

Bank Board Structure and Loan Syndication

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Abstract

We study the impact of bank board structure on loan syndication and find both monitoring quality and connections of the lead bank's board have a positive effect on three measures of the ability to syndicate a larger portion of a loan. Board monitoring quality plays a more dominant role during the financial crisis and following a negative reputation shock to the lead arranger. Board member connectedness is dominant for lower reputation lead arrangers. Our results are robust to approaches that control for endogeneity. Overall, we conclude that lead arranger board quality serves as a credible signal to participant banks.

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Syndicated loans are one of the most important sources of financing for corporations in the United States (Ivashina (2009)). Loan syndications allow banks to diversify the risk of large loans across multiple financial institutions. The lead arranger in a syndicated loan is responsible for ex-ante screening and ex-post monitoring of borrowers to protect their own share of the loan as well as the investments of participant banks. However, there are two incentive problems for the lead bank: adverse selection in the screening process and a moral hazard concern from reduced incentive to monitor the borrower after the loan is sold to the participating banks. Therefore, syndicated loans create an agency conflict between the lead arranger and participant banks.

Loan syndication activities create significant fees for the lead arranger as well as for the banks which act as “agents” for the syndicate in distributing payments and maintaining documentation. The lead arranger role, however, is unique in that it confers prestige much like investment banking lead underwriters. Bloomberg maintains League Tables for syndicated loan markets much like those for investment banking: by the dollar volume of completed deals. BofA Securities led the 2020 Global Loans Mandated Arranger League Table in syndicated loans, completing \$241.7 billion in deals. In our sample, the fee for a lead arranger is typically between 25 and 50 basis points of the deal value. Taking the midpoint of 37.5 basis points as a typical fee, BofA Securities generated just short of \$1 billion in revenues from its role as lead arranger, making attracting participant lenders to loan syndicates important for lead arranger bank shareholders.

Participant lenders consider several factors in deciding to join a syndicate and face this agency conflict, including the reputation of the lead arranger (Dennis and Mullineaux (2000)), the

corporate governance of the borrowers (Chen (2014), Lin, Song, and Tian (2016), Elyasiani and Zhang (2018)), and even geographic proximity (Sufi (2007)). This paper considers whether the lead arranger's board of directors serves as a credible signal of lower agency costs to attract participant banks to the syndicate. Using a principal component analysis of seven measures of the board of directors, we find two factors: (1) board monitoring quality based on board size, independence, non-co-option, and director tenure; and (2) director connectedness based on the number of board seats as well as primary and secondary director connections. We include three measures of the ability to attract participant banks: the percent of the loan sold to participant banks, the Herfindahl concentration of the loan among all participant lenders, and the total number of lenders in the syndicate. We find that both board monitoring quality and director connectedness can mitigate this agency conflict and are positively associated with the percent of the loan sold to participant banks, the diffusion of the loan among participant banks, and the total number of participant banks. Furthermore, lead arranger board characteristics retain significance even after controlling for lead arranger reputation (Dennis and Mullineaux (2000)).

We also examine several moderating factors that affect the relationship between lead arranger boards and loan syndication activities. During the financial crisis, bank lending fell significantly due to increased risk (Ivashina and Scharfstein (2010)), and the syndicated loan market experienced significant changes (Giannetti and Laeven (2012)). During the financial crisis, lead arrangers generally retained a larger portion of each syndicated loan, and De Haas and Van Horen (2010) conclude that participant banks demanded better monitoring by lead arrangers during this period. We test the relative importance of board of director monitoring quality and

connectedness during the financial crisis and find that only bank board monitoring quality is positively associated with the fraction of the loan sold in a syndication. Director connectedness has no impact during the financial crisis, supporting the idea that participant banks interpret bank board monitoring quality as a strong signal that the lead arranger will effectively act as a delegated monitor for the syndicate members.

Secondly, we examine cases where lead arrangers receive a negative shock to their reputation following the bankruptcy of an existing borrower. Gopalan, Nanda, and Yerramilli (2011) show that a large bankruptcy of a lead arranger's existing borrowers creates a negative reputation shock. Subsequent to this shock, lead arrangers retain a larger portion of syndicated loans and have more difficulty attracting participant lenders. A bankruptcy of an existing borrower signals to potential participant lenders that screening and oversight by the lead bank may have been inadequate. Therefore, we examine whether lead arranger board monitoring quality or connectedness mitigates the reputation shock of a large bankruptcy. Consistent with Gopalan, Nanda, and Yerramilli (2011), following a bankruptcy a lower portion of a loan is sold to participant lenders. However, those lead banks with stronger board monitoring quality mitigate the negative reputation shock and sell a larger portion of the loan.

A strong reputation in the syndicated loan market, measured in several ways, allows lead arrangers to sell a larger portion of syndicated loans (Dennis and Mullineaux (2000), Gopalan, Nanda, and Yerramilli (2011)). In our main results, we show that board monitoring quality and connectedness are associated with a higher fraction of a loan sold to participant banks even after

controlling for lead arranger reputation measured by repeat business between lead arrangers and participant banks (Dennis and Mullineaux (2000)), the market share of the lead arranger in the syndicated loan market in the prior year (Sufi (2007), Chaudhry and Kleimeier (2015)), and lead arrangers with credit ratings. Highly reputable lead arrangers also help to overcome information asymmetries between borrowers and lenders, and the adverse selection problem only occurs for the least reputable lead arrangers (Chaudhry and Kleimeier (2015)). Based on these findings, the impact of the lead arranger board may depend on the lead arranger's reputation.

Therefore, we partition our loan sample into quartiles by lead arranger reputation measured by repeat business. For only the lowest reputation quartile director connectedness is associated with a larger fraction of the loan sold, suggesting that lead arranger boards may play a pivotal role in attracting participant banks when lead arrangers do not have a strong existing reputation. For all but the highest quartile of lead bank reputation, board monitoring quality has a positive effect on the portion of the loan syndicated. For the most reputable lead arrangers, however, neither board monitoring quality nor connections are associated with the percent of the loan sold. Highly reputable banks do not need the additional certification from the board of directors based on the level of repeat business with participant lenders in the past.

Lastly, borrower characteristics may moderate the need for continued oversight by the lead arranger and the magnitude of the agency conflict between the lead arranger and participant lenders. Following Chaudhry and Kleimeier (2015), we define an opaque borrower as one without a debt rating or cases where the lead arranger and borrower have no prior lending relationship that

may reduce information asymmetry. When the borrower is opaque by either measure, lead arrangers sell a smaller portion of the loan. Board connections have a smaller impact in credibly signaling to participant banks when the borrower is unrated or when the lender and borrower have no prior relationship. Board monitoring quality matters more when the borrower is unrated, but not when there is no prior lending relationship with the borrower.

We also conduct a series of robustness tests including an instrumental variable approach similar to Faleye and Krishnan (2017) to establish causality between lead arranger board structure and the portion of the loan sold. Using this instrumental variable approach, results show that lead arranger director connectedness increases the percent of a loan sold to participant banks. We also orthogonalize our corporate governance measures with respect to bank reputation. The residual of corporate governance, which is completely independent of bank reputation, is positively associated with the portion of the loan sold, so the effect of bank corporate governance is completely independent of bank reputation. We also ensure our results are robust to OLS estimation.

Our results contribute to several strands of literature. First, we contribute to the literature on how banks solve the agency problem in syndicated lending identified in Sufi (2007) and Chaudhry and Kleimeier (2015). Dennis and Mullineaux (2000) demonstrate that lead arranger reputation is an important component to the syndicated loan market, and Gopalan, Nanda, and Yerramilli (2011) extend the analysis by looking at cases where there is a negative shock to lead arranger reputation. Panyagometh and Roberts (2010) find that the agency problem can be mitigated by increasing the proportion of the contribution by the lead arranger(s). In addition, the

identity of the participant lenders can also impact their decision to contribute to a syndicated loan (Tykvová (2007), Casamatta and Haritchabalet (2007)). The participant lenders' intention to join the group depends on the perception of the lead lender as a trustworthy source of certification and monitoring. Ivashina (2009) and Beatty, Liao, and Zhang (2019) show that information symmetry on the borrower helps mitigate the agency problem. Elyasiani and Zhang (2018), Chen (2014), and Lin, Song, and Tian (2016) all demonstrate that the borrower's board of directors affects loan syndications.¹ Our results demonstrate that bank board of director quality is an important component in syndicated loans. Bank boards with higher monitoring quality and better connections help attenuate the agency problem between the lead arranger and participant banks.

Our study also contributes to the literature on bank board governance and bank characteristics. Anginer et al. (2018) and Faleye and Krishnan (2017) show that board governance lowers bank risk. Adams and Mehran (2012), Aebi, Sabato, and Schmid (2012), and De Andres and Vallelado (2008) show that board governance affects bank performance. Nguyen, Hagendorff, and Eshraghi (2016) find that board governance lowers bank misconduct, and Baselga-Pascual et al. (2018) find that governance increases bank reputation. Here, we demonstrate that bank board governance positively influences loan syndication activity, particularly in financial crises and particularly for opaque borrowers. Board governance is a complement to bank reputation, and both serve as credible signals to participating banks that the lead arranger has performed ex-ante screening and will perform ex-post monitoring of the loan effectively.

¹ We ensure our results are robust to controlling for borrower board structure as well.

I. Background and Prior Literature

A. *Loan Syndication and Agency Problems*

Loan syndication is a process in which more than two financial institutions jointly provide a large loan to a single borrower. The loan syndication market is motivated by the liquidity position of the agent banks, their geographical locations, and bank regulations (Dennis and Mullineaux (2000), Simons (1993)). Financial institutions team up in a syndicated loan to diversify their portfolio and to overcome limitations related to their size, operating activity, geographic location, and regulatory constraints by sharing a large loan with other participant lenders. The market for syndicated loans is huge and is growing rapidly, from \$137 billion in 1987 (Dennis and Mullineaux (2000)) to more than \$5.3 trillion in fiscal year 2018.^{2,3} Moreover, the United States plays a key role in the syndicated loan market. Its contribution in fiscal year 2018 totaled almost \$3 trillion, representing almost 60% of the global market.

