jotikasthira, C., Venkataraman, K., 2020. Mutual Fund Trading Style and Bond Market Fragility. The Review of Financial Studies 34, 2993–3044.

Anton, M., Polk, C., 2014. Connected stocks. Journal of Finance 69, 1099–1127.

Axelson, U., Makarov, I., 2022. Informational black holes in financial markets. Journal of Finance Forthcoming.

Babus, A., Hu, T.W., 2017. Endogenous intermediation in over-the-counter markets. Journal of Financial Economics 125, 200–215.

Badoer, D.C., Demiroglu, C., James, C.M., 2019. Ratings quality and borrowing choice. The Journal of Finance 74, 2619–2665.

Bajo, E., Chemmanur, T.J., Simonyan, K., Tehranian, H., 2016. Underwriter networks, investor attention, and initial public offerings. Journal of Financial Economics 122, 376–408.

Becker, B., Ivashina, V., 2014. Cyclicality of credit supply: Firm level evidence. Journal of Monetary Economics 62, 76–93.

Bessembinder, H., Jacobsen, S., Maxwell, W., Venkataraman, K., 2022. Overallocation and secondary market outcomes in corporate bond offerings. Journal of Financial Economics 146, 444–474.

Bessembinder, H., Jacobsen, S.E., Maxwell, W.F., Venkataraman, K., 2018. Capital commitment and illiquidity in corporate bonds. Journal of Finance 73, 1615–1661.

Bessembinder, H., Spatt, C., Venkataraman, K., 2020. A survey of the microstructure of fixed-income markets. Journal of Financial and Quantitative Analysis 55, 1–45.

Blickle, K., Fleckenstein, Q., Hillenbrand, S., Saunders, A., 2021. The myth of the lead arranger's share. Working paper, Federal Reserve Bank of New York.

Bolton, P., Freixas, X., 2006. Corporate Finance and the Monetary Transmission Mechanism. The Review of Financial Studies 19, 829–870.

Bolton, P., Scharfstein, D.S., 1996. Optimal debt structure and the number of creditors. Journal of Political Economy 104, 1–25.

Chang, B., Zhang, S., 2021. Endogenous market making and network formation. Working paper, Wisconsin School of Business.

Chodorow-Reich, G., 2013. The Employment Effects of Credit Market Disruptions: Firm-level Evidence from the 2008–9 Financial Crisis *. The Quarterly Journal of Economics 129, 1–59.

Cohen, L., Lou, D., 2012. Complicated firms. Journal of Financial Economics 104, 383–400.

Colliard, J.E., Foucault, T., Hoffmann, P., 2021. Inventory management, dealers' connections, and prices in over-the-counter markets. The Journal of Finance 76, 2199–2247.

Crouzet, N., 2018. Aggregate implications of corporate debt choices. The Review of Economic Studies 85, 1635–1682.

Crouzet, N., 2021. Credit disintermediation and monetary policy. IMF Economic Review 69, 23–89.

Darmouni, O., 2020. Informational frictions and the credit crunch. Journal of Finance 75, 2055–2094.

Darmouni, O., Siani, K., 2022. Bond market stimulus: Firm-level evidence. Working paper, Columbia Business School .

Dass, N., Massa, M., 2014. The variety of maturities offered by firms and institutional investment in corporate bonds. The Review of Financial Studies 27, 2219–2266.

De Fiore, F., Uhlig, H., 2015. Corporate debt structure and the financial crisis. Journal of Money, Credit and Banking 47, 592–613.

Degryse, H., Van Cayseele, P., 2000. Relationship lending within a bank-based system: Evidence from european small business data. Journal of Financial Intermediation 9, 90–109.

Di Maggio, M., Kermani, A., Song, Z., 2017. The value of trading relations in turbulent times. Journal of Financial Economics 124, 266–284.

Diamond, D.W., 1991. Monitoring and reputation: The choice between bank loans and directly placed debt. Journal of Political Economy 99, 689–721.

Dick-Nielsen, J., Nielsen, M.S., von Rüden, S.L., 2021. The value of bond underwriter relationships. Journal of Corporate Finance 68, 101930.

Drucker, S., Puri, M., 2005. On the benefits of concurrent lending and underwriting. The Journal of Finance 60, 2763–2799.

Falato, A., Hortacsu, A., Li, D., Shin, C., 2021. Fire-sale spillovers in debt markets. Journal of Finance 76, 3055–3102.

Fang, L.H., 2005. Investment bank reputation and the price and quality of underwriting services. The Journal of Finance 60, 2729–2761.

Fee, C.E., Hadlock, C.J., Huang, J., Pierce, J.R., 2017. Robust Models of CEO Turnover: New Evidence on Relative Performance Evaluation. The Review of Corporate Finance Studies 7, 70–100.

Friewald, N., Nagler, F., 2019. Over-the-counter market frictions and yield spread changes. Journal of Finance 74, 3217–3257.

Gande, A., Puri, M., Saunders, A., 1999. Bank entry, competition, and the market for corporate securities underwriting. Journal of Financial Economics 54, 165–195.

Gande, A., Puri, M., Saunders, A., Walter, I., 1997. Bank Underwriting of Debt Securities: Modern Evidence. The Review of Financial Studies 10, 1175–1202.

Geelen, T., Morellec, E., Rostova, N., 2022. Relationship capital and financing decisions. Working paper, Copenhagen Business School.

Gilchrist, S., Zakrajšek, E., 2012. Credit spreads and business cycle fluctuations. American Economic Review 102, 1692–1720.

Goldstein, I., Jiang, H., Ng, D.T., 2017. Investor flows and fragility in corporate bond funds. Journal of Financial Economics 126, 592–613.

Gürkaynak, R.S., Sack, B., Wright, J.H., 2007. The us treasury yield curve: 1961 to the present. Journal of Monetary Economics 54, 2291–2304.

Hendershott, T., Li, D., Livdan, D., Schürhoff, N., 2020. Relationship trading in over-the-counter markets. Journal of Finance 75, 683–734.

Jiang, H., Sun, Z., 2014. Dispersion in beliefs among active mutual funds and the cross-section of stock returns. Journal of Financial Economics 114, 341–365.

Kisin, R., 2011. The impact of mutual fund ownership on corporate investment: Evidence from a natural experiment. Working Paper .

Li, D., Schürhoff, N., 2019. Dealer networks. The Journal of Finance 74, 91–144.

Lian, C., Ma, Y., 2020. Anatomy of Corporate Borrowing Constraints*. The Quarterly Journal of Economics 136, 229–291.

McCabe, P.E., 2009. The economics of the mutual fund trading scandal .

Nagler, F., Ottonello, G., 2022. Inventory-Constrained Underwriters and Corporate Bond Offerings. The Review of Asset Pricing Studies .

Neuhann, D., Saidi, F., 2018. Do universal banks finance riskier but more productive firms? Journal of Financial Economics 128, 66–85.

Nikolova, S., Wang, L., 2022. Corporate bond flipping. Working paper, University of Nebraska.

Nikolova, S., Wang, L., Wu, J., 2020. Institutional allocations in the primary market for corporate bonds. Journal of Financial Economics 137, 470–490.

O'Hara, M., Wang, Y., Zhou, X.A., 2018. The execution quality of corporate bonds. Journal of Financial Economics 130, 308–326.

Ottonello, P., Winberry, T., 2020. Financial heterogeneity and the investment channel of monetary policy. Econometrica 88, 2473–2502.

Petersen, M.A., Rajan, R.G., 1994. The benefits of lending relationships: Evidence from small business data. Journal of Finance 49, 3–37.

Puri, M., 1996. Commercial banks in investment banking conflict of interest or certification role? Journal of Financial Economics 40, 373–401.

Rajan, R.G., 1992. Insiders and outsiders: The choice between informed and arm's-length debt. The Journal of Finance 47, 1367–1400.

Santos, J.A., Winton, A., 2008. Bank loans, bonds, and information monopolies across the business cycle. Journal of Finance 63, 1315–1359.

Schultz, P., 2001. Corporate bond trading costs: A peek behind the curtain. The Journal of Finance 56, 677–698.

Schwert, M., 2018. Bank capital and lending relationships. Journal of Finance 73, 787–830.

Siani, K., 2022. Raising bond capital in segmented markets. Working paper, Columbia Business School.