As the main point of contact with the borrower, the lead arranger is responsible for screening the borrower prior to the loan for creditworthiness, which may trigger a selection bias problem in that the lead arranger has an incentive to sell loans with poor quality (Chaudhry and Kleimeier (2015)). For example, in the Enron bankruptcy case, some participant lenders accused the lead arranger, JP Morgan, of hiding potentially important financial information regarding Enron at a detriment to participant lenders. In addition, as the lead arranger sells a larger portion

² Global Syndicated Loans League Tables, Fiscal Year 2018. Bloomberg.

³ The syndicated loan market cooled in 2019 and fell dramatically in 2020 to only \$3.5 trillion.

of the loan, the incentive to monitor decreases since the lead arranger has less to lose (Sufi (2007), Chaudhry and Kleimeier (2015)). These agency problems may impact the decision of participant banks to join the syndicate. Indeed, Gopalan, Nanda, and Yerramilli (2011) demonstrate that negative shocks to reputation, stemming from Chapter 11 bankruptcy filings of existing borrowers of the lead arranger, impact the subsequent amount that lead arrangers can sell of syndicated loans. Additionally, Casamatta and Haritchabalet (2007) show that participant lenders' intention to join the group depends on the perception of the lead arranger as a trustworthy source of certification and continued monitoring.

B. Attenuating Factors in Loan Syndication

How, then, does the syndicated loan market operate in the face of these agency issues? Panyagometh and Roberts (2010) demonstrate that these agency problems can be mitigated by increasing the proportion of the contribution by the lead arrangers. Furthermore, previous literature has examined how participant lenders react to the reputation of the lead arranger and to transparent information on the lead arranger and borrowers. Dennis and Mullineaux (2000) measure reputation by the repeated business of the lead bank with participant lenders. Their findings show that highly reputable lead banks retain a smaller fraction of the loan compared to less reputable banks. Similarly, studies on the availability of information on the lead arranger and borrowers (Ivashina (2009), Beatty, Liao, and Zhang (2019), Elyasiani and Zhang (2018), Sufi (2007), Lee and Mullineaux (2004)) indicate that lead arrangers and borrowers with clear and

transparent information aids in mitigating the agency problem in that banks can sell a larger fraction in a syndicated loan compared to the lenders and borrowers with opaque information.

The loan syndication process is also affected by the corporate governance of the borrowers (Elyasiani and Zhang (2018), Chen (2014), Lin, Song, and Tian (2016)). Excessive risk-taking by the CEOs of the borrowing firms puts more risk on participant lenders. Elyasiani and Zhang (2018) demonstrate that when the loan is made to borrowers with entrenched CEOs, the number of participant lenders is small and their share in the loan is smaller. The lead arranger holds a larger proportion of the syndicated loan in an attempt to provide more security to the borrowers. Chen (2014) exhibits similar results: when CEOs of borrowing firms have incentives to take high risk the syndicate structure is arranged to provide better due diligence and monitoring of the borrowers. Moreover, the effect of CEO entrenchment impacts the syndicate structure less if the lead arranger is reputable, has transparent information, and is financially sound. Lin, Song, and Tian (2016) demonstrate that borrower director reputation matters in facilitating better loan terms and in mitigating information asymmetry with lenders. To date, there are no studies of the impact of the corporate governance of the lead arrangers in a syndicated loan.

C. Can Bank Board Structure Attenuate the Agency Problem?

Studies on corporate governance of banks (see De Haan and Vlahu (2016)) reveal that banks take excessive risk to maximize profit at a substantial cost to the stakeholders. This excessive risk-taking by banks can create systemic risk and negative externalities in the financial system (Flannery (1998)). The recent financial crisis of 2007-2008 shows the ineffectiveness of bank

governance in containing the excessive risk-taking behavior of banks. Kirkpatrick (2009) concludes that the financial crisis can be attributed to the failure of bank corporate governance in overseeing against excessive risk-taking by the banks, which suggests an important role for regulation on banks and for effective bank governance. Effective governance can curtail the problems of risky lending by careful screening and monitoring of borrowers (Kashyap, Rajan, and Stein (2008)). Our research question is whether bank board structure affects loan syndication activities.

Bhagat, Bolton, and Romano (2008) suggest there is no best measure of corporate governance, so we begin with seven board of director measures: the number of board members, the percent of independent directors, the percent of non-co-opted directors (Coles, Daniel, and Naveen (2014)), average director tenure, the average number of seats held by board members, and the number of primary and secondary connections with other S&P 1500 board members. Primary connections measures the number of other directors with shared board appointments, whereas secondary connections captures the number of other directors known via a primary connection. While not exhaustive, these characteristics have been studied in the previous literature in many contexts. From these measures, we conduct a principal component analysis and compute two factors: board monitoring quality and director connectedness. Board size, independence, non-co-option, and director tenure load on the board monitoring quality factor, whereas the average number of board seats, primary connections, and secondary connections load on the director connectedness factor.

In terms of the previous literature, some studies favor a larger board size (see Adams and Mehran (2012), Aebi, Sabato, and Schmid (2012), Adams and Ferreira (2007), Adams and Mehran (2003)). They assert that a larger board provides a pool of information and resources, greater monitoring to the managers, and more expertise to the management. Alternatively, other studies favor a smaller board size (Faleye and Krishnan (2017), Yermack (1996) among others). They argue that a larger board may become less effective due to the free-rider problem among the larger number of directors on the board and directors lack of motivation in collecting and interpreting information. In addition, a small board is more likely to lend to investment grade borrowers and less likely to lend to risky borrowers (Faleye and Krishnan (2017)). Coles, Daniel, and Naveen (2008) argue that the size of the board depends on the balance between monitoring and advising needs of the firm. Indeed, there may be a non-linear relationship between the size of the board and the bank's ability to syndicate a loan. De Andres and Vallelado (2008) find such a non-linear relationship between bank board size and bank performance.

Similarly, the average tenure of directors can theoretically have opposite effects. Directors with a long tenure gain firm- and industry-specific knowledge, which allows them to advise management well, but these long-serving directors also have the potential to become entrenched and dependent on their board appointment. These entrenched directors may be unwilling to discipline management effectively (Baran and Forst (2015), Coles, Daniel, and Naveen (2014)).

Our next board characteristic related to board monitoring quality is director independence. Some studies on independent directors support a larger number of independent directors (Ferreira

and Laux (2016), Adams and Mehran (2012), Pathan (2009), Devriese et al. (2004)). These studies claim that more independent directors provide greater monitoring to managers, reduce agency costs, and improve firm performance. However, other studies by Harris and Raviv (2008) and Adams and Ferreira (2007) argue that more independent directors can deteriorate firm performance if they do not have adequate financial knowledge and expertise required to monitor the managers. Dupire and Slagmulder (2019) find that banks with more independent boards are more likely to have risk committees, and Pathan (2009) and Faleye and Krishnan (2017) find a negative relationship between bank board independence and risk.

Coles, Daniel, and Naveen (2014) define true director independence in a different manner. Given that the CEO exerts considerable influence over the slate of directors up for election, Coles, Daniel, and Naveen (2014) show that directors appointed under the current CEO do not monitor effectively because they are “co-opted.” They propose an alternate measure of board independence, non-co-opted independence, as the proportion of independent directors appointed prior to the CEO, and they find stronger monitoring effectiveness with this measure in comparison to the proportion of independent directors. Nguyen, Hagendorff, and Eshraghi (2016) employ this measure in their study of bank misconduct and find non-co-opted independence is negatively associated with bank misconduct.

The board connectedness factor includes the average number of seats held by directors on S&P 1500 boards, sometimes referred to as director “busyness.” Literature on director busyness in other contexts suggests this characteristic may impact loan syndication activities (Elyasiani and

Zhang (2015), Falato, Kadyrzhanova, and Lel (2014), Masulis and Mobbs (2014), Field, Lowry, and Mkrtyan (2013)). Director “busyness” stemming from holding multiple board appointments can lead to directors without adequate time to devote to their advisory and monitoring duties. However, appointment to multiple boards also certifies the expertise and quality of directors (Field, Lowry, and Mkrtyan (2013), Fich and Shivdasani (2006)). They are in high demand due to their ability to better serve on the board.

Director connections have been shown to impact several outcomes in prior literature, and well-connected boards might be able to attract participant banks and have a broader network to provide information useful in monitoring borrowers. Engelberg, Gao, and Parsons (2012) demonstrate that connections between a lender and borrower allow for superior monitoring and better credit terms for borrowers. For non-financial firms, Dass et al. (2014) find that directors from related industries provide information relevant to better weather economic shocks, and Baran and Wilson (2018) demonstrate that remotely located firms benefit from connections to directors located in large MSAs due to the benefits of economies of agglomeration. Lastly, Cai and Sevilir (2012) support the notion that shared connections (primary or secondary) between a target and acquirer in an M&A lead to better information flow and superior returns. Our board connectedness measure captures the strength of the connections of the members of the lead arranger board of directors.

II. Estimation Methods and Key Variables

A. Lead Arranger Board Structure

The existing literature in corporate governance, both of banks and other firms, highlights many features of a board of directors potentially relevant to the agency conflict between the lead arranger and participant banks. We include seven characteristics of the bank board structure:

1. Board size, measured by the number of directors (Aebi, Sabato, and Schmid (2012), Adams and Mehran (2003), Yermack (1996) among others),
2. Independent directors, measured by the percent of outside directors (Ferreira and Laux (2016), Adams and Mehran (2012), Pathan (2009)),
3. Non-co-opted directors, measured as the percentage of directors that are independent and who were on the board at the time the CEO was hired (Coles, Daniel, and Naveen (2014), Nguyen, Hagendorff, and Eshraghi (2016)),
4. Average “busyness” of directors, measured as the average number of board appointments held by all outside directors (Elyasiani and Zhang (2015), Falato, Kadyrzhanova, and Lel (2014), Masulis and Mobbs (2014), Field, Lowry, and Mkrtchyan (2013)),
5. Average director tenure (Baran and Forst (2015), Coles, Daniel, and Naveen (2014)),
6. Average number of primary director connections, measured as the average over all board members at the focal board of the number of other S&P 1500 board members they are connected to by a shared board appointment (Renneboog and Zhao (2014), Cai and Sevilir (2012)), and
7. Average number of secondary director connections, measured as the average over all board members at the focal firm of the number of other S&P 1500 board members they are connected to via a primary connection. If director A and B have a primary connection via a shared board appointment and director B has another board appointment with director C, the directors A and C have a secondary connection via director B. (Cai and Sevilir (2012), Baran and Wilson (2018)).