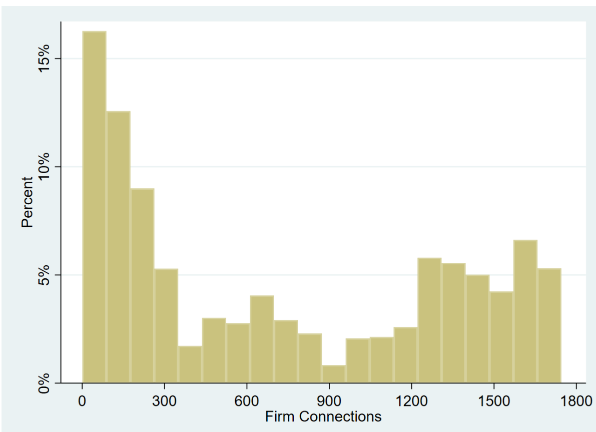
Stock, J.H., Yogo, M., 2002. Testing for weak instruments in linear iv regression.

Yasuda, A., 2005. Do bank relationships affect firm's underwriter choice in the corporate-bond underwriting market? Journal of Finance 60, 1259—-1292.

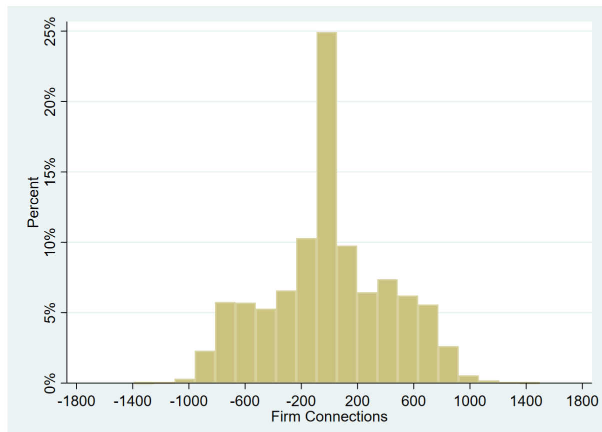
Zhu, Q., 2021. Capital supply and corporate bond issuances: Evidence from mutual fund flows. Journal of Financial Economics .

Figure 1: Cross-Sectional and Time-Series Variation in Connections

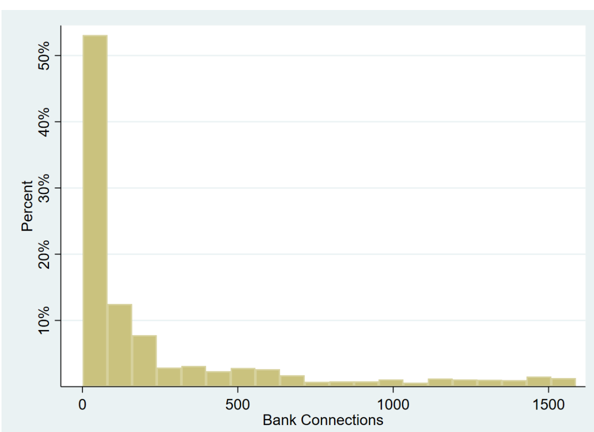
This figure describes the cross-sectional and time-series variation in our connections variables. In panels A and B connections are defined as the number of mutual funds connections that firms have through their banks. In panels C and D, connections are measured as the number of fund connections of the banks in our sample. In panels E and F, connections are defined as the number of bank connections of the asset managers in our sample. Panels A, C, and E plots the distribution of the raw connection variables. To construct panel B, we first run a firm-level panel regression with firm and time fixed effects, and we plot the resulting residuals. Panel D and F follow a similar procedure using bank-level and asset manager-level panel regressions, respectively.



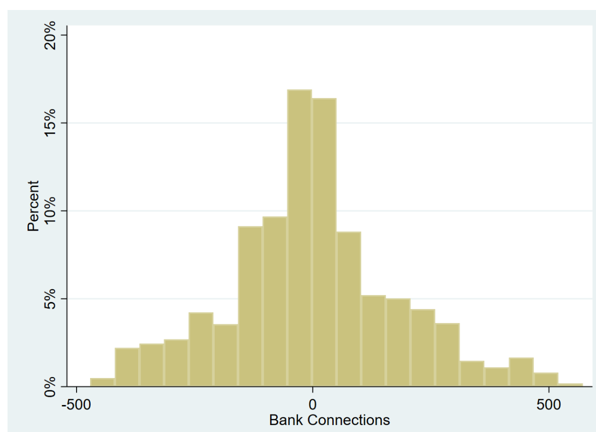
Panel A: Firm Connections - Cross-Section



Panel B: Firm Connections - Time-Series



Panel C: Bank Connections - Cross-Section



Panel D: Bank Connections - Time-Series

Figure 2: Timing of 2003 Trading Scandal Effect on Bond Financing

This figure plots point estimates from a firm-panel regression of bond issuance variables on the number of firms' mutual funds connections that were affected by the scandal, firm and time fixed effects, and lagged controls. The specification is the same as that reported in Table 2 Panel B, except that the effect of the trading scandal is allowed to vary annually in event time. Figure A uses the size of bond offerings that as fraction of lagged total assets. Figure B uses the amount of firms' outstanding bonds over total assets as dependent variable.

Figure A

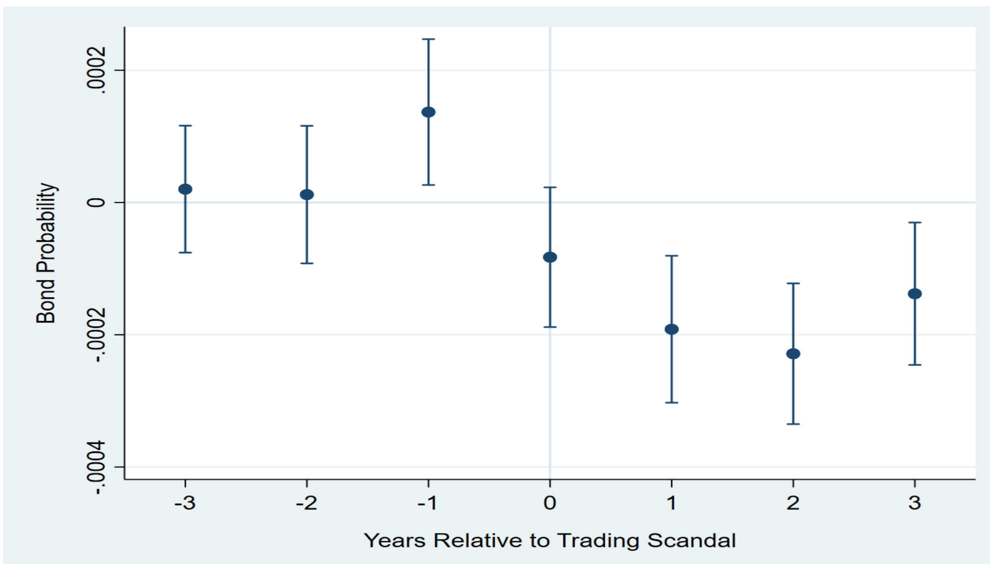


Figure B

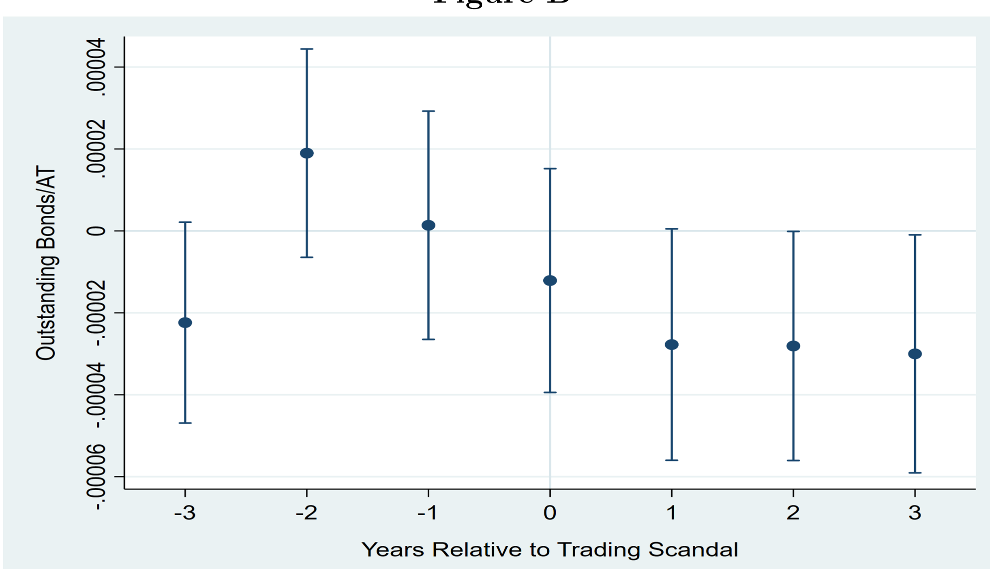


Figure 3: Simulation Test Scandal

The figure compares the point estimate for the actual coefficient of column (2) and column (4) of Panel B of Table 2 with the results of 1000 simulations based on randomized firms' mutual funds networks. To obtain each placebo network we first randomize both the number and the identity of a firm's underwriter connections. Then, we aggregate the mutual funds connections of the resulting bank network at the firm level. The red vertical line in the graph indicate the value of the coefficient in column (2) and column (4) of Panel B of Table 2 as well as the p-value of the probability of observing a smaller coefficient.

Figure A

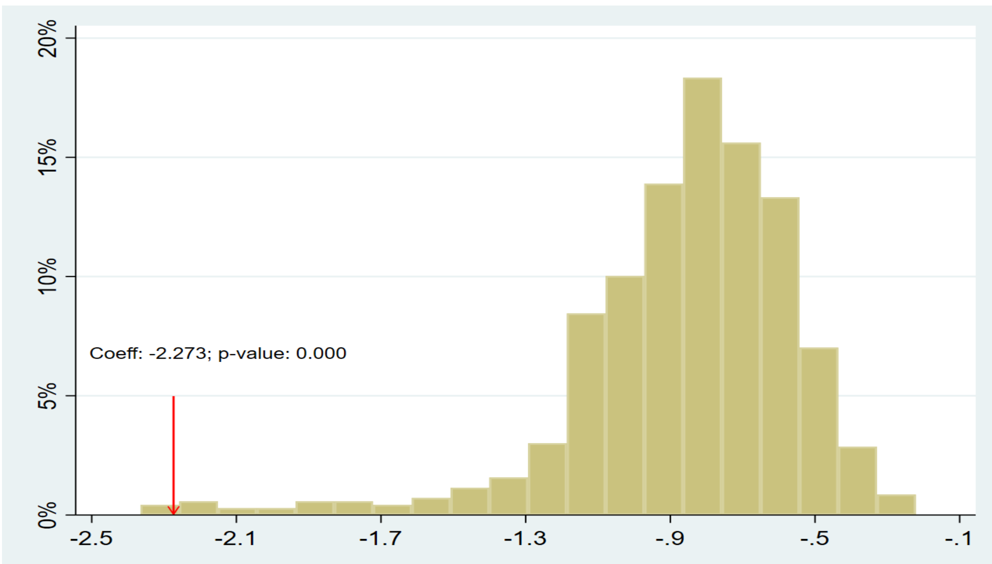


Figure B

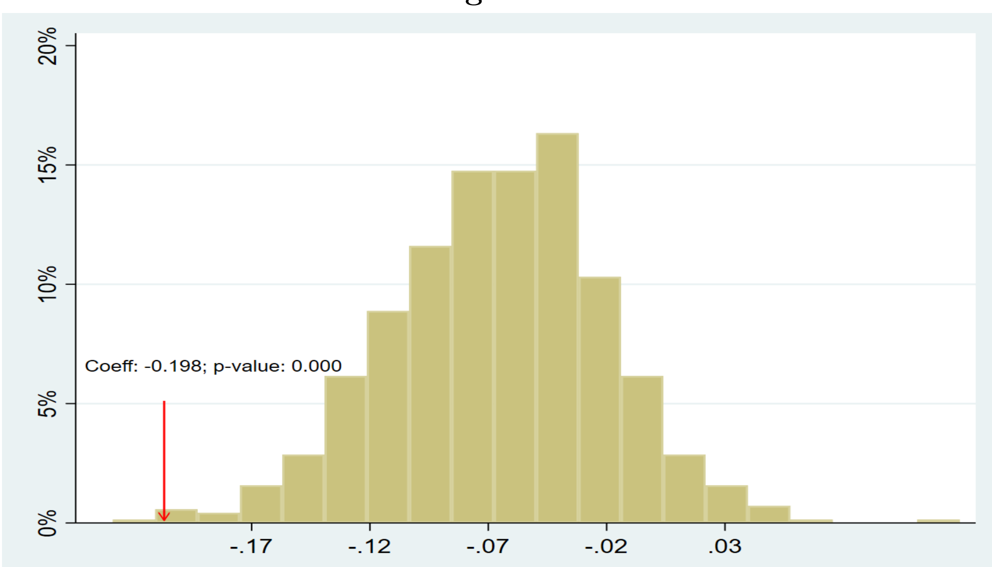


Table 1: Summary Statistics

Panel A of the table reports summary statistics for the firm-level variables used in our analyses. Panel B reports summary statistics for the bank-level variables used in our analyses. The sample period runs from 1995 through 2017. A complete list of definitions for these variables is provided in the Data appendix.

Panel A: Firm-Level Variables

	Unit	Observation	Mean	SD	P10	P50	P90
Firm Connections	Integer	218,874	555.85	610.50	0.00	220.00	1546.00
Outstanding Bonds/AT	%	218,874	6.58	12.91	0.00	0.00	24.67
Bond Probability	%	218,874	3.81	19.15	0.00	0.00	0.00
Secondary Market Yield Spread	%	49,681	3.48	3.78	0.81	2.33	6.85
Offering Yield Spread	%	6,524	6.03	2.28	3.16	5.97	8.97
Leverage	%	218,874	21.90	18.85	0.00	19.76	48.00
Loan Probability	%	218,874	10.37	30.48	0.00	0.00	100.00
Total Assets	$B	218,874	5.72	23.38	0.06	0.75	11.48
Book-to-Market	%	218,874	62.98	54.81	16.86	48.55	121.01
Asset Tangibility	%	218,874	31.54	24.88	5.11	23.88	72.23
Profitability	%	218,874	7.24	12.06	-1.34	6.29	16.12
Sales Growth	%	218,874	4.55	23.55	-17.04	2.33	25.51

Panel B: Bank-Level Variables

	Unit	Observation	Mean	SD	P10	P50	P90
Bank Connections	Integer	2,350	173.41	339.17	0.00	23.00	587.50
Bonds Underwritten	$B	2,350	16.82	41.13	0.00	2.15	49.16
Loans Conceded	$B	2,350	87.85	88.82	6.13	58.68	217.27
Transactions Intermediated	$B	2,350	56.33	105.70	0.00	3.19	243.55
Total Assets	$B	2,350	565.13	711.42	45.13	260.78	1722.04
Deposits/Assets	%	2,350	62.14	11.26	47.92	64.24	73.62
Loans/Assets	%	2,350	50.08	16.40	26.49	53.88	67.10
Book Equity	%	2,350	7.59	2.53	4.37	7.60	11.05
Market Equity	%	2,350	11.14	8.07	0.14	10.97	21.15

Table 2: Firms' Connections and Firms' Access to the Bond Market

In this table we report estimates of the model

$$Y_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

In both panels, Y_{it} is either an indicator with value 1 for firms that issue a bond at date t in columns (1) and (3), or the amount of outstanding bonds over total assets in columns (2) and (4). X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. α_i and α_t are issuer and year-quarter fixed effects. *Firm Connections* in Panel A counts the number of mutual funds connections that firms have through their banks. In Panel B we employ a difference-in-differences analysis, using as shock the 2003 trading scandal (see e.g., Anton and Polk (2014)). *Scandal Connections* × *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. We restrict the sample to 2 years before and 2 years after the trading scandal. In Panel B we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. In Panel A, we adjust for serial correlation by clustering standard errors at the issuer and year-quarter level. In Panel B, we adjust for serial correlation by clustering standard errors at the issuer level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

Panel A: Baseline Regression

	Bond Probability		Outstanding Bonds/AT	
	(1)	(2)	(3)	(4)
Firm Connections	0.144***	0.110***	0.018***	0.021***
	(8.35)	(7.85)	(8.09)	(6.47)
Controls	Y	Y	Y	Y
Industry x Time FE	Y		Y	
Time FE		Y		Y
Issuer FE		Y		Y
Observations	218,874	218,874	218,874	218,874
Adjusted R^2	0.099	0.139	0.925	0.927

Panel B: DiD Mutual Fund Scandal

	Bond Probability		Outstanding Bonds/AT	
	(1)	(2)	(3)	(4)
Scandal Connections × Post	-2.090***	-2.273***	-0.216***	-0.198**
	(-5.79)	(-5.68)	(-3.60)	(-2.50)
Controls	Y	Y	Y	Y
Industry x Time FE	Y		Y	
Time FE		Y		Y
Issuer FE		Y		Y
Observations	44,565	44,565	44,565	44,565
Adjusted R^2	0.103	0.172	0.919	0.925

Table 3: Firms' Choice of Banks and Banks' Connections: IV Analysis

In this table we report estimates of the model

$$\begin{aligned} Bond\ Issuance_{ijt} = \alpha_{it} + \alpha_j + \beta_1 Bank\ Client_{ijt} + \beta_2 Bank\ Connections_{jt} \\ + \beta_3 Bank\ Client_{ijt} \times Bank\ Connections_{jt} + \epsilon_{ijt} \end{aligned}$$

Bond Issuance in the first two columns is an indicator with value 1 for firm-underwriter pairs in which firm i issues a bond using bank j as underwriter at date t. *Bond Issuance* in the last two columns measure the dollar value (in $M) of the bond that firm i issues using bank j as underwriter at date t as a fraction of firm i lagged total assets. *Bank Client* is a dummy variable for firm-underwriter pairs in which the firm has either at least one loan outstanding or issued at least one bond with the bank during the past five years. In Panel B and C we report results of an IV estimation where we instrument *Bank Client* in both the level and interaction term with *Pre-1996 Client*, an indicator that takes value 1 if a firm and a bank were connected before the final repeal of the Glass-Steagal Act in the third quarter of 1996, and the bank was forbidden to engage in corporate bond underwriting before 1996. *Bank Connections* is a variable that counts the number of fund connections of the underwriters in our sample. α_{it} and α_j are issuer $\times$ time and underwriter fixed effects, respectively. Panel A reports OLS results. Panel B shows first-stage results, while Panel C reports the second-stage. In Panel B and C the sample ends in 2007, 10 years after the repeal of the Glass-Steagal Act. We adjust for serial correlation by clustering standard errors at the issuer and time level, t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. A complete list of definitions for these variables is provided in the Data appendix.