Due to the large number of board characteristics we consider, we conduct a principal component analysis of our seven board characteristics. Table I presents the results of this analysis, which finds two main factors. The first factor captures the connectedness of the board and is positively impacted by the average number of appointments, primary connections, and secondary connections. The second factor is related to the traditional proxies for board monitoring quality with a negative loading from board size and positive loadings from the fraction of outside directors, the percent of non-coopted board members, and the average tenure of directors. We use these factors in most of our analyses.

B. Base Model

In this study, we investigate the effect of the lead banks' board structure on several measures of the ability of a lead bank to attract participant lenders to the syndicate. The dependent variable, *Synd%*, is the proportion of the loan sold by the lead arranger in a syndicated loan. *Synd%* is 0% for a non-syndicated loan and between 0% and 100% for a syndicated loan.⁴ An alternative dependent variable, *Herfindahl Index*, captures the concentration of the loan shares held by different banks as in Chaudhry and Kleimeier (2015), and we also measure the number of participant banks in the syndicate (Sufi (2007)). For our estimation, we use a Tobit model because the main dependent variable, *Synd%*, is censored at both the lower and upper bounds. We conduct

⁴ Our analysis is consistent with Dennis and Mullineaux (2000) but differs from some previous studies who examine the portion of the loan retained by the lead lender. The rationale for our approach is to maintain a consistent interpretation when using the *Syndicated* indicator variable in the Cragg's two-stage estimation robustness test.

our analysis on the full sample including both syndicated and non-syndicated loans following Dennis and Mullineaux (2000) and Gopalan, Nanda, and Yerramilli (2011). In order to assess the effect of bank board structure, following Gopalan, Nanda, and Yerramilli (2011) and Dennis and Mullineaux (2000), we control for bank characteristics, loan characteristics, and borrower characteristics. Our model expressing the relationship between dependent variables, board structure, and control variables is shown in equation (1).

$$\begin{aligned}
 \text{Synd\%/Herfindahl Index/Number of Participants}_{l,i,t} & \quad (1) \\
 & = \beta_0 + \beta_1 \times \text{Bank Board Structure}_{i,t-1} + \beta_2 \times \text{Bank Characteristics}_{i,t-1} \\
 & \quad + \beta_3 \times \text{Loan Characteristics}_{l,t} + \beta_4 \times \text{Borrower Characteristics}_{j,t-1} \\
 & \quad + \beta_5 \times \text{Bank Reputation}_{i,t-1} + \mu_j + \mu_t
 \end{aligned}$$

In the above equation, the subscript l denotes loan, subscript j denotes borrowers, and subscript i denotes lead arrangers, and the measures for bank board structure, bank characteristics, and borrower characteristics are lagged. In a robustness test, we also employ Cragg's two-step estimation process to examine the factors that affect the probability of loan syndication (in a probit model) separately from the factors that influence the amount of the loan syndicated (in a truncated regression model). We confirm our results are robust to estimation by OLS as well.

Following Gopalan, Nanda, and Yerramilli (2011) and Dennis and Mullineaux (2000), we control for bank characteristics such as size, ROA, deposit-to-assets ratio, loan-to-assets ratio, and Tier 1 capital-to-assets ratio. We control for loan characteristics such as loan maturity, size of the loan, and purpose of the loan (takeover, debt repayment, or working capital). We use a dummy variable, *Secured*, with a value of 1 if the loan is secured with collateral. Both loan maturity and

secured status may impact the lead arranger's monitoring effort. The borrower's financial stability can also have a direct influence on the loan syndication process. We control for borrowers' characteristics such as borrower size, leverage, return on assets, and growth opportunities.

C. Moderating Characteristics

In our analysis, we examine the moderating effects of the financial crisis, level of lead arranger reputation, a bankruptcy by an existing borrower of a lead arranger, and borrower information asymmetry. We define the financial crisis period, *Financial Crisis*, as loans originated in 2008 and 2009. As one measure of reputational capital of the lead arranger, we employ *Repeat*, measured similarly to Dennis and Mullineaux (2000) as the repeat business of participant lenders with the lead arranger over the previous five years scaled by the number of loans originated by the lead arranger in that five-year window. An alternative measure of reputation of the lead arranger is *Market Share*, measured as the percent of the total dollar volume in loan syndications in the prior year arranged by a given lead bank. We also control for the presence of a long-term debt rating of the lead arranger with the variable *Lender Rated*, an indicator variable if the lead arranger has a credit rating. The debt rating indicates lower information asymmetry between the participant banks and the lead arranger bank and has been shown to impact lead allocation (Ivashina (2009), Beatty, Liao, and Zhang (2019), Elyasiani and Zhang (2018), Sufi (2007), and Lee and Mullineaux (2004)).

Gopalan, Nanda, and Yerramilli (2011) analyze damage to the reputational capital of the lead arranger if there are bankruptcy filings of borrowers of the lead arrangers. Therefore, we

measure damage to the lead arranger's reputational capital, *Bankruptcy*, if there is at least one large bankruptcy by borrowers in three years prior to the loan syndication. Lastly, we define borrower opacity using two measures. *Unrated* captures borrowers without a debt rating, and *No Prior Relationship* indicates higher information asymmetry between the borrower and lead arranger because of no previous lending relationship.

III. Data and Descriptive Statistics

For the empirical tests, we use panel data over the 1998-2017 period taken from divergent sources. For individual loans and lender information, we use Thomson-Reuters' LPC (Loan Pricing Corporation) DealScan database. This database gathers information from SEC filings and public documents such as 10Ks, 10Qs, 8Ks, and registration statements. This includes firms within the U.S. and around the globe. It contains historical information on loan pricing, contract details, terms, and conditions. The DealScan database has 292,897 loans available over the period of January 1, 1998, to December 31, 2017. These include loans made by a single lender or a group of lenders in a syndicated loan. Figure 1 shows the number of DealScan loans originated over our sample period with a maximum of 18,731 loans originated in 2017 and a minimum of 9,412 loans in 2009. The increasing number of loans is due to an increase in syndication activity over the period as well as improved coverage by DealScan over time. For our empirical study, we use DealScan to obtain information such as loan amount, maturity, secured status, lead arranger and participant lenders, proportion of the loan sold by the lead arranger, and deal year.

----- Insert Figure 1 here -----

Data on board characteristics are obtained from Institutional Shareholder Services (ISS) database, formerly known as RiskMetrics, beginning in 1998 when the full set of director variables is available. We obtain financial information on borrowers from the Compustat database and match the DealScan database with the Compustat database by using the Compustat-DealScan linking database (Chava and Roberts (2008)).

For lead arrangers' characteristics, we match lead arrangers from DealScan with the Bank Regulatory Database at the bank holding company (BHC) level. First, we identify lead arrangers in DealScan and restrict our data to only U.S. firms. Following Gopalan, Nanda, and Yerramilli (2011), we use the variable *LeadArrangerCredit* to identify if the lender is also a lead arranger. In cases of multiple lead arrangers, we keep one observation for each lead arranger consistent with Gopalan, Nanda, and Yerramilli (2011).⁵ We keep the lead arrangers in both syndicated and non-syndicated loans at the BHC level. We then use data from Schwert (2018) to match the lead arrangers with the Bank Regulatory Database.

Table II provides summary statistics of our key variables. We restrict our sample to lenders and borrowers with available financial information. After merging DealScan with the Compustat and ISS databases, our final sample has a total of 8,739 loans created for 3,090 unique borrowers from 203 lead arrangers at the bank holding company level. Table II demonstrates that the median bank board consists of 14 directors with around 80% of directors classified as independent. On average, 64% of the board is non-co-opted, and the average tenure of directors is 7.85 years.

⁵ In our sample, 42% of the observations have single lead arrangers, 24% have two lead arrangers, and the rest have three or more lead arrangers. We ensure our results are robust to keeping only loans with one lead arranger.

Busyness of directors, measuring the number of boards on which the director concurrently serves, is an average of 1.48 board seats. The average number of connections via shared board appointments is with 24 other directors.

There is a large variation in the size of loans. The average loan size is \$712 million with a median size of only \$275 million. In our sample, 78% of the loans are syndicated, and the median syndicated loan consists of 10 lenders. On average, the lead arranger sells 64.32% of the loan with a median amount of 84%. The average maturity of loans in our sample is 44.85 months. Among loans, 45% of the loans are secured with collateral, and on average, 8% of the loans are used for takeover, 20% for working capital, and 8% for debt payments.

In terms of lead arranger characteristics, the average total assets of the lead arrangers are \$1.07 billion. The average return on assets is 3%, deposit-to-assets is 55%, Tier 1 capital-to-assets ratio is 7%, and loan-to-assets value is 48%. In addition, 6% of loans in our sample are made within three calendar years after a large bankruptcy by another one of the lead arranger's existing borrowers.

Moreover, the average total assets of the borrowers are \$12.17 billion. The borrowers have an average leverage of 38%, an average return on assets of 11%, and an average market-to-book value of 1.48. In our sample, 43% of the borrowers do not have a S&P 500 credit rating and 44% of the borrowers have no prior lending relationship with the lead arrangers.

----- Insert Table II about here -----

IV. Empirical Results

A. Impact of Board Structure on the Ability to Attract Participant Banks

We begin our empirical analysis using the regression specification shown in equation (1) to assess the effect of the lead bank's board structure on the three measures of attracting participant banks: the proportion of the loan sold by lead arrangers, the Herfindahl Index of the loan shares among all participating banks, and the number of participant banks. Table III Panels A-C contains the results of our base model using the two board factors: *Monitoring Quality* and *Connectedness*. Both board characteristics are positively associated with *Synd%* (Panel A), *Herfindahl Index* (Panel B), and *No. of Participants* (Panel C), providing our first evidence that the lead arranger's board structure sends a signal of lower agency problems to participant lenders. However, a principal lender with a strong reputation also has more incentive to screen and monitor borrowers, and lead arranger reputation is also positively associated with attracting participant banks (Amiram et al. (2017), Gopalan, Nanda, and Yerramilli (2011), Sufi (2007), Dennis and Mullineaux (2000)). Therefore, we control in columns 2 and 6 for *Repeat*, in columns 3 and 7 for *Market Share*, and in columns 4 and 8 for *Lender Rated* to ensure our results are robust to controlling for lead arranger reputation, and we find that *Connectedness* and *Monitoring Quality* remain significant.

In Table III, we also observe that *Synd%* increases with the loan amount, consistent with diversification motives and with the lead arranger's limited resources. The coefficient on loan maturity is significantly positive, and the coefficient on secured status is negative, both of which are consistent with Dennis and Mullineaux (2000). The loan purpose indicator variables are all

insignificant, consistent with both Dennis and Mullineaux (2000) and Gopalan, Nanda, and Yerramilli (2011) except for *Takeover*, which is negative and significant. The coefficients on borrower size, leverage, and ROA are all positive and significant, consistent with Gopalan, Nanda, and Yerramilli (2011), indicating that lead arrangers of loans to large, highly leveraged, and profitable borrowers sell a larger fraction of a loan. Borrower market-to-book ratio is significantly negative, indicating that banks sell smaller portions of loans where borrowers have greater growth options. The only lead arranger characteristic that is consistently related to *Synd%* is ROA, and lead arrangers with higher ROA have a lower *Synd%*. These results are largely consistent with Gopalan, Nanda, and Yerramilli (2011), although our results tend to attain higher levels of significance and tend to be more robust.

----- Insert Table III about here -----

In untabulated tests, we also include our seven board measures individually in the same model from Table III. We find that each individual measure is significantly related to *Synd%*. Specifically, we find that *Independent Directors*, *Non-Coopted Directors*, and *Average Director Tenure* are positively associated with *Synd%* and that *Board Size* is negatively associated, consistent with the *Monitoring Quality* factor. Similarly, the individual components that load on the *Connectedness* factor, including *Average Busyness*, *Average Primary Connections*, and *Average Secondary Connections*, are all positively related to *Synd%*.

B. Moderating Effect of the Financial Crisis

The financial crisis of 2008 and 2009 brought significant changes to the banking sector overall as well as to the syndicated loan market. Overall bank lending dropped during the financial crisis as a response to the increased market risk (Ivashina and Scharfstein (2010)). De Haas and Van Horen (2010) attribute the contraction of credit to the heightened screening and monitoring requirements of banks, finding that participant banks demanded better monitoring by lead arrangers during the financial crisis period. The global nature of loan syndications also changed with lenders more focused on participating in loans to borrowers from their own country (Giannetti and Laeven (2012)). In Table IV, we test how the financial crisis impacts our main findings of the positive effect of board *Connectedness* and *Monitoring Quality* on the percent of a loan sold. In all our models, the coefficient on *Financial Crisis* is negative, indicating that lead arrangers retained a larger portion of syndicated loans to increase their incentive to monitor. Note that while the effect of *Connectedness* on loan syndication activities was unchanged during the financial crisis, the effect of *Monitoring Quality* was greatly enhanced during the crisis. Lead arrangers with high levels of board monitoring effectiveness were able to sell a much larger portion of the loan during the crisis, while board connections had no impact.

----Insert Table IV about here-----

C. Moderating effect of a Large Bankruptcy

Gopalan, Nanda, and Yerramilli (2011) examine damage to lead arranger's reputational capital when borrowers of lead arrangers declare bankruptcy. Following a bankruptcy of a lead

arranger's existing borrowers, the lead arrangers are less likely to syndicate loans and sell a smaller portion of those that are syndicated. This is attributed to the damage done to the lead arranger's reputation in the market and participant banks being wary about future risk. In Table V, we examine whether the signal sent by the lead arranger's board structure can mitigate the negative reputation shock of a bankruptcy as well as the relative effect of board connections and monitoring quality. We define our indicator *Bankruptcy* as equal to 1 when an existing borrower with loans equal to at least 5% of the lead arranger's average loan volume over the past two years has declared bankruptcy over the previous three years. These bankruptcies are significant for the lead arranger and have occurred in the recent past, so the negative reputation shock should be significant.

In Table V, we include the *Bankruptcy* dummy variable along with the lead arranger board measures. Consistent with Gopalan, Nanda, and Yerramilli (2011), in the three years after a large bankruptcy lead arrangers retain a larger share of a syndicated loan. In columns 2 and 4, we also include the interaction between *Connectedness* and *Monitoring Quality* and *Bankruptcy*. In column 2, we find that while *Connectedness* is positively associated with *Synd%*, the coefficient for the interaction with *Bankruptcy* is significantly negative. Following a bankruptcy of an existing borrower, highly connected directors on a lead arranger's board are associated with lower levels of loan syndication. In column 4, we find the opposite effect of the interaction of *Monitoring Quality* and *Bankruptcy*. This positive coefficient means that banks with higher *Monitoring Quality* overcome the negative effect of the bankruptcy and can continue to sell a larger share of loans to participant banks. Despite the previous monitoring failure of the lead arranger evidenced

by the large bankruptcy, board monitoring effectiveness serves as a signal to participant banks of lower agency problems compared to lead arrangers without high levels of board monitoring.

-----Insert Table V about here-----

D. Moderating effect of Lead Arranger Reputation

Lead arranger reputation plays a dominant role in the loan syndicate structure and the portion of a loan able to be syndicated (Gopalan, Nanda, and Yerramilli (2011), Dennis and Mullineaux (2000)). Chaudhry and Kleimeier (2015) also find that adverse selection only occurs when low reputation lead arrangers lend to opaque borrowers. Panyagometh and Roberts (2010) highlight that lead arrangers do not seem to exploit participant lenders and act to protect their reputation for future repeat business. As in the cases of the financial crisis and following a negative reputation shock, the impact of *Connectedness* and *Monitoring Quality* on *Synd%* may depend on the level of the lead arranger's reputation.

To address this possibility, we partition lead arranger reputation, measured by repeat business between the lead arranger and participant banks, on an annual basis into quartiles and conduct our analysis within each quartile of reputation.⁶ In Table VI, we show that for only the lowest quartile of lead arranger reputation, the coefficient on *Connectedness* is a significant predictor of the *Synd%*. Well-connected boards may be able to attract participant banks or borrowers using their connections or may possess a wider network of information relevant to

⁶ We also conduct this analysis using the market share of the lead arranger in the syndicated loan market in the prior year and find similar results.

borrower screening and monitoring, and these board qualities appear most relevant for only the least reputable lead arrangers. *Monitoring Quality*, on the other hand, positively impacts the portion of the loan sold for all but the highest reputation lead arrangers. In quartile 4 with the highest reputation lead arrangers, neither *Connectedness* nor *Monitoring Quality* are significantly related to loan syndication activity. The strong reputation of these banks makes it less likely that participant lenders would need to consider board structure as an additional factor.

-----Insert Table VI about here-----

E. Moderating effect of Borrower Opacity

The final moderating setting we consider relates to information asymmetry between borrowers and lenders. A significant literature examines the impact of information asymmetry on loan syndication. Beatty, Liao, and Zhang (2019) consider the information asymmetry between the lead arranger and participant lenders, finding higher levels associated with a larger share retained by the lead arranger. Ivashina (2009) links borrower information asymmetry to both loan spreads and the share of the loan retained by the lead arranger. Both Lee and Mullineaux (2004) and Sufi (2007) find that information asymmetry between borrower and lender leads to a smaller syndicate with a larger portion retained by the lead arranger. Lead arranger reputation can mitigate the information asymmetry problem but cannot eliminate it. Our analysis considers whether lead arranger board structure can similarly attenuate the information asymmetry problem caused by opaque borrowers and whether board monitoring or connections play a larger role. We measure information asymmetry between borrowers and participant banks using two proxies: *Unrated*,

which is an indicator that the borrower does not have a debt rating, and *No Prior Relationship*, which is an indicator if this borrower and lead arranger have no previous lending relationship. The results of including this measure of borrower opacity are presented in Table VII.

The effect of *Unrated* in Table VII is always significantly negative, as is the effect of *No Prior Relationship*. *Monitoring Quality* attenuates this negative effect in panel A, but interestingly not significantly so in Panel B. If the lead lender has no prior lending relationship with the borrower, the monitoring quality of the bank's board does not reduce the negative effect of borrower opacity. This result is consistent with many event studies regarding the positive effects of loan announcements on borrower stock returns occurring only when the bank has a prior lending relationship with the borrower (see Lummer and McConnell (1989)). Note that board connections actually enhance the negative effect of borrower opacity on the ability of the bank to sell the loan in both Panels A and B. Columns 3 and 6 show that these results are robust to the inclusion of repeat business as a proxy for the bank's reputation. Board connections matter, but they have a lower impact when the borrower is unrated or when there is no prior lending relationship. Board monitoring quality has a stronger effect when the borrower is unrated but not when there is no prior lending relationship with the borrower.

-----Insert Table VII about here-----

V. Robustness Tests

We conduct several robustness tests to ensure our results are not driven by the choice of estimation method or by endogeneity.

A. Cragg's Two-Stage Model

Consistent with prior studies, our Tobit results include both syndicated and non-syndicated loans, and in our sample about 78% of the loans are syndicated. As a robustness check, we use Cragg's two-step regression as an alternate estimation technique. The first step is a probit model with *Syndicated* as a binary dependent variable which takes a value of (1) if the loan is a syndicated loan and (0) otherwise. The second step is a truncated regression with *Synd%* as the dependent variable which takes a value between 1 and 100 with truncation on the upper bound (i.e., we remove all non-syndicated loans from the sample). In this manner, we can examine the stability of the results by separating the decision to syndicate the loan versus the decision as to how much of the loan to sell.