Panel A: OLS

	Bond Probability		Bond Issuance Size/AT	
	(1)	(2)	(3)	(4)
Bank Client × Bank Connections	0.011***	0.012***	0.001***	0.001***
	(5.37)	(6.10)	(5.73)	(6.62)
Bank Client	-23.682**	-19.879**	-0.851**	-0.673*
	(-2.58)	(-2.26)	(-2.17)	(-1.84)
Bank Connections	0.001*		0.000**	
	(2.03)		(2.40)	
Bank FE	Y		Y	
Issuer x Time FE	Y	Y	Y	Y
Bank x Time FE		Y		Y
Observations	1,023,407	1,023,407	1,023,407	1,023,407
Adjusted R^2	0.235	0.243	0.193	0.200

Table 3 continued from previous page

Panel B: First Stage

	Firm Client (1)	Firm Client x Bank Conn. (2)	Firm Client (3)	Firm Client x Bank Conn. (4)
Pre-1997 Client	0.199***	-3.488	0.212***	-2.381
	(22.93)	(-1.60)	(12.64)	(-1.45)
Pre-1997 Client x Bank Connections	0.001	0.141***	-0.001	0.115***
	(0.63)	(6.51)	(-1.21)	(5.33)
Underwriter	Y	Y		
Issuer x Time FE	Y	Y	Y	Y
Underwriter x Time FE			Y	Y
Observations	979,988	979,988	979,988	979,988
$F-$statistics	110.98	26.13	118.19	15.84

Panel B: Second Stage

	Bond Probability		Bond Issuance Size/AT	
	(1)	(2)	(3)	(4)
Bank Client x Bank Connections	0.135***	0.124***	0.007***	0.007***
	(4.96)	(3.88)	(4.73)	(3.91)
Bank Client	3.629**	3.660**	0.175***	0.168***
	(2.52)	(2.63)	(3.01)	(3.05)
Bank Connections	-0.017*		-0.001	
	(-1.72)		(-0.95)	
Underwriter FE	Y		Y	Y
Issuer x Time FE	Y	Y	Y	
Underwriter x Time FE		Y		Y
Observations	979,988	979,988	979,988	979,988

Table 4: Firms' Connections and Firms' Bond Financing Costs

In this table we report estimates of the model

$$Yield\ Spread_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it} \quad (11)$$

In columns (1) and (2), *Yield Spread* is the value weighted average secondary market yield spread on outstanding corporate bonds of firm i in quarter t. In columns (3) and (4), *Yield Spread* is the value weighted average offering yield spread on corporate bonds of firm i offered in quarter t. In columns (1) and (3), *Firm Connections* counts the number of mutual funds connections that firms have through their underwriters. In columns (2) and (4), *Scandal Connections* × *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. In columns (2) and (4), we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. In columns (1) and (2) we also control for the lagged average time to maturity and rating of outstanding bonds. α_i and α_t are issuer and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the issuer and year-quarter level in columns (1)-(2) and issuer level in columns (3)-(4). t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. A complete list of definitions for these variables is provided in the Data appendix.

	Secondary Market Yield Spread		Offering Yield Spread	
	Baseline Regression	2003 Scandal	Baseline Regression	2003 Scandal
Firm Connections	-0.048*		-0.029**	
	(-1.90)		(-2.010)	
Scandal Connections × Post		0.660**		1.179**
		(2.29)		(2.20)
Controls	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	50,453	6,020	6,524	1,227
Adjusted R^2	0.727	0.856	0.812	0.827

Table 5: Banks' Connections and Asset Managers' Portfolio Choices

In Panel A of this table we report estimates of the model

$$Holding\ Probability_{fit} = \alpha_{ft} + \alpha_i + \beta Connected\ AM_{fit} + \epsilon_{fit}$$

The dependent variable is an indicator that takes value 1 if asset manager f holds the newly issued bond i in its portfolio in the month of the issuance. *Connected Asset Manager* is an indicator variable with value 1 if the issue i underwriter is among the top 10 dealers of asset manager f in the previous 5 years. α_{ft} and α_i are fund families' × time and issue fixed effects, respectively. In Panel B, we report estimates of the model

$$\begin{aligned} Connected\ AM\ Investment_{it} = \alpha_t + \alpha_i + \gamma X_{it-1} \\ \beta N\ Connected\ AM_{it} + \epsilon_{it} \end{aligned}$$

The dependent variable measures the percentage of the newly issued bond i in the portfolio of asset managers connected to the issue's underwriters. *N Connected AM* counts the number of asset managers that are connected to issue i underwriters. α_t and α_i are time and issue fixed effects, respectively. X_{it-1} includes the following control variables: Index Bond, Bond Rating, Offering Amount, Bond Maturity, Total Asset Managers Investments. We focus on bond offerings that occurs between January 2003 and December 2017. We adjust for serial correlation by clustering standard errors at the asset manager and year-quarter level, t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. A complete list of definitions for these variables is provided in the Data appendix.

Panel A: Holding Probability

	(1)	(2)	(3)
Connected AM	604.591***	184.184***	61.587***
	(9.12)	(8.90)	(5.17)
Asset Manager × Time FE		X	X
Issue FE			X
Observations	3,763,456	3,763,456	3,763,456
Adjusted r^2	0.021	0.151	0.190

Panel B: Connected AM Investment

	(1)	(2)	(3)
N Connected AM	37.742***	32.845***	32.188***
	(13.30)	(9.71)	(11.15)
Time FE	X	X	X
Issuer FE		X	X
Observations	18,457	18,457	18,457
Adjusted r^2	0.282	0.426	0.775

Table 6: Demand Uncertainty Sample Splits - Disagreement in Stock Holdings

In this table we report estimates of the model

$$Y_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

for a sample split in low (simple) and high (complex) demand uncertainty based on the quarterly median. Demand uncertainty is captured by measuring the dispersion in fund managers' beliefs about future stock returns based on their active holdings (see Jiang and Sun (2014)). In both panels, Y_{it} is either an indicator with value 1 for firms that issue a bond at date t in columns (1) and (3), or the amount of outstanding bonds over total assets in columns (2) and (4). X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. α_i and α_t are issuer and year-quarter fixed effects. *Firm Connections* in Panel A counts the number of mutual funds connections that firms have through their banks. In Panel B we employ a difference-in-differences analysis, using as shock the 2003 trading scandal (see e.g., Anton and Polk (2014)). *Scandal Connections* $\times$ *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. We restrict the sample to 2 years before and 2 years after the trading scandal. In Panel A, we adjust for serial correlation by clustering standard errors at the issuer and year-quarter level. In Panel B, we adjust for serial correlation by clustering standard errors at the issuer level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

Panel A: Baseline Regression

	Simple		Complex	
	Bond Probability	Outstanding Bonds/AT	Bond Probability	Outstanding Bonds/AT
Firm Connections	0.014	0.006	0.172***	0.029***
	(1.00)	(1.25)	(5.69)	(4.96)
Controls	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Observations	87,560	87,560	87,559	87,559
Adjusted R^2	0.100	0.922	0.138	0.933

Panel B: DiD Mutual Fund Scandal

	Simple		Complex	
	Bond Probability	Outstanding Bonds/AT	Bond Probability	Outstanding Bonds/AT
Scandal Connections $\times$ Post	-1.007*	-0.160	-3.767***	-0.257**
	(-1.83)	(-1.24)	(-5.21)	(-2.15)
Controls	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Observations	17,342	17,342	17,718	17,718
Adjusted R^2	0.127	0.926	0.188	0.933