In results not shown for brevity, *Connectedness* and *Monitoring Quality* are both positively associated with the decision to syndicate a loan in the first-stage probit model. Generally, all other variables are consistent with the Tobit results. In the second stage of the Cragg model, a truncated regression that includes only syndicated loans, both *Connectedness* and *Monitoring Quality* positively impact the percentage of the loan sold and all other variables are quantitatively similar to the Tobit results.

B. Ordinary Least Squares Model

In addition, we also examine OLS estimation. Gopalan, Nanda, and Yerramilli (2011) estimate their main results using OLS, and we present these results in Table VIII for robustness. Importantly, we find that in all specifications both *Connectedness* and *Monitoring Quality* are

positively associated with *Synd%*, even when controlling for *Repeat*, *Lender Rated*, *Bankruptcy*, and *Unrated* borrowers.⁷

-----Insert Table VIII about here-----

C. Instrumental Variable Tests

As with many studies of governance, the concern about omitted variables or reverse causality exists in our analysis. Lead arranger board structure and the percent of a loan syndicated may be jointly determined by omitted variables, which could bias our results. Likewise, it is possible that banks with previous loan syndication activity could attract or appoint directors to their boards with desirable characteristics. To mitigate these concerns, we replicate the methodology of Faleye and Krishnan (2017), which relies on differential changes in board structures following the passage of the Sarbanes-Oxley Act of 2002 (SOX). This method uses the bank's board structure before the passage of the law to predict the post-SOX changes in board structure. While SOX only directly targeted director independence, Faleye and Krishnan (2017) find that bank boards with lower overall board effectiveness pre-SOX experienced a larger post-SOX change in overall effectiveness.

In columns 1 and 3 of Table IX, we use the IV approach to predict the level of *Connectedness* and *Monitoring Quality* for a second stage analysis. This analysis uses loans originated from 2000-2017 to provide a lag between the board structure in 1998 and the loan

⁷ Our alternate dependent variables measuring the ability to attract participant lenders to the syndicate, *Herfindahl Index* and *Number of Participant Lenders*, are also robust to the Cragg's Two Stage and OLS estimation methods. Results suppressed for brevity and available upon request.

origination decision. The instrumental variable is the level of *Connectedness* and *Monitoring Quality* in 1998 multiplied by a *Post-SOX* indicator. Similar to Faleye and Krishnan (2017), the interaction between *Post-SOX* and *Connectedness* and *Monitoring Quality* are negatively associated with future levels of *Connectedness* and *Monitoring Quality*. Lead arranger boards with lower *Connectedness* and *Monitoring Quality* pre-SOX experienced the largest improvements in these measures after SOX mandated board structure reform.

The predicted levels of *Connectedness* and *Monitoring Quality* are used in columns 2 and 4 to verify that our main results are robust to controlling for endogeneity in this manner. In fact, we find that the predicted level of *Connectedness* is positively related to *Synd%* as in our main tests. However, the predicted level of *Monitoring Quality* has no significant association with the percent of the loan sold to participant banks. Columns 5 and 6 include the impact of the financial crisis. As we find in our main results, the impact of board *Monitoring Quality* is heightened in the financial crisis, and the interaction between predicted *Monitoring Quality* and *Financial Crisis* is positive and statistically significant.

-----Insert Table IX about here-----

C. Orthogonalization with Respect to Reputation

One concern with the instrumental variables approach arises if the characteristics of the board pre-SOX (and hence the level of changes induced by SOX) are correlated with the underlying bank characteristics. A strict approach to determining if the effect of bank corporate governance is relevant separate from the effect of bank reputation is to orthogonalize corporate

governance relative to reputation. Panel A, Columns 1 and 2, of Table X present results of the first-stage regression of *Connectedness* and *Monitoring Quality* on *Repeat*. We find a significantly positive relationship between both governance measures and repeat business. In Columns 3-6, we use the residuals from the first-stage regression, which are uncorrelated with lead arranger reputation, and find that both the *Connectedness* and *Monitoring Quality* residuals are similarly positively related to *Synd%* and *Participants* as in our baseline regressions. Panel B of Table X uses the alternate proxy of lead arranger reputation, *Market Share*, and finds the same results. Thus, the effect of bank board connections and monitoring quality on the ability to attract participant lenders is separate from the effect of bank reputation in the syndication market. In untabulated tests, we use the orthogonalized measures of *Connectedness* and *Monitoring Quality* in our other tests and find results that are largely consistent with previous tables.

VI. Conclusion

In this paper, we investigate the role of bank board structure on the loan syndication activities of banks. As a delegated monitor for participant banks, lead banks must credibly signal to possible participant banks that they will accurately convey information and effectively monitor borrowers, mitigating both the adverse selection and moral hazard problems. Lead arranger reputation serves as one signal to participant banks, and we test whether bank corporate governance serves as another signal. For this, we find two board factors, *Connectedness* and *Monitoring Quality*, from an initial set of seven measures for board structure: number of directors, fraction of outside directors, fraction of non-coopted outside directors, average director tenure,

average number of board appointments, and average primary and secondary connections. We find that, even when controlling for three proxies of lead arranger reputation, both board connections and monitoring effectiveness are positively associated with the ability to attract participant lenders, as measured by the percent of a loan sold by the lead arranger, the loan Herfindahl Index, and the number of participant banks.

We consider several moderating factors for our main findings. We demonstrate that during the financial crisis board monitoring effectiveness played a heightened role in the ability of lead arrangers to sell a larger portion of a loan. In addition, we find that following a negative reputation shock from an existing borrower bankruptcy, the monitoring quality of the board, not its connections, are paramount. We then partition our sample by lead arranger reputation and further examine the bank's board structure. Board connections are positively associated with syndicating a loan for only the lowest reputation lead arrangers. Board monitoring quality is important for all but the highest reputation lead arrangers. Lead arrangers with the highest reputation do not depend on board structure as a signal to participant lenders. Lastly, board monitoring effectiveness is most important for opaque borrowers without a debt rating, but not when the lender and borrower have no prior relationship.

Given the potential for omitted variable bias and reverse causality, we implement an instrumental variable approach similar to Faleye and Krishnan (2017), and we find that our results are robust. Since our sample contains both syndicated loans as well as non-syndicated loans and the dependent variable is doubly censored (from 0% to 100%), our main results use a Tobit model.

In robustness tests, we use Cragg's two-step regression model and OLS estimation and find very similar results. Lastly, we orthogonalize our corporate governance measures to lead arranger reputation, purging the effect of reputation, and the significantly positive impact of bank board governance on loan syndication retains its significance.

Our results are important because they demonstrate that banks have a real incentive to build an appropriate board structure. Previous studies have shown that bank board structure influences bank risk-taking, performance, and misconduct, and these previous results are important to bank regulators and bank shareholders. We add to these results by demonstrating that bank board structure is a significant attribute affecting the ability of the bank to syndicate loans, thereby generating revenue contributing to bank shareholder value.

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Appendix I Variable Names and Definitions

Variable	Definition
Bank Governance	
<i>Connectedness</i>	An indicator variable from the principal component analysis that combines the average number of appointments, average primary connections, and average secondary connections.
<i>Monitoring Quality</i>	An indicator variable from the principal component analysis, which is formed by board size, the fraction of outsiders, percent of non-coopted directors, and average tenure of directors.
Loan Characteristics	
<i>Syndicated</i>	A dummy equal to one if the loan is a syndicated loan and zero otherwise. A syndicated loan has more than one lender.
<i>Synd%</i>	The fraction of loans sold by lead arrangers to participating lenders expressed as a percentage. Its value is 0% for non-syndicated loans and more than 0% and less than or equal to 100% for a syndicated loan.
<i>Herfindahl Index</i>	A measure of the concentration of holdings within a syndicate. It is estimated as the sum of the squared individual loan shares. Its value ranges from 0 – 10,000, with the Herfindahl Index being 10,000 for lenders that hold 100% of the loan (Sufi (2007)).
<i>Number of Participants</i>	Number of participant lenders in a loan syndicate.
<i>Loan Amount</i>	Facility amount in DealScan.
<i>Maturity</i>	Loan maturity measured in months.
<i>Secured</i>	A dummy equal to one if the loan has collateral against it and zero otherwise.
<i>Takeover</i>	A dummy equal to one if the primary purpose of the loan is for takeover and zero otherwise.
<i>Working Capital</i>	A dummy equal to one if the primary purpose of the loan is to finance working capital and zero otherwise.
<i>Debt repayment</i>	An indicator equals one if the primary purpose of the loan is for the debt repayment and zero otherwise.
Lead Arranger Characteristics	
<i>BHC Size</i>	The natural log of the bank's book value of total assets (BHCK2170).
<i>BHC ROA</i>	The ratio of bank's income before extraordinary items (BHCK4592) to total assets.
<i>BHC Deposit/Assets</i>	The ratio of total deposits (BHDM6631 + BHDM6636 + BHFN6631 + BHFN6636) to total assets.
<i>BHC loan/assets</i>	The ratio of total bank loans (BHCK2122) to its total assets.
<i>BHC Tier 1 capital/assets</i>	The ratio of Tier-1 capital (BHCK8274) to its total assets.
<i>Repeat</i>	The repeat business between lead arrangers and participant lenders over the previous five years divided by the number of loans originated by the lead arrangers during that period.

<i>Market Share</i>	Lead lender's total loan volume in the last year market divided by the total loan amount in the entire syndicated loan market.
<i>Lender Rated</i>	A dummy equal to one if the bank has a debt rating.
<i>Bankruptcy</i>	A dummy equal to one if any loan is made within three calendar years after a large bankruptcy by one of the lead arranger's existing borrowers. A bankruptcy is defined as large if it exceeds 5% of the total loan volume syndicated in the last two years.
<i>Financial Crisis</i>	An indicator equals one if the loan is originated in the years 2008 and 2009 and zero otherwise.

Borrower Characteristics

<i>Borrower Size</i>	The log of total assets.
<i>Borrower Leverage</i>	The ratio of sum of long-term debt and debt in current liabilities to total assets.
<i>Borrower Market to book</i>	The ratio of sum of long-term debt, debt in current liabilities, and market value of equity to assets. The market value of equity is the product of price per share and number of shares outstanding.
<i>Borrower ROA</i>	The ratio of earnings before interest, depreciation, and taxes (EBITDA) to total assets.
<i>No Prior Relationship</i>	A dummy equal to one if the borrower has not had a prior lending relationship with the lead arranger and zero otherwise.
<i>Unrated</i>	A dummy equal to one if the borrower has no S&P 500 credit rating and zero otherwise.

Figure 1

This figure shows the DealScan loan origination over the period of 1998 to 2017. The x-axis represents the deal year, and the y-axis represents the number of loans in DealScan.

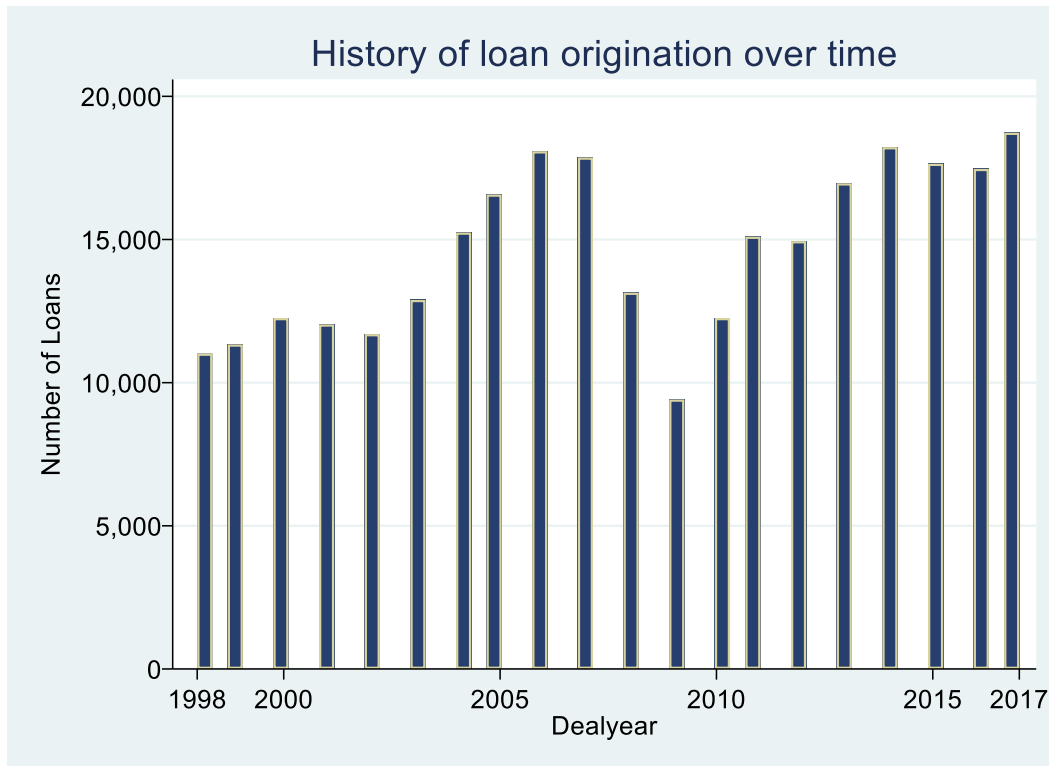


Table I
Principal Component Analysis

This table reports principal component analysis for seven board characteristics. Panel A shows the correlation matrix of the board characteristics. Panel B shows the factor loadings and unexplained variations of the board characteristics. The board size, independent directors, non-coopted directors, and average director tenure load on monitoring quality and average busyness of directors, average primary connections, and average secondary connections load on connections. The definition of all variables is shown in Appendix I.

Panel A: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Board Size	1.000						
(2) Independent Directors	-0.409	1.000					
(3) Non-Coopted Directors	-0.131	-0.010	1.000				
(4) Average Director Tenure	0.051	-0.148	0.348	1.000			
(5) Average Busyness of Directors	0.258	-0.226	0.311	0.331	1.000		
(6) Average Primary Connections	0.596	-0.342	0.169	0.320	0.859	1.000	
(7) Average Secondary Connections	0.372	-0.285	0.200	0.335	0.890	0.951	1.000

Panel B: Principal Component Factor Loadings

Variables	Connectedness	Monitoring Quality	Unexplained
Board Size		-0.529	0.308
Independent Directors		0.349	0.624
Non-Coopted Directors		0.623	0.367
Average Director Tenure		0.420	0.540
Average Busyness of Directors	0.482		0.173
Average Primary Connections	0.523		0.052
Average Secondary Connections	0.507		0.123

Table II
Summary Statistics of Key Variables

This table reports summary statistics of the key variables in our sample dataset. The variables are identified uniquely at loan- and deal-year level. The descriptive statistics cover data from 1998 to 2017. All continuous variables are winsorized at 1% and 99% level. Our final sample contains 8,739 loans where 3,090 firms borrowing from 203 unique lenders at the BHC level. The definition of all variables is shown in Appendix I.

Variables	Mean	SD	P25	Median	P75	N
Governance Characteristics						
Board Size	14.32	3.15	12	14	16	12,304
Independent Directors	80.01	10.43	75	83.33	87.5	12,304
Non-Coopted Directors	64.49	24.83	46.15	71.43	84.62	12,304
Average Director Tenure	7.85	2.54	6.27	8	9.86	12,304
Average Busyness of Directors	1.48	0.59	1.09	1.35	1.79	12,304
Average Primary Connections	24.47	6.79	19.45	24.33	27.81	12,304
Average Secondary Connections	214.7	119.02	134.64	186	272.31	12,304
Loan Characteristics						
Loan Amount (in Million)	712	1530	68	275	750	12,304
Number of Lenders	11.53	10.05	2	10	18	12,304
Number of Participants	8.85	8.91	1	7	14	12,304
Syndicated	0.78	0.41	1	1	1	12,304
Synd%	64.32	36.54	49	84	90.59	12,304
Herfindahl Index	3322.44	3741.74	714.84	1234.25	5000	12,304
Lead Arranger's Market Share	0.12	0.14	0.01	0.05	0.18	12,042
Maturity	44.85	21.02	30	59	60	12,304
Secured	0.45	0.50	0	0	1	12,304
Takeover	0.08	0.27	0	0	0	12,304
Working Capital	0.20	0.4	0	0	0	12,304
Debt Repay	0.08	0.26	0	0	0	12,304
Borrower Characteristics						
Total Assets	12167	31459.26	421.44	2,280.13	8,834	12,304
Borrower Size	7.55	2.2	6.04	7.73	9.09	12,304
Borrower Leverage	0.38	9.69	0.16	0.27	0.40	12,304
Borrower ROA	0.11	0.4	0.08	0.12	0.17	12,304
Borrower (Market to Book)	1.48	11.62	0.74	1.05	1.60	12,304
No Prior Lending Relationship	0.44	0.50	0	0	1	12,304
Unrated	0.43	0.49	0	0	1	12,304
Lead Arranger Characteristics						
Total Assets (in Million)	1,070	841	267	902	1,880	12,304
BHC Size	20.19	1.41	19.4	20.62	21.36	12,304
BHC ROA	0.03	0.02	0.02	0.04	0.05	12,304
BHC deposit to assets	0.55	0.14	0.46	0.56	0.65	12,304
BHC Tier1 Capital to Assets	0.07	0.02	0.06	0.07	0.08	12,304
BHC Loans to Assets	0.48	0.17	0.36	0.45	0.63	12,304
Repeat	23.92	18.45	8.25	20.27	34.63	11,997
Lender Rated	0.98	0.13	1	1	1	12,304
Bankruptcy	0.06	0.23	0	0	0	11,860
Financial Crisis	0.05	0.21	0	0	0	12,304

Table III
Bank Board Structure and Loan Syndication Activity

This table reports the result of regression analysis of the bank board structure on the fraction of the loan sold by the lead arranger using all U.S. firms over the period of 1998-2017. The dependent variable *Synd%* is a fraction of the loan sold by the lead arrangers to the participating lenders. The key independent variables in Panel A are *Connectedness* in Columns (1) - (4) and *Monitoring Quality* in Columns (5) - (8). In addition, we control for borrower, loan, and lender characteristics in all columns. All independent variables are lagged except loan characteristics. We further include year fixed effect to control for heterogeneity across time. The variable *Repeat* in Columns (2) and (6) measures the repeat business between lead arrangers and participating lenders over the previous five years. The variable *Market Share* in Columns (3) and (7) is the lead arranger's last year's market share, and the variable *Lender Rated* in Columns (4) and (8) is an indicator variable for lead banks with available S&P 500 credit ratings. Panel A, B, and C reports the results of bank board structure factors on the percentage of the loan sold by lead arrangers to participant lenders, loan concentration, and the number of participant lenders. Standard errors are shown in parentheses below the estimated coefficients. ***, **, and * indicate the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. The definition of all the variables is shown in Appendix I.