Table 7: Firms' Connections and Firms' Access to the Bond Market - First Issuance

In this table we report estimates of the model

$$Bond\ Probability_{it} = \alpha_{ind,t} + \beta Firm\ Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

$Bond\ Probability_{it}$ an a dummy for firms that issue a bond at date t. In the first two columns we report the results of a logistic regression, whereas in last two we use OLS. In columns (1) and (3), *Firm Connections* counts the number of mutual funds connections that firms have through their underwriters. In columns (2) and (4), *Scandal Connections* $\times$ *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. In columns (2) and (4) we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. $\alpha_{ind,t}$ are industry-time fixed effects. In the logit model, we follow Fee et al. (2017) and apply firm age fixed effects. The sample only includes firms up to their first bond issuance. In the baseline regression adjust for serial correlation by clustering standard errors at the issuer and year-quarter level. In DiD around the 2003 mutual fund scandal, we adjust for serial correlation by clustering standard errors at the issuer level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

	Logit		OLS	
	Baseline Regression	2003 Scandal	Baseline Regression	2003 Scandal
Firm Connections	0.054***		0.043***	
	(5.95)		(6.40)	
Scandal Connections $\times$ Post		-0.683***		-0.536**
		(-2.95)		(-2.50)
Controls	Y	Y	Y	Y
Firm Age FE	Y	y	Y	Y
Industry x Time FE	Y	y	Y	Y
Observations	135,013	28,465	135,013	28,465
Adjusted R^2	0.068	0.111	0.013	0.018

Table 8: Banks' Connections and Asset Managers' Portfolio Choices - First Issuance

In Panel A of this table we report estimates of the model

$$Holding\ Probability_{fit} = \alpha_{ft} + \alpha_i + \beta Connected\ AM_{fit} + \epsilon_{fit}$$

The dependent variable is an indicator that takes value 1 if asset manager f holds the newly issued bond i in its portfolio in the month of the issuance. *Connected AM* is an indicator variable with value 1 if the issue i underwriter is among the top 10 dealers of asset manager f in the previous 5 years. α_{ft} and α_i are fund families' × time and issue fixed effects, respectively. In Panel B, we report estimates of the model

$$Connected\ AM\ Investment_{it} = \alpha_t + \alpha_i + \gamma X_{it-1}$$
$$\beta N\ Connected\ AM_{it} + \epsilon_{it}$$

The dependent variable measures the fraction of the newly issued bond i in the portfolio of asset managers connected to the issue's underwriters. *N Connected AM* counts the number of asset managers that are connected to issue i underwriters. α_t and α_i are time and issue fixed effects, respectively. X_{it-1} includes the following control variables: Index Bond, Bond Rating, Offering Amount, Bond Maturity, Total Asset Managers Investments. We focus on bond offerings that that occur between January 2003 and December 2017. We adjust for serial correlation by clustering standard errors at the asset manager and year-quarter level, t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. A complete list of definitions for these variables is provided in the Data appendix.

Panel A: Holding Probability

	(1)	(2)	(3)
Connected AM	614.730***	275.714***	141.098***
	(10.23)	(6.08)	(4.64)
Asset Manager × Time FE		X	X
Issue FE			X
Observations	148,412	146,770	146,770
Adjusted r^2	0.021	0.157	0.190

Panel B: Connected AM Investment

	(1)	(2)	(3)
N Connected AM	46.354***	18.439***	17.373**
	(6.73)	(4.72)	(2.23)
Time FE	X	X	X
Issuer FE		X	X
Observations	738	738	738
Adjusted r^2	0.334	0.392	0.776

Table 9: Firms' Connections and Firms' Investment Policies

In this table we report estimates of the model

$$Y_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

Y is one of the following variables: log of total assets; long-term investments over assets; short-term investments over assets; intangibles over assets; tangibles over assets; net working capital over assets; cash over assets. In Panel A, *Firm Connections* counts the number of mutual funds connections that firms have through their underwriters. In Panel B, *Scandal Connections* × *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. In Panel B, we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. α_i and α_t are issuer and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the issuer and year-quarter level in Panel A and issuer level in Panel B. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

Panel A: Baseline Regression

	Size (log)	Long-Term	Short-Term	Intangibles	Tangibles	NWC	Cash
Firm Connections	0.020***	0.245***	-0.227***	0.439***	0.004	-0.006	-0.196***
	(9.56)	(7.93)	(-7.29)	(11.36)	(1.04)	(-0.23)	(-6.28)
Controls	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y	Y	Y	Y
Observations	214,080	214,080	214,080	214,080	214,080	214,080	214,080
Adjusted R^2	0.948	0.880	0.869	0.753	0.984	0.759	0.719

Panel B: DiD Mutual Fund Scandal

	Size (log)	Long-Term	Short-Term	Intangibles	Tangibles	NWC	Cash
Scandal Connections × Post	-0.094***	-1.453***	1.661***	-1.588***	-0.121	0.130	1.178***
	(-7.55)	(-4.76)	(5.50)	(-5.42)	(-1.31)	(0.51)	(4.07)
Controls	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y	Y	Y	Y
Observations	43,605	43,605	43,605	43,605	43,605	43,605	43,605
Adjusted R^2	0.987	0.940	0.936	0.887	0.983	0.851	0.869

Data appendix: Variable definitions

Variable	Definition
Connection Variables	
Bank Connections	Number of bond funds connected to a bank. We consider a bank and a bond fund connected if the bank's broker-dealer is within the top 10 entities with whom the fund's asset manager did the largest amount of portfolio transactions in the previous five years. We only counts funds whose investment mandate indicates they may hold U.S. corporate bonds, selecting fixed income corporate funds, either domestic or international (codes IC and IF), as well as mixed fixed income and equity funds (codes M and MT).
Firm Connections	Defined as the sum of bank connections across all banks that have a business relationship with the firm. We define a firm-bank pair as having a business relationship if the firm has issued at least one bond using the bank as an underwriter or if the bank has extended at least one loan to the firm in the past five years.
Scandal Connections	Number of firm connections that are affected by the 2003 trading scandal. We define a connection to be affected if the asset manager of the fund is in the list of 18 treated asset managers reported by Falato et al. (2021).
Firm Connections (Table IA3)	Defined as the dollar sum of connected funds total net assets (TNA) at the firm level. A fund and a firm are connected if the broker-dealer of one of the banks that have a business relationship with the firm is within the top 10 entities with whom the fund's asset manager did the largest amount of portfolio transactions in the previous five years. We define a firm-bank pair as having a business relationship if the firm has issued at least one bond using the bank as an underwriter or if the bank has extended at least one loan to the firm in the past five years.
Firm Connections (Table IA4)	Defined as the weighted sum of bank connections across all banks that have a business relationship with the firm. For each bank-fund pair, the weight is the fraction of total transactions made by the fund in a reporting period with a bank's dealer. We define a firm-bank pair as having a business relationship if the firm has issued at least one bond using the bank as an underwriter or if the bank has extended at least one loan to the firm in the past five years.
Dependent Variables	
Bond Probability	Defined as an indicator variable coded as 1 for firms that issue a bond in a given quarter.
Outstanding Bonds/AT	Defined as the ratio of a firm's outstanding bonds over the firm's lagged total assets.
Bond Issuance Size/AT	Defined as the ratio of a firm's bond issuance size over the firm's lagged total assets.
Secondary Market Yield Spread	Defined as the value-weighted average secondary market yield spread on outstanding corporate bonds of a firm in a given quarter. For each bond, we select the last available yield in a quarter.
Offering Yield Spread	Defined as the value-weighted average offering yield spread on newly issued corporate bonds of a firm in a given quarter.
Holding Probability	Defined as an indicator variable that takes value 1 if an asset manager has the newly issued bond of the firm in its portfolio in the month of the issue.