Panel A: Bank Board Structure Factors on Loan Syndication Activity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%
Connectedness	3.270*** (0.263)	3.357*** (0.265)	3.418*** (0.268)	2.583*** (0.274)				
Monitoring Quality					3.004*** (0.275)	3.001*** (0.279)	3.051*** (0.277)	2.916*** (0.275)
Repeat		0.218*** (0.022)				0.170*** (0.023)		
Market Share			12.319*** (2.492)				4.286* (2.464)	
Lender Rated				52.444*** (6.906)				62.856*** (6.895)
Log (Loan Amount)	14.098*** (0.292)	13.686*** (0.292)	13.832*** (0.293)	14.097*** (0.291)	14.236*** (0.291)	13.843*** (0.291)	14.006*** (0.292)	14.163*** (0.290)
Log (Maturity)	8.465*** (0.475)	8.229*** (0.474)	8.331*** (0.475)	8.514*** (0.475)	8.745*** (0.475)	8.501*** (0.474)	8.614*** (0.475)	8.765*** (0.474)
Secured	-4.611*** (0.648)	-4.528*** (0.645)	-4.766*** (0.648)	-4.406*** (0.648)	-4.460*** (0.648)	-4.386*** (0.646)	-4.572*** (0.648)	-4.233*** (0.647)
Takeover	-3.766*** (0.980)	-4.133*** (0.972)	-3.868*** (0.975)	-3.799*** (0.977)	-3.544*** (0.980)	-3.862*** (0.973)	-3.540*** (0.977)	-3.599*** (0.976)
Working Capital	0.676 (0.726)	0.724 (0.723)	0.576 (0.726)	0.422 (0.726)	0.696 (0.725)	0.744 (0.723)	0.596 (0.726)	0.399 (0.725)
Debt Repay	-1.703 (1.150)	-1.596 (1.161)	-1.477 (1.158)	-1.957* (1.149)	-1.515 (1.147)	-1.549 (1.159)	-1.269 (1.156)	-1.805 (1.146)
Borrower Size	2.268***	2.221***	2.213***	2.283***	2.364***	2.295***	2.292***	2.356***

	(0.246)	(0.245)	(0.246)	(0.246)	(0.246)	(0.245)	(0.246)	(0.245)
Borrower Leverage	0.105	-0.357	-0.250	-0.176	0.503	0.072	0.197	-0.010
	(1.310)	(1.305)	(1.310)	(1.309)	(1.309)	(1.304)	(1.309)	(1.307)
Borrower ROA	42.275***	40.443***	42.057***	40.584***	43.780***	41.928***	43.523***	40.716***
	(2.904)	(2.895)	(2.897)	(2.917)	(2.892)	(2.891)	(2.889)	(2.909)
Borrower Market to Book	-1.333***	-1.252***	-1.359***	-1.271***	-1.346***	-1.288***	-1.373***	-1.244***
	(0.232)	(0.231)	(0.231)	(0.232)	(0.231)	(0.230)	(0.231)	(0.231)
BHC Size	-1.198***	-2.878***	-2.003***	-1.218***	0.686*	-0.732*	0.339	0.017
	(0.448)	(0.476)	(0.475)	(0.447)	(0.406)	(0.435)	(0.425)	(0.408)
BHC ROA	-97.354***	-61.769***	-80.326***	-81.522***	-101.068***	-71.986***	-94.802***	-76.854***
	(16.883)	(17.059)	(17.306)	(17.096)	(16.813)	(16.966)	(17.186)	(17.087)
BHC Deposit to Assets	14.444***	3.288	8.983**	23.837***	6.940*	-2.991	4.436	18.271***
	(3.795)	(3.904)	(3.930)	(3.945)	(3.895)	(3.987)	(3.986)	(4.026)
BHC Tier1 to Assets	-55.825	-97.496***	-72.419**	27.147	-16.821	-65.853*	-40.967	72.608**
	(35.064)	(34.976)	(35.196)	(36.750)	(34.508)	(34.560)	(34.775)	(35.943)
BHC Loans to Assets	-9.622***	1.717	-5.064	-22.339***	2.807	13.327***	5.431	-14.445***
	(3.244)	(3.362)	(3.339)	(3.564)	(3.323)	(3.430)	(3.401)	(3.676)
Observations	12304	11997	12042	12304	12304	11997	12042	12304
Pseudo R-squared	0.107	0.103	0.105	0.108	0.107	0.103	0.105	0.108
Specification	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Bank Board Structure Factors and Loan Concentration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Herfindahl Index	Herfindahl Index	Herfindahl Index	Herfindahl Index	Herfindahl Index	Herfindahl Index	Herfindahl Index	Herfindahl Index
Connectedness	-332.529*** (27.213)	-342.731*** (27.397)	-348.991*** (27.635)	-258.248*** (28.309)				
Monitoring Quality					-304.484*** (28.451)	-305.839*** (28.779)	-310.416*** (28.566)	-295.320*** (28.355)
Repeat		-22.488*** (2.320)				-17.588*** (2.331)		
Market Share			-1297.605*** (257.812)				-476.661* (254.832)	
Lender Rated				-5561.276*** (707.363)				-6600.409*** (705.321)
Observations	12304	11997	12042	12304	12304	11997	12042	12304
Pseudo R-squared	0.058	0.055	0.056	0.058	0.057	0.055	0.056	0.058
Specification	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Lender, Loan, Borrower Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel C: Bank Board Structure Factors and Number of Participant Lenders

	(1) No of Participants	(2) No of Participants	(3) No of Participants	(4) No of Participants	(5) No of Participants	(6) No of Participants	(7) No of Participants	(8) No of Participants
Connectedness	0.110* (0.057)	0.157*** (0.059)	0.182*** (0.059)	0.173*** (0.061)				
Monitoring Quality					0.236*** (0.059)	0.157** (0.062)	0.198*** (0.061)	0.236*** (0.059)
Repeat		0.038*** (0.005)				0.036*** (0.005)		
Market Share			3.593*** (0.577)				3.117*** (0.570)	
Lender Rated				-2.106*** (0.687)				-1.431** (0.646)
Observations	12304	11997	12042	12304	12304	11997	12042	12304
R-squared	0.469	0.465	0.468	0.469	0.469	0.465	0.468	0.470
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Lender, Loan, Borrower Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IV
Bank Board Structure and Loan Syndication During Financial Crisis

Table IV reports the results of regression analysis of the bank board structure on the fraction of the loan sold by the lead arranger using all U.S. firms over the period of 1998-2017. The dependent variable *Synd%* is the fraction of the loan sold by the lead arrangers to the participating lenders. The key independent variables are *Connectedness* in Columns (1) and (2) and *Monitoring Quality* in Columns (3) and (4). In addition, we include *Financial Crisis* which is a dummy equal one if the loan is originated in the year 2008 and 2009 and zero otherwise. We control for borrower, loan, and lender characteristics in all columns; however, we do not report these coefficients to save space. All independent variables are lagged except loan characteristics. We further include year-fixed effects to control for heterogeneity across time. Standard errors are shown in parentheses below the estimated coefficients. ***, **, and * indicate the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. The definition of all variables is shown in Appendix I.

	(1)	(2)	(3)	(4)
	Synd%	Synd%	Synd%	Synd%
Connectedness	2.209*** (0.186)	2.233*** (0.186)		
Monitoring Quality			3.340*** (0.246)	3.230*** (0.248)
Financial Crisis	-3.885*** (1.312)	-4.500*** (1.382)	-7.228*** (1.303)	-10.056*** (1.519)
Connectedness X Financial Crisis		-1.879 (1.323)		
Monitoring Quality X Financial Crisis				6.206*** (1.668)
Observations	12304	12304	12304	12304
Pseudo R ²	0.106	0.106	0.106	0.106
Specification	Tobit	Tobit	Tobit	Tobit
Lender, Loan, Borrower Control	Yes	Yes	Yes	Yes
Year FE	No	No	No	No

Table V
Bank Board Structure and Shock to the Reputation of the Lead Arrangers

Table V reports the results of regression analysis of the bank board structure on the fraction of the loan sold by the lead arranger using all U.S. firms over the period of 1998-2017. The dependent variable *Synd%* is the fraction of the loan sold by the lead arrangers to the participating lenders. The key independent variables are *Connectedness* in Columns (1) and (2) and *Monitoring Quality* in Columns (3) and (4). In addition, we include *Bankruptcy* which is a dummy equal to one if the loan is made within three calendar years after a large bankruptcy of an existing borrower of the lead arranger and zero otherwise. We control for borrower, loan, and lender characteristics in all columns; however, we do not report these coefficients to save space. All independent variables are lagged except loan characteristics. We further include year-fixed effects to control for heterogeneity across time. Standard errors are shown in parentheses below the estimated coefficients. ***, **, and * indicate the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. The definition of all variables is shown in Appendix I.

	(1)	(2)	(3)	(4)
	Synd%	Synd%	Synd%	Synd%
Connectedness	3.366*** (0.266)	3.371*** (0.265)		
Monitoring Quality			2.800*** (0.278)	2.494*** (0.293)
Bankruptcy	-10.424*** (1.277)	-6.898*** (1.341)	-8.977*** (1.280)	-7.956*** (1.320)
Connectedness X Bankruptcy		-9.462*** (1.088)		
Monitoring Quality X Bankruptcy				2.701*** (0.847)
Observations	11860	11860	11860	11860
Pseudo R ²	0.110	0.110	0.110	0.110
Specification	Tobit	Tobit	Tobit	Tobit
Lender, Loan, Borrower Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table VI
Bank Board Structure and Bank Reputation Subsamples

Table VI reports the results of regression analysis of the bank board structure on the fraction of the loan sold by the lead arranger using all U.S. firms over the period of 1998-2017. The dependent variable *Synd%* is the fraction of the loan sold by the lead arrangers to the participating lenders. The key independent variables are *Connectedness* and *Monitoring Quality*. Columns (1) and (2) presents the results of lead arrangers with least reputation measured by the lowest quartile based on the repeat business between lead arrangers and participating lenders. Columns (3) – (6) presents the results of the lead arrangers from middle quartiles, and Columns (7) and (8) presents results for lead arrangers with the highest reputation. We control for borrower, loan, and lender characteristics in all columns; however, we do not report these coefficients to save space. All independent variables are lagged except loan characteristics. We further include year-fixed effects to control for heterogeneity across time. Standard errors are shown in parentheses below the estimated coefficients. ***, **, and * indicate the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. The definition of all variables is shown in Appendix I.

Reputation Quartiles

	Quartile 1 - Low		Quartile 2		Quartile 3		Quartile 4 - High	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%
Connectedness	2.691*** (0.784)		1.143 (0.716)		-0.414 (0.717)		-0.741 (1.400)	
Monitoring Quality		3.264*** (0.842)		1.222** (0.569)		4.170*** (0.527)		0.508 (2.219)
Observations	2964	2964	2975	2975	2824	2824	3234	3234
Pseudo R ²	0.1603	0.1605	0.0977	0.0978	0.0659	0.0683	0.0435	0.0435
Specification	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Lender, Loan, Borrower								
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table VII
Bank Board Structure and Borrower Opacity

Table VII reports the results of regression analysis of the bank board structure on the fraction of the loan sold by the lead arranger using all U.S. firms over the period of 1998-2017. The dependent variable *Synd%* is the fraction of the loan sold by the lead arrangers to the participating lenders. The key independent variables are *Connectedness* and *Monitoring Quality*. In addition, we include two proxy variables for opaque borrowers that will be more difficult for lead arrangers to monitor: *Unrated*, used in Panel A, is a dummy equals one if the borrower is non-rated and zero otherwise, and *No Prior Relationship*, used in Panel B, indicates that no previous loans were made to the borrower by this lead arranger. The variable *Repeat* in columns (3) and (6) measures repeat business between lead arrangers and participating lenders over the previous five years. We control for borrower, loan, and lender characteristics in all columns; however, we do not report these coefficients to save space. All independent variables are lagged except loan characteristics. We further include year-fixed effects to control for heterogeneity across time. Standard errors are shown in parentheses below the estimated coefficients. ***, **, and * indicate the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. The definition of all variables is shown in Appendix I.