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Variable	Definition
Connected AM Investment	Defined as the percentage of a bond offering dollar amount held at issuance by fund managers connected with at least one of the issue's underwriters.
Loan Probability	Defined as an indicator variable coded as 1 for firms that obtain a loan in a given quarter.
Outstanding Loans/AT	Defined as the ratio of a firm's outstanding loans over the firm's lagged total assets.
Gross Spread	Defined as the value weighted average gross spread of corporate bonds issued by a firm in a given quarter. Gross spread is defined as the difference between the price that the issuer receives for its securities and the price that investors pay for them.
Selling Concession	Defined as the value weighted average selling concession of corporate bonds issued by a firm in a given quarter. Selling concession is defined as the portion of the gross spread paid to other securities dealers in the offering syndicate for reselling the issue for the underwriter.
Underwriting Fee	Defined as the value weighted average underwriting fee of corporate bonds issued by a firm in a given quarter. Underwriting fee is defined as the difference between gross spread and selling concession.
Bond Maturity	Defined as the value weighted average maturity of corporate bonds issued by a firm in a given quarter.
Issuance Size	Defined as the cumulative size of corporate bonds issued by a firm in a given quarter.
Control Variables	
Size	Defined as a firm total asset value.
Market-to-Book	Number of individual political candidates to which the fund managers made at least one donation. Aggregated over the election cycle.
Asset Tangibility	Number of individual political candidates that won the elections to which the fund managers made at least one donation. Aggregated over the election cycle.
ROA	Euclidean distance between the average political views of the fund managers and the average political views of the fund holdings.
Sales Growth	Fraction of fund holdings invested in politically aligned stocks (Wintoki and Xi (2018)).
Short Term Debt/AT	Natural logarithm of TNA (total net assets) under management (in US $m).
Book Leverage	The ratio of a firm's total debt (long-term debt plus short-term debt) over the firm's total asset value.
Bond Fire Sales	Fraction of a firm's bonds outstanding value sold in aggregate by the mutual fund industry.
Bond Rating	Average credit rating among outstanding bonds of a firm.
Time to Maturity	Average time to maturity among outstanding bonds of a firm.

Internet Appendix for
"Is Bond Financing Disintermediated? The Role of Bank Trading Networks"

by Giorgio Ottonello, Emanuele Rizzo, and Rafael Zambrana

Table IA1: Yearly Statistics

This table reports yearly statistics for our sample. A complete list of definitions for these variables is provided in the Data appendix.

Year	N. Banks	N. Firms	N. Asset Managers	N. Bond Funds	Total TNA ($B)
1995	22	2,569	17	20	41
1996	20	3,032	29	39	60
1997	23	3,281	124	202	162
1998	23	3,342	140	286	213
1999	24	3,305	162	327	230
2000	24	3,247	178	363	263
2001	24	3,120	195	445	292
2002	30	2,942	200	488	307
2003	29	2,883	244	783	951
2004	28	2,833	255	897	967
2005	27	2,803	247	929	1,148
2006	28	2,780	238	1,008	1,370
2007	28	2,725	279	1,315	1,905
2008	29	2,604	293	1,648	1,555
2009	27	2,465	295	1,837	2,012
2010	27	2,405	323	1,692	2,313
2011	28	2,377	344	1,815	2,445
2012	29	2,315	372	1,911	2,749
2013	28	2,267	389	1,971	3,076
2014	29	2,243	397	2,054	3,219
2015	29	2,227	407	2,139	3,142
2016	29	2,104	398	2,149	3,265
2017	29	2,006	398	2,169	3,478
Total	44	5,591	509	4,794	

Table IA2: Statistics by Quartiles of Connections

In Panel A of this table we study the relationship between firms' connections to the mutual fund industry and a set of characteristics of the firm. We first divide our sample of firm-dates (year-quarter) into quartiles of *Firm Connections*, which is a variable that counts the number of mutual funds connections that firms have through their banks. Next we report the average of each firm characteristics for each of the resulting quartiles. We adjust for serial correlation by clustering standard errors at the firm level. In Panel B, we perform a similar analysis to study bank characteristics by quartiles of bank connections to the mutual fund industry. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. A complete list of definitions for these variables is provided in the Data appendix.

Panel A: Firm-Level Variables

	Unit	Observations	Low	High	High-Low
Bond Probability	Integer	218,874	0.446	10.997	10.551***
Outstanding Bonds/AT	%	218,874	0.987	15.760	14.773***
Secondary Market Yield Spread	%	49,681	5.877	2.853	-3.024***
Offering Yield Spread	%	6,524	8.155	5.754	-3.353***
Leverage	%	218,874	13.900	30.150	16.250***
Loan Probability	%	218,874	5.706	16.121	4.709***
Total Assets	$B	218,874	1.277	16.512	15.235***
Book-to-Market	%	218,874	62.421	55.137	-7.284***
Asset Tangibility	%	218,874	27.896	37.135	9.239***
Profitability	%	218,874	5.059	9.856	4.797***
Sales Growth	%	218,874	5.667	3.863	-1.804***

Panel B: Bank-Level Variables

	Unit	Observations	Low	High	High-Low
Bonds Underwritten	Integer	2,350	3.565	79.652	76.087***
Bonds Size	$B	2,350	1.826	59.769	57.943***
Loans Conceded	Integer	2,350	64.229	235.068	170.839***
Loans Size	$B	2,350	46.161	183.917	137.756***
Securities Transactions	$B	2,350	2.376	199.574	197.198***
Total Assets	$B	2,350	308.226	1231.248	923.022***
Deposits/Assets	%	2,350	64.970	50.866	-10.104***
Loans/Assets	%	2,350	57.032	36.439	-20.593***
Book Equity	%	2,350	7.534	6.829	-0.705
Market Equity	%	2,350	10.920	8.830	-2.090

Table IA3: Firms' Mutual Funds Connections and Firms' Access to the Bond Market - Measuring Connections Using Funds' TNA

In this table we report estimates of the model

$$\textit{Bond Issuance}_{it} = \alpha_i + \alpha_t + \beta \textit{Connections}_{it} + \gamma X_{it-1} + \epsilon_{it}$$

In columns (1) and (3), *Bond Issuance* is an indicator with value 1 for firms that issue a bond at date t. In columns (2) and (4) we use the amount of outstanding bonds over total assets. In columns (1) and (2), *Firm Connections* measures the total TNA managed by the mutual funds connections that firms have through their underwriters. In columns (3) and (4), *Scandal Connections* $\times$ *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. *Firm Connections* and *Scandal Connections* are constructed as a weighted sum of the mutual funds connections that firms have through their banks. We use as weights the fraction of total transactions made by a fund in a reporting period with a given dealer. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. In columns (3) and (4), we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. α_i and α_t are issuer and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the issuer and year-quarter level in columns (1)-(2) and issuer level in columns (3)-(4). t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

	Baseline Regression		2003 Scandal	
	Bond Probability	Outstanding Bonds/AT	Bond Probability	Outstanding Bonds/AT
Firm Connections	0.333***	0.053***		
	(4.64)	(4.84)		
Scandal Connections × Post			-7.868***	-0.596*
			(-5.43)	(-1.95)
Controls	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	218,874	218,874	44,565	44,565
Adjusted R^2	0.139	0.927	0.171	0.925

Table IA4: Firms' Connections and Firms' Access to the Bond Market - Measuring Connections Using Fund-Dealer Transactions

In this table we report estimates of the model

$$Bond\ Issuance_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

In columns (1) and (3), *Bond Issuance* is an indicator with value 1 for firms that issue a bond at date t. In columns (2) and (4) we use the amount of outstanding bonds over total assets. In columns (1) and (2), *Firm Connections* counts the number of mutual funds connections that firms have through their underwriters. In columns (3) and (4), *Scandal Connections* $\times$ *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. *Firm Connections* and *Scandal Connections* are constructed as a weighted sum of the mutual funds connections that firms have through their banks. We use as weights the fraction of total transactions made by a fund in a reporting period with a given dealer. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. In columns (3) and (4), we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. α_i and α_t are issuer and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the issuer and year-quarter level in columns (1)-(2) and issuer level in columns (3)-(4). t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

	Baseline Regression		2003 Scandal	
	Bond Probability	Outstanding Bonds/AT	Bond Probability	Outstanding Bonds/AT
Firm Connections	0.222***	0.040***		
	(5.63)	(7.63)		
Scandal Connections × Post			-4.090***	-0.224***
			(-6.98)	(-3.45)
Controls	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	218,874	218,874	44,565	44,565
Adjusted R^2	0.139	0.927	0.175	0.925

Table IA5: Firms' Connections and Firms' Access to the Bond Market - Standardized Firm Connections

In this table we report estimates of the model

$$Bond\ Issuance_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

In columns (1) and (3), *Bond Issuance* is an indicator with value 1 for firms that issue a bond at date t. In columns (2) and (4) we use the amount of outstanding bonds over total assets. In columns (1) and (2), *Firm Connections* counts the number of mutual funds connections that firms have through their underwriters. In columns (3) and (4), *Scandal Connections* $\times$ *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. We standardize the variable *Firm Connections* and *Scandal Connections* within each cross section of firms. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. In columns (3) and (4), we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. α_i and α_t are issuer and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the issuer and year-quarter level in columns (1)-(2) and issuer level in columns (3)-(4). t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

	Baseline Regression		2003 Scandal	
	Bond Probability	Outstanding Bonds/AT	Bond Probability	Outstanding Bonds/AT
Firm Connections	40.615***	5.869***		
	(5.46)	(3.89)		
Scandal Connections × Post			-2.273***	-0.198**
			(-5.68)	(-2.50)
Controls	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	218,874	218,874	44,565	44,565
Adjusted R^2	0.139	0.927	0.172	0.925

Table IA6: Firms' Choice of Banks and Banks' Connections: IV Analysis II

In this table we report estimates of the model

$$\begin{aligned} Bond\ Issuance_{ijt} = {} & \alpha_{it} + \alpha_j + \beta_1 Bank\ Client_{ijt} + \beta_2 Bank\ Connections_{jt} + Bank\ Size_{jt} \\ & + Bank\ ROA_{jt} + \beta_3 Bank\ Client_{ijt} \times Bank\ Connections_{jt} \\ & + \beta_3 Bank\ Client_{ijt} \times Bank\ Size_{jt} \\ & + \beta_3 Bank\ Client_{ijt} \times Bank\ ROA_{jt} + \epsilon_{ijt} \end{aligned}$$

Bond Issuance in the first two columns is an indicator with value 1 for firm-underwriter pairs in which firm i issues a bond using bank j as underwriter at date t. *Bond Issuance* in the last two columns measure the dollar value (in \$M) of the bond that firm i issues using bank j as underwriter at date t as a fraction of firm i lagged total assets. *Bank Client* is a dummy variable for firm-underwriter pairs in which the firm has either at least one loan outstanding or issued at least one bond with the bank during the past five years. In Panel B and C we report results of an IV estimation where we instrument *Bank Client* in both the level and interaction term with *Pre-1996 Client*, an indicator that takes value 1 if a firm and a bank were connected before the final repeal of the Glass-Steagal Act in the third quarter of 1996, and the bank was forbidden to engage in corporate bond underwriting before 1996. *Bank Connections* is a variable that counts the number of fund connections of the underwriters in our sample. α_{it} and α_j are issuer × time and underwriter fixed effects, respectively. Panel A reports OLS results. Panel B shows first-stage results, while Panel C reports the second-stage. In Panel B and C the sample ends in 2007, 10 years after the repeal of the Glass-Steagal Act. We adjust for serial correlation by clustering standard errors at the issuer and time level, t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. A complete list of definitions for these variables is provided in the Data appendix.

Panel A: OLS

	Bond Probability		Bond Issuance Size/AT	
	(1)	(2)	(3)	(4)
Bank Client × Bank Connections	0.011***	0.012***	0.000***	0.001***
	(5.37)	(6.10)	(5.73)	(6.62)
Bank Client × Bank Size	2.963***	2.639***	0.109***	0.094***
	(4.12)	(3.86)	(3.51)	(3.29)
Bank Client × Bank ROA	-1.018***	-1.999***	-0.034***	-0.034***
	(-4.18)	(-3.98)	(-3.36)	(-3.27)
Bank Client	-23.682**	-19.879**	-0.851**	-0.673*
	(-2.58)	(-2.26)	(-2.17)	(-1.84)
Bank Connections	0.001*		0.000**	
	(2.03)		(2.40)	
Bank Size	0.517*		0.029*	
	(1.76)		(1.92)	
Bank ROA	0.051**		0.002**	
	(2.52)		(2.37)	
Bank FE	Y		Y	
Issuer x Time FE	Y	Y	Y	Y
Bank x Time FE		Y		Y
Observations	1,023,407	1,023,407	1,023,407	1,023,407
Adjusted R^2	0.235	0.243	0.193	0.200

Panel B: IV

	Bond Probability		Bond Issuance Size/AT	
	(1)	(2)	(3)	(4)
Bank Client x Bank Connections	0.151***	0.091***	0.008***	0.005***
	(4.29)	(4.29)	(4.00)	(4.16)
Bank Client x Bank Size	1.298	1.070	0.100**	0.087
	(1.10)	(0.85)	(2.01)	(1.64)
Bank Client x Bank ROA	-0.563	-0.607*	-0.021	-0.023
	(-1.62)	(-1.68)	(-1.36)	(-1.50)
Bank Client	-8.999	-5.107	-0.920	-0.718
	(-0.63)	(-0.33)	(-1.55)	(-1.14)
Bank Connections	-0.036*		-0.002	
	(-1.73)		(-0.40)	
Bank Size	0.097		0.003	
	(0.52)		(0.36)	
Bank ROA	0.002		0.005	
	(0.07)		(0.37)	
Bank FE	Y		Y	Y
Issuer x Time FE	Y	Y	Y	
Bank x Time FE		Y		Y
Observations	606,330	606,330	606,330	606,330

Table IA7: Firms' Connections and Firms' Leverage

In this table we report estimates of the model

$$Leverage_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

Leverage is computed as the sum of long-term and short-term debt over total asset (Book Leverage) or as the sum of long-term and short-term debt over stock market capitalization (Market Leverage). In columns (1) and (2), *Firm Connections* counts the number of mutual funds connections that firms have through their underwriters. In columns (3) and (4), *Scandal Connections* $\times$ *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. In columns (3) and (4), we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. α_i and α_t are issuer and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the issuer and year-quarter level in columns (1)-(2) and issuer level in columns (3)-(4). t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

	Baseline Regression		2003 Scandal	
	Book Leverage	Market Leverage	Book Leverage	Market Leverage
Firm Connections	0.021***	0.057**	-0.090*	-0.040
	(2.85)	(2.12)	(-1.93)	(-0.52)
Scandal Connections			-0.475***	-1.789***
			(-2.77)	(-6.13)
Controls	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Observations	218,874	218,874	44,565	44,565
Adjusted R^2	0.861	0.817	0.871	0.889

Table IA8: Firms' Connections and Firms' Loan Issuance

In this table we report estimates of the model

$$Loan\ Issuance_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

In columns (1) and (3), *Loan Issuance* is an indicator with value 1 for firms that issue a bond at date t. In columns (2) and (4) we use the amount of outstanding bonds over total assets. In columns (1) and (2), *Firm Connections* counts the number of mutual funds connections that firms have through their underwriters. In columns (3) and (4), *Scandal Connections* $\times$ *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. In columns (3) and (4), we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. α_i and α_t are issuer and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the issuer and year-quarter level in columns (1)-(2) and issuer level in columns (3)-(4). t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

	Baseline Regression		2003 Scandal	
	Loan Probability	Outstanding Loans/AT	Loan Probability	Outstanding Loans/AT
Firm Connections	0.033	-0.021***		
	(0.93)	(-6.47)		
Scandal Connections $\times$ Post			1.894***	0.198**
			(3.39)	(2.50)
Controls	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	218,874	218,874	44,565	44,565
Adjusted R^2	0.042	0.927	0.048	0.925

Table IA9: Bank Sample

In this table we list the banks in our sample, as well as those that became universal after the repeal of the Glass-Stegal Act in August 1996. The latter information is taken from Table 1 of Neuhann and Saidi (2018).

Banks in Our Sample	Universal Banks post Glass-Steagal Repeal
ABN AMRO	
BANC ONE	
BANCO SANTANDER	
BANK OF AMERICA	
BANK OF NEW YORK	YES
BANK OF NOVA SCOTIA	
BARCLAYS	
BBVA	
BB&T	YES
BMO CAPITAL	
BNP PARIBAS	
CHASE MANHATTAN BANK	
CIBC OPPENHEIMER	
CITIGROUP	YES
CREDIT SUISSE	
DEUTSCHE BANK	
JP MORGAN	
FIFTH THIRD BANK	
FIRST CHICAGO BANK	
FLEETBOSTON	
GOLDMAN SACHS	
HSBC	
HUNTINGTON NATIONAL BANK	
KEYBANC	YES
LEHMAN BROTHERS	
LLOYDS TSB BANK	
MELLON BANK	
MERRILL LYNCH	
MIZUHO INTERNATIONAL	
MORGAN STANLEY	
NATWEST SECURITIES	
NORTHERN TRUST CORP	
PNC CAPITAL	
RBC CAPITAL MARKETS	
SMBC NIKKO	
STATE STREET BANK	
SUNTRUST	
TD SECURITIES	
TOKYO MITSUBISHI INTERNATIONAL	
UBS	
US BANCORP	YES
WACHOVIA	YES
WELLS FARGO	YES
WESTPAC BANKING CORP	

Table IA10: Sample Splits by Demand Uncertainty: Measure Based on Business Segments

In this table we report estimates of the model

$$Y_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

for a sample split in low (simple) and high (complex) demand uncertainty based on the quarterly median. Demand uncertainty is captured by firm complexity, measured by the number of business segments as in Cohen and Lou (2012). In both panels, Y_{it} is either an indicator with value 1 for firms that issue a bond at date t in columns (1) and (3), or the amount of outstanding bonds over total assets in columns (2) and (4). X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. α_i and α_t are issuer and year-quarter fixed effects. *Firm Connections* in Panel A counts the number of mutual funds connections that firms have through their banks. In Panel B we employ a difference-in-differences analysis, using as shock the 2003 trading scandal (see e.g., Anton and Polk (2014)). *Scandal Connections* $\times$ *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. We restrict the sample to 2 years before and 2 years after the trading scandal. In Panel A, we adjust for serial correlation by clustering standard errors at the issuer and year-quarter level. In Panel B, we adjust for serial correlation by clustering standard errors at the issuer level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

Panel A: Baseline Regression

	Simple		Complex	
	Bond Probability	Outstanding Bonds/AT	Bond Probability	Outstanding Bonds/AT
Firm Connections	0.077***	0.021***	0.155***	0.025***
	(5.33)	(4.65)	(5.70)	(3.95)
Controls	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Observations	130,756	130,756	76,933	76,933
Adjusted R^2	0.120	0.923	0.149	0.928

Panel B: DiD Mutual Fund Scandal

	Simple		Complex	
	Bond Probability	Outstanding Bonds/AT	Bond Probability	Outstanding Bonds/AT
Scandal Connections $\times$ Post	-0.997**	-0.149	-3.192***	-0.217*
	(-1.99)	(-1.36)	(-4.77)	(-1.68)
Controls	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Observations	24,601	24,601	15,424	15,424
Adjusted R^2	0.142	0.928	0.185	0.920

Table IA11: Firms' Connections and Bond Issuance Fees

In this table we report estimates of the model

$$Fees_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

In columns (1) and (2), *Gross Spread* is the value weighted average gross spread of corporate bonds of firm i offered in quarter t. In columns (3) and (4), *Selling Concession* is the value weighted average selling concession of corporate bonds of firm i offered in quarter t. In columns (5) and (6), *Underwriting Fee* is the value weighted average underwriting fee of corporate bonds of firm i offered in quarter t. In columns (1), (3), (5) *Firm Connections* counts the number of mutual funds connections that firms have through their underwriters. In columns (2), (4), (6) *Scandal Connections* × *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. In columns (2) and (4), we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. In columns (1) and (2) we also control for the lagged average time to maturity and rating of outstanding bonds. α_i and α_t are issuer and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the issuer and year-quarter level in columns (1)-(2) and issuer level in columns (3)-(4). t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. A complete list of definitions for these variables is provided in the Data appendix.

	Gross Spread		Selling Concession		Underwriting Fee	
	Baseline Regression	2003 Scandal	Baseline Regression	2003 Scandal	Baseline Regression	2003 Scandal
Firm Connections	-0.009	0.038	0.006	-0.165	-0.008	-0.665
	(-0.126)	(0.018)	(0.202)	(-0.360)	(-0.187)	(-1.432)
Scandal Connections × Post		2.856		-0.834		2.655
		(0.166)		(-0.127)		(0.263)
Controls	Y	Y	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y
Observations	4,681	673	4,692	674	4,681	673
Adjusted R^2	0.736	0.716	0.529	0.546	0.754	0.821

Table IA12: Banks' Connections and Fees

This table studies the impact of banks' connections to bond funds on the fees charged by underwriters to firms at bond issuance. A complete list of definitions for these variables is provided in the Data appendix. We report estimates of the model

$$Y_{bt} = \alpha_b + \alpha_t + \beta Bank\ Connections_{bt} + \gamma X_{bt} + \epsilon_{bt}$$

The dependent variable is the equally weighted average gross spread, selling concession, underwriting fees or the cumulative volume of the bonds underwritten by bank b in quarter t. *Bank Connections*$_{bt}$ count the number of mutual funds connections that bank b has through its dealership business. X_{it} is a set of bank-level controls that includes size, book to market, sales growth, average time to maturity, average rating of bonds underwritten by bank b in quarter t. $\alpha_b + \alpha_t$ are bank and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the time and bank level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

	Gross Spread (1)	Selling Concession (2)	Underwriting Fee (3)	Underwriting Volume (4)
Bank Connections	0.108	0.011	0.096	40.884***
	(1.37)	(0.38)	(1.32)	(3.23)
Controls	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Bank FE	Y	Y	Y	Y
Observations	1,747	1,747	1,747	1,747
Adjusted R^2	0.3235	0.2039	0.2856	0.4278

Table IA13: Firms' Connections and Bond Issuance Characteristics

In this table we report estimates of the model

$$Char_{it} = \alpha_i + \alpha_t + \beta Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

In columns (1) and (2), *Char* is the value weighted average maturity on corporate bonds of firm i offered in quarter t. In columns (3) and (4), *Char* is the cumulative size of corporate bonds of firm i offered in quarter t. In columns (1) and (3), *Firm Connections* counts the number of mutual funds connections that firms have through their underwriters. In columns (2) and (4), *Scandal Connections* $\times$ *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets, total debt over total assets and average bond issuance rating. In columns (2) and (4), we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. α_i and α_t are issuer and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the issuer and year-quarter level in columns (1)-(2) and issuer level in columns (3)-(4). t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. A complete list of definitions for these variables is provided in the Data appendix.

	Bond Maturity		Issuance Size	
	Baseline Regression	2003 Scandal	Baseline Regression	2003 Scandal
Firm Connections	-0.001	0.001	-0.057	0.101
	(-0.74)	(0.04)	(-0.77)	(0.39)
Scandal Connections $\times$ Post		0.025		-3.024
		(0.80)		(-1.59)
Controls	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	6,524	6,524	1,227	1,227
Adjusted R^2	0.182	0.495	0.093	0.411

Table IA14: Funds' Connections and Tracking Error

In this table we report estimates of the model

$$TE_{ft} = \alpha_f + \alpha_t + \beta Connections_{ft} + \gamma X_{ft-1} + \epsilon_{it}$$

TE is the tracking error of fund f at time t, calculated over a 12 months rolling window. *Fund Connections* counts the number of dealers the fund is connected to through secondary market trading. More specifically, a dealer is connected to a fund if it is in the among the top 10 dealers of fund f in the previous 5 years X_{ft-1} is a set of fund-level controls that includes lagged size, expense ratio, net flows, turnover, past 12-month returns. α_f and α_t are fund and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the fund-quarter level. t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. A complete list of definitions for these variables is provided in the Data appendix.

	(1)	(2)	(3)	(4)
Fund Connections	-6.459***	-4.022**	-8.301***	-1.881*
	(-3.30)	(-2.04)	(-3.38)	(-1.82)
Controls		Y	Y	Y
Fund FE			Y	Y
Time FE				Y
Observations	106,594	106,594	106,594	106,594
Adjusted R^2	0.006	0.048	0.509	0.734

Table IA15: Firms' Connections and Firms' Access to the Bond Market - The Role of Previous Bondholders

In this table we report estimates of the model

$$Bond\ Issuance_{it} = \alpha_i + \alpha_t + \beta_1\ Connections_{it} + +\beta_2 Lag\ Connections_{it} + \gamma X_{it-1} + \epsilon_{it}$$

In columns (1) and (3), *Bond Issuance* is an indicator with value 1 for firms that issue a bond at date t. In columns (2) and (4) we use the amount of outstanding bonds over total assets. In columns (1) and (2), *Firm Connections* counts the number of mutual funds connections that firms have through their underwriters. In columns (3) and (4), *Scandal Connections* $\times$ *Post* measures the number of a firm's mutual funds connections that were affected by the scandal and is zero before 2004 Q2. *Lag Connections* counts the number of mutual funds holding previously issued bonds of firm i that were affected by the scandal. X_{it-1} is a set of issuer-level controls that includes lagged total assets, market-to-book, asset tangibility, ROA, outstanding bonds over total assets, sales growth, short term debt over total assets and total debt over total assets. In columns (3) and (4), we also add controls for total number of connections and the fraction of a firm outstanding bonds sold in aggregate by mutual funds. α_i and α_t are issuer and year-quarter fixed effects, respectively. We adjust for serial correlation by clustering standard errors at the issuer and year-quarter level in columns (1)-(2) and issuer level in columns (3)-(4). t-statistics are reported in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5% level and *** denotes significance at the 1% level. Coefficients are reported in basis points. A complete list of definitions for these variables is provided in the Data appendix.

	Baseline Regression		2003 Scandal	
	Bond Probability	Outstanding Bonds/AT	Bond Probability	Outstanding Bonds/AT
Firm Connections	0.101***	0.019***		
	(7.72)	(5.82)		
Lag Connections	0.229*	0.070***		
	(1.81)	(3.74)		
Scandal Connections × Post			-1.389***	-0.155*
			(-3.56)	(-1.87)
Lag Connections			-13.830***	-0.660
			(-3.58)	(-1.59)
Controls	Y	Y	Y	Y
Issuer FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	218,874	218,874	44,565	44,565
Adjusted R^2	0.139	0.927	0.173	0.925