Panel A: Unrated Borrower Proxy for Opacity						
	(1)	(2)	(3)	(4)	(5)	(6)
	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%
Connectedness	3.273*** (0.263)	4.146*** (0.288)	4.152*** (0.288)			
Monitoring Quality				3.002*** (0.275)	2.352*** (0.356)	2.401*** (0.356)
Unrated	-2.753*** (0.745)	-2.584*** (0.743)	-2.697*** (0.738)	-2.704*** (0.745)	-2.817*** (0.745)	-2.967*** (0.741)
Connectedness X Unrated		-2.289*** (0.311)	-2.165*** (0.310)			
Monitoring Quality X Unrated					1.359*** (0.471)	1.287*** (0.472)
Repeat			0.212*** (0.022)			0.167*** (0.023)
Observations	12304	12304	11997	12304	12304	11997
Pseudo R ²	0.107	0.108	0.104	0.107	0.107	0.103
Specification	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Lender, Loan, Borrower Control	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: No Prior Lending Relationship Proxy for Opacity

	(1)	(2)	(3)	(4)	(5)	(6)
	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%
Connectedness	3.324*** (0.262)	3.836*** (0.290)	3.777*** (0.290)			
Monitoring Quality				2.942*** (0.274)	2.659*** (0.367)	2.672*** (0.367)
No Prior Relationship	-6.083*** (0.581)	-5.885*** (0.583)	-4.937*** (0.596)	-5.786*** (0.581)	-5.827*** (0.582)	-5.067*** (0.596)
Connectedness X No Prior Relationship		-1.229*** (0.299)	-1.007*** (0.299)			
Monitoring Quality X No Prior Relationship					0.542 (0.468)	0.665 (0.468)
Repeat			0.165*** (0.023)			0.125*** (0.023)
Observations	12304	12304	11997	12304	12304	11997
Pseudo R ²	0.108	0.109	0.104	0.108	0.108	0.104
Specification	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Lender, Loan, Borrower Control	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table VIII
OLS Regression Model

Table VIII reports OLS regression analysis of the bank board structure on the fraction of the loan sold by the lead arranger using all U.S. firms over the period of 1998-2017. The dependent variable, *Synd%*, is the fraction of the loan sold by the lead arrangers to the participating lenders. The key independent variables are *Connectedness* and *Monitoring Quality*. We include *Repeat* in Columns (3) and (4), *Lender Rated* in Columns (5) and (6), *Bankruptcy* in Columns (7) and (8), and *Unrated* in Columns (9) and (10). In addition, we control for borrower, loan, and lender characteristics in all columns; however, we do not report these coefficients to save space. All independent variables are lagged except loan characteristics. We further include year-fixed effects to control for heterogeneity across time. Standard errors are shown in parentheses below the estimated coefficients. ***, **, and * indicate the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. The definition of all variables is shown in Appendix I.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%	Synd%
Connectedness	1.887*** (0.202)		2.016*** (0.206)		1.703*** (0.215)		1.977*** (0.204)		1.891*** (0.202)	
Monitoring Quality		2.224*** (0.210)		2.172*** (0.217)		2.226*** (0.210)		2.051*** (0.211)		2.218*** (0.210)
Repeat			0.191*** (0.018)	0.159*** (0.018)						
Lender Rated					6.130** (2.435)	12.768*** (2.284)				
Bankruptcy							-8.301*** (0.955)	-7.270*** (0.956)		
Unrated									-3.210*** (0.582)	-3.158*** (0.581)
Observations	12304	12304	11997	11997	12304	12304	11860	11860	12304	12304
R-squared	0.604	0.604	0.593	0.593	0.604	0.605	0.614	0.614	0.605	0.605
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Lender, Loan, Borrower Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IX
Bank Board Structure using Instrumental Variable Model

Table IX reports the results of regression analysis of the bank board structure on the fraction of the loan sold by the lead arranger using all U.S. firms over the period of 1998-2017. The dependent variables in Column (1) and (3) are *Connectedness* and *Monitoring Quality*, and the dependent variable in Columns (2) and (4) – (6) is *Synd%* which is the fraction of the loan sold by the lead arrangers to the participating lenders. Columns (1) and (3) are the first stage of the 2SLS model, and Columns (2) and (4) are the second stage of the 2SLS model in which *Connectedness_1998* and *Monitoring_Quality_1998* is instrumented using post-SOX changes in bank governance. *Connectedness_1998* and *Monitoring_Quality_1998* are bank governance characteristics in 1998 if available and in 1999 if not. *Post-SOX* is an indicator variable equals one for the deal year after 2003 and zero otherwise. In addition, we control for borrower, loan, and lender characteristics in all columns; however, we do not report these coefficients to save space. All independent variables are lagged except loan characteristics. We further include year-fixed effects to control for heterogeneity across time. Standard errors are shown in parentheses below the estimated coefficients. ***, **, and * indicate the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. The definition of all variables is shown in Appendix I.

	(1)	(2)	(3)	(4)	(5)	(6)
	Connectedness	Synd%	Monitoring Quality	Synd%	Synd%	Synd%
Connectedness_1998	0.536*** (0.005)	1.612*** (0.180)			1.607*** (0.180)	
Connectedness_1998 X Post-SOX	-0.585*** (0.007)					
Connectedness (Predicted)		2.959*** (0.521)			3.027*** (0.524)	
Monitoring_Quality_1998			0.383*** (0.021)	-2.667*** (0.484)		-2.637*** (0.485)
Monitoring_Quality_1998 X Post-SOX			-0.275*** (0.021)			
Monitoring_Quality (Predicted)				-0.686 (1.911)		-0.804 (1.912)
Connectedness (Predicted) X Financial Crisis					2.206 (1.851)	
Monitoring_Quality (Predicted) X Financial Crisis						4.604* (2.692)
Financial Crisis					13.411*** (3.625)	-3.823 (3.302)
Observations	9569	9569	9569	9569	9569	9569
R-squared/Pseudo R ²	0.859	0.1119	0.392	0.1117	0.1119	0.1117
Specification	OLS	Tobit	OLS	Tobit	Tobit	Tobit
Lender, Loan, Borrower Control	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table X
Orthogonalization with Respect to Reputation

Table X reports the orthogonalized results of regression analysis of the measures of the reputation of the lead arrangers on the fraction of loans sold by the lead arranger and number of participant lenders using all U.S. firms over the period of 1998-2017. The dependent variables in Columns (1) and (2) are *Connectedness* and *Monitoring Quality*. The dependent variable in Columns (3) and (4) are *Synd%* which is the fraction of the loan sold by the lead arrangers to the participant lenders. And, the dependent variables in Columns (5) and (6) are *No of Participants*, which is the number of participant lenders in the loan syndicate. In Panel A, the key independent variables are *Repeat*, *ConnResidRepeat*, and *MonResidRepeat*. *Repeat* is the repeat business between the lead arrangers and participant lenders over the previous five years. *ConnResidRepeat* is the residual from the regression of *Repeat* on *Connectedness* from Column (1) and *MonResidRepeat* is the residual from the regression of *Repeat* on *Monitoring Quality* in Column (2). Similarly, the key independent variables in Panel B are *Market Share*, *ConnResidMarketShare*, and *MonResidMarketShare*. *Market Share* is the last year's market share of the lead arrangers. *ConnResidMarketShare* is the residual from the regression of *Market Share* on *Connectedness* in Column (1) and *MonResidMarketShare* is the residual from the regression of *Market Share* on *Monitoring Quality* in Column (2). We control for the borrower, loan, and lender characteristics in Columns (3) – (6); however, we do not report these coefficients for brevity. All independent variables are lagged except loan characteristics. We further include year-fixed effects to control for heterogeneity across time. Standard errors are shown in parentheses below the estimated coefficients. ***, **, and * indicate the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. The definition of all variables is shown in Appendix I.

Panel A: Orthogonalization with Respect to Repeat						
	(1)	(2)	(3)	(4)	(5)	(6)
	Connectedness	Monitoring Quality	Synd%	Synd%	No of Participants	No of Participants
Repeat	0.022*** (0.001)	0.018*** (0.001)	0.291*** (0.024)	0.224*** (0.023)	0.041*** (0.005)	0.038*** (0.005)
ConnResidRepeat			3.357*** (0.265)		0.157*** (0.059)	
MonResidRepeat				3.001*** (0.279)		0.157** (0.062)
Observations	11997	11997	11997	11997	11997	11997
R-squared/Pseudo R ²	0.521	0.262	0.1033	0.1029	0.465	0.465
Specification	OLS	OLS	Tobit	Tobit	OLS	OLS
Lender, Loan, Borrower Control	No	No	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Orthogonalization with Respect to Market Share						
	(1)	(2)	(3)	(4)	(5)	(6)
	Connectedness	Monitoring Quality	Synd%	Synd%	No of Participants	No of Participants
Market Share	1.202*** (0.098)	1.773*** (0.075)	16.428*** (2.568)	9.694*** (2.468)	3.812*** (0.594)	3.468*** (0.571)
ConnResidMarketShare			3.418*** (0.268)		0.182*** (0.059)	
MonResidMarketShare				3.051*** (0.277)		0.198*** (0.061)
Observations	12042	12042	12042	12042	12042	12042
R-squared/Pseudo R ²	0.484	0.243	0.1054	0.1050	0.468	0.468
Specification	OLS	OLS	Tobit	Tobit	OLS	OLS
Lender, Loan, Borrower Control	No	No	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes