

**Bank Mergers and Syndicate Structure**

by

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## **DEDICATION**

I dedicate this dissertation to my parents, Bong-Joo Lee and Haekyung Lee, my sister Eonby Lee, and my grandparents. Thank you for your endless love, support, and encouragement.

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## **ABSTRACT**

This study examines whether and how syndicated loan structure is affected by the merger activity of lead banks. While the ownership structure of a syndicate is influenced by a lead bank's syndication relationships with participating lenders, these syndication relationships can radically change in response to critical events, such as a merger involving the lead bank. I predict and document that after a lead bank's merger is complete, the renewal of a syndication relationship between the past participants and the lead is less likely, and the merged banks hold a greater portion of new loans and form more concentrated syndicates. I also find that the influence of lead banks' mergers on the share of loans retained is conditional on participating lenders' prior lending relationship with the borrower, borrower transparency, and lead banks' reputation. Overall, my empirical results suggest that a lead bank's merger activity influences its syndication relationships with participants, which function as a mechanism to reduce information asymmetry among the syndicate members.



## CHAPTER 1

### Introduction

This study examines whether and how syndicated loan structure is affected by the merger activity of lead banks. A syndicated loan unites two or more differentially informed lenders into a group (i.e., a syndicate) in which an informed “lead” bank originates the loan and performs due diligence and monitoring, and uninformed “participant” lenders fund part of the loan.<sup>1</sup> Due to the lead bank’s information advantage over participants and the unobservability of the lead bank’s due diligence and monitoring efforts, information asymmetry exists between a lead bank and participants within a syndicate (e.g., Leland and Pyle 1977; Holstrom and Tirole 1997; Sufi 2007; Bushman, Williams, and Wittenberg-Moerman. 2017). Prior research also suggests that the extent of the information asymmetry between these two parties can be reduced by lead banks’ syndication relationships with participants, which allows the lead banks with stronger syndication relationships to retain a smaller stake in loans. However, a lead bank’s syndication relationships with participants may radically change in response to critical events such as mergers (e.g., Halinen, Havila, and Salmi. 1999; Anderson, Havila, and Salmi. 2001).<sup>2</sup>

Bank mergers are an interesting setting in which to examine a potential change in an entity’s syndication relationships because the mergers are generally followed by extensive organizational change, such as a large employee turnover in lending departments, integration of

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<sup>1</sup> Lead banks are also called as “lead arrangers” or “leads.” Participant lenders are called “participating lenders,” “syndicate participants,” or simply “participants.”

<sup>2</sup> I use the terms “mergers,” “mergers and acquisitions,” and “M&A” interchangeably throughout this paper.

two different information systems and credit-approval processes, and the mixing of two different cultures (e.g., Buono, Bowditch, and Lewis. 1985; Rhoades 1998; Zollo and Singh 2004; Boissel, Bourveau, and Matry. 2015). These changes can impact the strength of a lead bank's existing syndication relationships with its syndicate participants, since the value of information about the lead bank that the participants have accumulated through their prior syndication experience becomes at least marginally outdated (e.g., Hakansson and Snehota 1995). While the U.S. banking system has undergone dramatic consolidation, and the prior research suggests that mergers may trigger a change in the syndication relationship, there is little empirical evidence that brings these two lines of research together (e.g., Halinen et al. 1999). To address this void, I examine whether and how lead bank mergers alter the syndicate participation decision, resulting in a change in the syndicate's ownership structure.

Lead bank mergers may influence which participating lenders become syndicate members. To illustrate, in a syndicated loan, participants who have a previous syndication relationship with the lead bank ("relationship" participants) as well as those who do not have a previous syndication relationship with the lead bank ("non-relationship" participants) can decide to join the lead bank's syndicate. Relationship participants, relative to non-relationship participants, are more likely to have an endowment of information about the lead bank from their past syndication experience and possess enhanced channels of communication with the lead. However, this information advantage only partially survives when the lead bank experiences a merger. Having less information about a merged lead bank can decrease relationship participants' willingness to participate in a loan arranged by the merged lead bank. On the other hand, the lingering information advantage may continue to draw relationship participants to the lead bank's post-merger syndicate, in which case there would be no significant change in the structure of syndicate participation.

For non-relationship participants, the willingness to participate in the loan can increase due to a more level playing field between the relationship and non-relationship participants. As the work of Rajan (1992) suggests, a decrease in the level of information advantage possessed by informed lenders (i.e., relationship participants) relative to uninformed lenders (i.e., non-relationship participants) can increase the aggressiveness with which uninformed lenders compete with informed lenders.<sup>3</sup> If the degree of relative information asymmetry between relationship and non-relationship participants about a lead arranger decreases due to the lead bank's merger activity, non-relationship participants are likely to be more willing to participate in a loan syndicated by the merged lead bank.

I examine how the merger changes the lead bank's exposure to post-merger loans. When the structure of syndicate participation changes after a merger, the information asymmetry between participants and the lead in a new, post-merger syndicate may be greater. To compensate for the change in information asymmetry, the level of the lead bank's exposure and commitment to a loan (i.e., the proportion of a loan retained by the lead bank) inevitably changes (e.g., Leland and Pyle 1977; Holstrom and Tirole 1997; Sufi 2007; Giannetti and Yafeh 2012; Bushman et al. 2017).<sup>4</sup> The literature on syndicated lending suggests that lead banks should retain a greater portion of the loan and form more concentrated syndicates when the perceived information asymmetry increases. On the one hand, the increase in information asymmetry may require the lead to carry a large share of the loan. On the other hand, the merger can lead to greater economies of scale, efficiency, and sophistication that may actually offset the asymmetry, in which case the syndicate structure might

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<sup>3</sup> In light of this competition, the syndication process can be viewed as an auction where potential syndicate participants submit sealed bids to the lead bank (e.g., Ivashina and Sun 2011).

<sup>4</sup> In practice, risk sharing in syndicated loans occurs on a pro rata basis according to each lender's share in the loan (Wight, Cooke, and Milbank. 2009). Therefore, a higher percentage of the loan kept by the lead arranger and a higher level of syndicate concentration capture an increase in the lead lender's exposure and commitment.

not change (e.g., Amel, Barnes, Panetta, and Salleo. 2004; Al-Sharkas, Hassan, and Lawrence. 2008). Therefore, how the change occurs in a merger setting is an empirical question.

Using a sample of syndicated loans from 1989 to 2012, I begin my analysis by investigating how bank mergers affect syndicate participation decisions by relationship and non-relationship participant lenders. I then examine the effect of a lead bank's merger activity on the percentage of a loan retained by the lead bank and the level of loan concentration based on the Herfindhal index of loan shares. To identify lead banks that experienced a merger, I construct a binary variable, *Merger*, which takes a value of 1 if the lead bank has been involved in a merger during the year preceding its loan's issuance.

Controlling for firm-, loan-, and lender-specific characteristics, as well as lender and year fixed effects, I find the following main results. First, I find that, on average, non-relationship syndicate participants are more likely to join a syndicated loan arranged by a merged lead bank. In other words, the renewal of a syndication relationship between the lead and a past participant is less likely after the lead bank completes a merger. This result is robust to assuming that acquiring banks inherit the syndication relationships that their target banks have. I also find that lead banks retain a greater share of loans and form more concentrated syndicates (i.e., syndicates with a higher Herfindhal index) when they syndicate loans after their merger completion.

After presenting my main results, I explore the extent to which the link between lead banks' mergers and the proportion of the loan retained is conditioned by other mechanisms that can reduce the information asymmetry between the lead and participants. The first mechanism I consider is participating lenders' prior lending relationships with the borrower. I find that merged lead banks retain a smaller stake in loans when a syndicate is composed of more participants with a prior lending relationship with the borrower. This result is consistent with the argument that the

participants' prior interactions with the borrower would allow them to accumulate knowledge about the borrower and serve as an alternative source of information that reduces information asymmetry between them and the lead (e.g., Gadanecz, Kara, and Molyneux. 2012).

I consider two additional information-asymmetry-reducing mechanisms: (1) the availability of information about the borrowers and (2) the reputation of the lead bank. The degree of information asymmetry between a lead bank and participants decreases when participating lenders can more easily learn about the borrower and when lead arrangers are more reputable (e.g., Dennis and Mullineaux 2000; Sufi 2007; Mansi, Maxwell, and Miller. 2011; Gopalan, Nanda, and Yerramilli. 2011). Using multiple measures of the transparency of the borrower's information environment, such as the borrowers' analyst coverage, credit rating, and size, I find that merged lead banks hold a smaller portion of loans and create a less concentrated syndicate when the information environment of their borrower is more transparent. I also document that more reputable lead banks hold smaller fractions of loans and have a less concentrated syndicate than those with a less established reputation.

This study contributes to two main streams of literature: relationship lending and bank mergers. First, it adds to the literature on relationship lending. My results specifically address how the syndication relationship between lead banks and syndicate participants affects syndicated loan structure by mitigating information asymmetry problems among these parties. My findings are in line with a contemporaneous study by Li (2017), who documents that prior interactions between participating lenders and lead arrangers are negatively associated with the share of a loan retained by the lead arranger. Building on Li's (2017) evidence, I explore how lead banks' critical events, such as mergers and acquisitions, affect their syndication relationships and the post-merger ownership structure of a loan syndicate. The focus on lender characteristics as a driver of the

syndicate structure is a novel approach in this literature, which has largely concentrated on how borrower characteristics shape syndicated loan arrangements. My study also suggests that participant lenders' past lending relationships with the borrower act as a substitute for the syndication relationship between a lead and participants to reduce information asymmetry among these parties, an aspect that has been underexplored in the existing research.

Second, I contribute to the literature on bank mergers. Understanding the consequences of the U.S. financial services industry consolidation in and of itself has been an important area of research because the waves of banking consolidations in the United States have significantly decreased the number of banking organizations, from about 14,500 in the mid-1980s to 5,600 today (Kowalik, Davig, Morris, and Regehr. 2015). While prior research provides some evidence on the effects of lender mergers on a lender's customers, it is silent on whether and how changes in merged lenders influence their relationship with their lending partners (e.g., syndication relationships) and their subsequent loan structure. Using the U.S. syndicated loan market as my setting, I extend the prior research by documenting that merged lead banks form relationships with unfamiliar syndicate participants and increase their commitment to new loans by retaining a larger share of the loans.

The remainder of the dissertation is organized as follows. Chapter 2 discusses previous research motivating my hypotheses. Chapter 3 describes my sample and data. Chapter 4 presents my research design and results. Chapter 5 concludes the paper.

## CHAPTER 2

### Background and Hypothesis Development

#### 2.1. Syndicated Loans

Syndicated loans have become the largest source of corporate financing in the United States, growing from approximately \$150 billion in 1987 to \$2.9 trillion in 2017 (Thomson Reuters 2017). In contrast to traditional loans, which involve a single lender and a borrower, syndicated loans involve multiple lenders that constitute a syndicate. To form a syndicate, a “lead” bank (i.e., lead arranger) sends out invitations to a large set of potential lenders, who then choose whether to join the syndicate and become “participants.”<sup>5</sup> These lenders jointly offer funds to a single borrower, which allows the lenders to share risks, satisfy demand for large loans, and generate extra fee income (e.g., Altunbas, Gadanez, and Kara. 2006). As the demand for syndicated loans has increased, a large stream of literature has examined elements of this important market, such as what factors influence contract terms and the ownership structure of the loan syndicate itself.

At a fundamental level, the ownership structure of the loan syndicate is determined by information asymmetry between contracting parties (e.g., Leland and Pyle 1977; Diamond 1991; Aghion and Bolton 1992; Holmstrom and Tirole 1997). Unlike traditional loans where information asymmetry exists only between lenders and borrowers, information asymmetry among lenders also

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<sup>5</sup> Lead arrangers manage the syndication process. They collect information about the borrower, build a relationship with the borrower, negotiate the terms of a loan contract, and monitor the borrower after the loan syndication. Unlike the lead arranger, participating lenders generally do not have direct communications with their borrowers and tend to maintain an arm’s-length relationship with them.

appears in syndicated loans for two main reasons. First, there is an adverse selection problem because lenders have different degrees of access to borrowers' information (e.g., Leland and Pyle 1977). Since lead arrangers gather information about the borrower and thus have more private information about their borrowers than participants do, participants face the risk that lead arrangers may not perform due diligence in screening and may originate low-quality loans.<sup>6</sup> Second, there is a moral hazard problem as participant lenders delegate monitoring of the borrower to the lead arranger throughout the life of the loan (e.g., Holstrom and Tirole 1997; Sufi 2007). Since the lead arranger's monitoring effort is not observable, there is a risk that the lead arranger may shirk its responsibility by not exerting full effort to monitor the borrower, because the lead lender retains only a portion of the loan. Theory suggests that to create incentives for monitoring effort, lead arrangers should put skin in the game by retaining a larger share of the loan and forming a more concentrated syndicate (e.g., Leland and Pyle 1977; Gorton and Pennacchi 1995; Holmstrom and Tirole 1997). This type of syndicate structure is important because it allows lead banks to credibly commit to loans they originate and offer participants protection against opportunistic behavior on the part of the lead banks. This commitment is costly for a lead arranger, as increased exposure to a single borrower restricts diversification of the lead arranger's loan portfolio and lowers the lead arranger's upfront fee income to exposure ratio (e.g., Esty 2001; Ivashina 2009).<sup>7</sup>

Much of the prior literature has explored how problems arising from information asymmetry between the lead arranger and participating lenders in a syndicate can be mitigated by borrowers' attributes, such as borrower transparency and a borrower's prior relationship with the lead arranger (e.g., Dennis and Mullineaux 2000; Sufi 2007; Ball, Bushman, and Vasvari. 2008).

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<sup>6</sup> Lead arrangers may originate low-quality loans for private benefits and/or cross-selling opportunities with the borrower (Mora 2015).

<sup>7</sup> An important motivation for lead arrangers to structure and lead syndicated loan transactions is to generate fee income. Lead banks seek to have larger syndicates to generate higher fee income with smaller loan shares (Esty 2001).



Information about the borrower is fundamental to the information asymmetry between leads and participating lenders. What is also important is the information about lead arrangers that may be available to participants. For example, anecdotal evidence suggests that participants seek information from a variety of data sources to ascertain lead arrangers' screening and monitoring abilities, and in doing so maintain internal rankings of lead arrangers that guide their decisions to participate in a syndicate (Gopalan et al. 2011).

A small number of studies have examined how lead arrangers' attributes, such as size and reputation, can help participants infer the lead arrangers' abilities and thus mitigate information asymmetry among lenders (e.g., Gopalan et al. 2011). Another mechanism that can reduce the degree of information asymmetry problems is syndication relationships between the lead arranger and participants. In a syndicated loan, those who participate can either have a previous syndication relationship with the lead arranger (in which case they are "relationship" participants) or have no previous syndication relationship with the lead arranger (in which case they are "non-relationship" participants). Just as repeated interactions with borrowers allow lenders to obtain private information about the borrower and build an information advantage, repeated interactions with lead lenders provide participating lenders opportunities to have a more open communication channel with the lead arrangers and to obtain information about them, which reduces asymmetric information problems among the syndicate members (e.g., Bushman et al. 2017).<sup>8</sup>

Consistent with the argument that past syndication experience with a lead bank may serve as an information source to participants, the literature suggests that a lead arranger retains a smaller share of the loan when its syndicate consists of more relationship participants (e.g., Li 2017). The

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<sup>8</sup> Anecdotal evidence suggests that lead banks do care about their relationships with other banks. Lead banks refer the participating banks as their lending partners and even have entire departments responsible for communicating with their lending partners and marketing their deals (Etsy 2001).

importance of information that participating lenders have about lead arrangers raises the question as to how a critical event for the lead arranger, such as its merger activity, can affect the syndication relationship and syndicate structure.

## **2.2. Mergers, Syndication Relationships, and Syndicate Structure**

Since mergers have dramatically reduced the number of U.S. banks, a large literature has examined the consequences of consolidation in the U.S. financial services industry. Most studies in this area focus on the main motivation of bank consolidation – maximization of shareholder value through increased market power and efficiency.<sup>9</sup> A few studies have investigated the effects of bank mergers on a bank’s relationships with external borrowers and the subsequent contract terms (e.g., Sapienza 2002; Di Patti and Gobbi 2007). While prior research provides evidence that mergers disturb the lender’s relationship with its customers, we do not yet know how lender merger activity affects the lender’s relationship with its lending partners and the subsequent loan structure.

To shed light on this issue, I examine the link among lead bank mergers, syndication relationships, and syndicate structure. An advantage of investigating syndication relationships is that syndicated loan contracts are disclosed publicly, which allows researchers to observe with whom lead banks arrange their syndicated loans (i.e., who the participants are) and how the composition of the participants changes.<sup>10</sup> Basing on prior research suggesting that an entity’s critical events can trigger radical change in its business relationships (e.g., Halinen et al. 1999), I argue that when lead banks experience mergers, these events may influence their syndication relationships.

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<sup>9</sup> See Berger, Demsetz, and Strahan (1999), Amel, Barnes, Panetta, and Salleo (2004), and DeYoung, Evanoff, and Molyneux (2009) for reviews of these studies.

<sup>10</sup> While prior research posits that an entity’s business relationships change after its merger is complete, this prediction has not been examined with a large-sample-based empirical approach because it is challenging to obtain data that allow researchers to trace the entity’s business relationships before and after its merger activity.

Mergers can involve sweeping changes to a bank's organization, personnel, and culture (e.g., Buono, Bowditch, and Lewis. 1985; Rhoades 1998; Zollo and Singh 2004; Boissel et al. 2015); as a result, the important information participating lenders have gathered about lead arrangers can become unreliable. Some studies also mention that bank mergers affect merged financial firms' use of information to monitor their borrowers as well as the information environment of the merged lenders (e.g., Stein 2002; Wu and Zang 2009; Chen and Vashishtha 2017). As the literature suggests, it thus seems highly likely that mergers can affect a bank's future syndication relationships and syndication structure (e.g., Halinen et al. 1999; Anderson et al. 2001).

Basing my prediction on prior research on the competition among differentially informed lenders to win a loan deal, I expect that a lead bank's merger activity can affect the post-merger structure of its syndicate membership, which consists of relationship and non-relationship participants. For example, Rajan (1992) suggests that a decrease in the level of information advantage possessed by informed lenders (i.e., relationship participants) against uninformed lenders (i.e., non-relationship participants) increases the aggressiveness with which uninformed lenders compete against informed lenders. I apply the intuition from his model to understand how information asymmetry issues between relationship and potential non-relationship participants may affect their loan-participation decision. When a lead bank goes through a merger, the information advantage possessed by its relationship participants relative to its non-relationship participants seems very likely to decrease marginally, and this shift may increase non-relationship participants' willingness to participate in syndicated loans arranged by the merged lead bank. However, it is possible that the structure of syndicate participation will not change after a lead bank's merger. Even though a lead bank's merger decreases the value of the relationship

participants' information endowment about the lead bank, relationship participants might continue to join syndicated loans arranged by the merged lead bank because they have gained familiarity with the merged bank through prior syndication experiences.

If information that relationship participants possess about their lead banks becomes outdated after the merger, and/or more non-relationship participants join a merged lead bank's syndicate, I expect greater information asymmetry between syndicate participants and the lead bank. Theory predicts and empirical evidence demonstrates that the severity of the information asymmetry between the lead arrangers and participants increases the participants' demand for lead arrangers to hold a greater proportion of the loan (e.g., Leland and Pyle 1977; Gorton and Pennacchi 1995; Holmstrom and Tirole 1997; Sufi 2007; Ball et al. 2008; Giannetti and Yafeh 2012; Bushman et al. 2017). In practice, risk sharing in syndicated loans occurs on a pro-rata basis based on each lender's share of the loan (Wight et al. 2009). Therefore, if a lead arranger keeps a higher percentage of the loan, it increases its own exposure and commitment. I hypothesize that merged lead arrangers hold a greater share of the loan and form a more concentrated syndicate when they syndicate loans after their merger completion. This prediction is not without tension. For example, mergers can lead to greater economies of scale, efficiency, and sophistication (e.g., Amel et al. 2004). Also, lead banks can help level the playing field for all participants, offsetting the increase in information asymmetry. Therefore, whether and how the syndicate structure changes in a merger setting is an empirical question.

### **2.3. Mechanisms to Mitigate Increase in Information Asymmetry from Bank Mergers**

I also consider whether the link between a lead bank's merger activity and its exposure to post-merger loans (i.e., the percentage of loans retained and loan concentration) is conditioned by other mechanisms that potentially reduce information asymmetry among the syndicate members.

The first mechanism I consider is participants' prior lending relationships with the borrower. Even though participating lenders do not have privileged access to the borrower, as lead arrangers do, these participants should still perform their own assessment of the borrower's credit quality when they make their participation decision (Esty 2001). Participants' repeated interactions with the borrower may allow the participating lenders to accumulate knowledge about it; thus, they may have better access to the borrower than participating lenders who do not have a prior relationship with the borrower (e.g., Gadanecz et al. 2012). This type of a relationship provides participating lenders with an alternative source of information that reduces information asymmetry problems between the participants and the lead bank. Therefore, I predict that when a syndicate is composed of more participating lenders with a prior relationship with the borrower, merged lead banks hold a smaller proportion of loans and less concentrated syndicates.

I further consider whether the impact of lead bank mergers on the percentage of shares retained and loan concentration varies with the borrowers' information environment as well as with the reputation of lead arrangers. I expect that when a borrower is more transparent, participating lenders have more sources of information with which to learn about and monitor the borrower (e.g., Sufi 2007; Guntay and Hackbarth 2010; Mansi et al. 2011). Conversely, when a borrower is more opaque, participating lenders have fewer sources of information about the borrower and will need to rely more on their lead bank. Therefore, in a testable hypothesis, I predict that the link between bank mergers and merged lead lenders' share of the loan and loan concentration is less pronounced when the borrower is more transparent, and more pronounced when the borrower is more opaque.

I expect a similar substitute effect regarding lead arrangers' reputations. Prior studies argue that a lead arranger's reputation can be an effective mechanism in reducing ex ante and ex post

moral hazard (e.g., Pichler and Wilhelm 2001; Gopalan et al. 2011). Therefore, lead arrangers who have experienced bank mergers may retain a smaller fraction of the loan at the margin if they have more established reputations in the syndicated loan marketplace.

## CHAPTER 3

### Sample, Data, and Descriptive Statistics

#### 3.1. Data Sources and Sample Selection

I start with data on DealScan from 1989 to 2012. I restrict my sample to this time period because the level of coverage on loan data is limited on DealScan before 1989 and because a large increase in the number of bank mergers occurred around this period. To identify lead arrangers, I use the lender arranger credit information available in DealScan. If the lender arranger credit is missing, I follow the prior literature and identify the lead arranger as the lender whose role has been specified as Admin Agent, Agent, Arranger or Lead Bank in the database (e.g., Chen and Vashishtha 2017). I use Chava and Roberts' (2008) DealScan-Compustat linking table to match the borrower identifiers in DealScan to the borrower identifiers in Compustat. I limit my sample to loans issued to borrowers and banks based in the United States, as I am interested in the effect of bank mergers on the syndicate structure in that country.

Merger information comes from the SNL Financial Bank Mergers and Acquisitions Database (SNL database). The SNL database provides comprehensive information on the mergers and acquisitions (M&A) activities of banking institutions in the United States. While the database provides banking institutions' CUSIP and RSSD IDs, these identifiers are not provided by DealScan. Therefore, I link lender identifiers in DealScan to their bank holding company's RSSD ID as well as to their Compustat identifiers (i.e., GVKEY). I first match lenders' IDs from

DealScan to lenders' IDs from Compustat.<sup>11</sup> I link these lenders' identifiers to the RSSD ID of their bank holding company (BHC) using the Federal Reserve's CRSP-RSSD linking table. I then match the lead banks identified from loan contracts in DealScan to the SNL database using the BHC's RSSD ID and CUSIP.<sup>12</sup> Using the merger data, I flag facilities that involve a lead arranger who experiences a bank merger within twelve months prior to the loan issuance date. To indicate a lead arranger with the merger experience, I treat only the mergers and acquisitions that are classified as "non-government assisted" and that do not involve two banks owned by the same bank holding company. Using the merger information, I trace lending relationships through time even if the original relationship lender disappears due to M&As. I obtain borrower and lender characteristics from Compustat and Bank Compustat, respectively.

Table 1 presents the sample selection process for the period from 1989 to 2012. I first start with facilities issued to U.S. public firms in U.S. dollars by lead banks based in the United States. Following prior research, I exclude all financial services firms (SIC codes between 6000 and 6999). Next, I exclude facilities with insufficient loan, borrower, and lender data. I estimate borrower and lender characteristics in the quarter prior to the loan issuance. This process leaves a final sample of 9,752 facilities related to 1,941 firms.

### 3.2. Descriptive Statistics

Table 2 presents descriptive statistics for the main variables used in my tests. All variables are described in detail in the appendix. To reflect the previous syndication relationship of the lead arranger and syndicate participants, I create a variable, *Participant-Lead No-Relationship*, which

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<sup>11</sup> I also use Schwert's (2018) lender link table that matches all lenders with at least 50 loans or at least \$10 billion in loans volume in the DealScan-Compustat sample as a supplement and cross check.

<sup>12</sup> In addition to using the SNL data, I use the merger data of Mora (2015) as a supplement and cross check. I thank Nada More for kindly sharing this information.



is a binary variable equal to 1 if the participant was not involved in a deal with the lead arranger over the one year preceding the loan issuance date. This variable effectively represents a “non-relationship” participant. Following Sufi (2007), I use a one-year window.<sup>13</sup> The mean value of *Participant-Lead No-Relationship* indicates that 21.4% of syndicate participants do not have a previous syndication relationship with the lead arranger. This value is in the ballpark with prior studies (e.g., Bushman et al. 2017) that consider this relationship variable. I use an indicator variable, *Merger*, which equals 1 if the lead arranger issues a loan within the one-year period after the effective date of the merger. The mean value of *Merger* indicates that 27.5% of facilities were syndicated by lenders who were part of mergers during the past twelve months.

For my analyses on the relationship between bank mergers and syndicate structure, I follow prior research and focus on the proportion of a loan retained by the lead arranger (*Lead Allocation*). For loans with sufficient data, the mean value of *Lead Allocation* is 21.1%; the median is 15%. As an alternative dependent variable, I also use the level of concentration of holdings within a syndicate based on the Herfindhal index of loan shares (*Syndicate Concentration*) (e.g., Sufi 2007; Lin et al. 2012). *Syndicate Concentration* is calculated as the sum of the squared individual percentage shares in the loan, and it varies from 0 to 10,000 ( $100 \times 100$ ), with 10,000 being the Herfindhal when a lender holds 100% of the loan. The lower value of the Herfindhal index indicates that a syndicate is more dispersed, and the borrower is monitored less closely. The mean and median value of *Syndicate Concentration* are 1,686 and 1,139, respectively, and the distribution is similar to that of prior studies (e.g., Sufi 2007).

With respect to loan characteristics, the average loan size is \$218 million. In terms of *Maturity* (defined as the logarithm of maturity), the average is 43 months. A total of 67.1% of the

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<sup>13</sup> On average, 94% of syndicate participants in my sample rejoin a syndicate issued by a lead arranger with whom they worked within the past year. I also perform my tests using a 3-year window for a robustness check.

sample loans have performance pricing provisions (*PP*), 61.0% are secured (*Collateral*), and loans have on average 1.7 financial covenants (*Covenants*). Most of the loans are revolvers (63.3%), and 8.4% are term loans B and below, which are typically made by nonbank institutional investors. Moreover, 62.4% of sample loans are issued to borrowers with an investment-grade rating. With respect to loan pricing, the average interest rate spread is 137.55 basis points (where *Spread* is the logarithm of the all-in-drawn spread). Moreover, *Borrower-Lead Relationship* indicates that 50.5% of loans are issued by lead arrangers who have a prior relationship with the borrower. Following the prior literature, I consider loans to be relationship loans if the lead arranger syndicated a loan to the same borrower within the five years preceding the date of a loan's issuance.

With respect to borrower characteristics, the average and median ratio of earnings before extraordinary items to total assets (ROA) is 0.9% and 1.1%, respectively, similar to the ROA of borrowers in the samples used in prior research. Sample firms have an average and median interest coverage ratio (*Interest coverage*) of 14.03 and 3.927, respectively. The mean of *Leverage* (total liabilities over total assets) is equal to 62.9%. Sample firms have a mean value of total assets of \$1.5B. *Size* is measured by the logarithm of the total assets. The average market-to-book ratio (MTB) is 2.49.

## CHAPTER 4

### Research Design and Findings

In this chapter, I present my empirical findings in the following subsections. Section 4.1 presents my main analyses. Specifically, section 4.1.1 investigates whether and how bank mergers affect the syndicate relationships between lead arrangers and participating lenders. Section 4.1.2 examines post-merger effects on the syndicate structure. Section 4.1.3 considers whether the link between bank mergers and the syndicate structure varies by participant lenders' lending relationship with the borrower. Section 4.2 provides additional analyses by considering whether the effects of bank mergers on the syndicate structure vary by borrowers' information environment and lead arrangers' reputation. Section 4.3 provides robustness testing.

#### 4.1 Main Analyses

##### *4.1.1. Bank Mergers and Participant-Lead Syndication Relationship*

I first examine how bank mergers affect the syndication relationship between participating and lead lenders by exploring syndicate participation decisions by relationship and non-relationship participant lenders. To examine the link between bank mergers and the syndicate participation decision, I employ the following linear probability model at the facility-lead-participant level:

$$\text{Participant-Lead No-Relationship} = \beta_1 \text{Merger} + \beta_2 \text{Controls} \quad (1)$$

where *Participant–Lead No–Relationship* is a binary variable equal to 1 if the syndicate participant has not participated in a syndicate arranged by the loan’s lead arranger in the year preceding the loan’s issuance and 0 otherwise. To calculate this variable, I let acquiring banks inherit their target banks’ prior syndication relationships. *Merger* is the variable of interest and equals 1 if the loan’s lead arranger has been involved in a merger during the year preceding the loan’s issuance.

I control for various factors that prior research suggests are associated with the probability of a non-relationship participant joining a syndicate (e.g., Bushman et al. 2017; Kang, Williams, and Wittenberg-Moerman. 2018). I include the borrower’s characteristics, such as profitability (*ROA*), interest coverage ratio (*Interest Coverage*), leverage (*Leverage*), the natural logarithm of size of total assets (*Size*), and the market-to-book ratio (*MTB*). I also control for whether the lead arranger and the borrower have a prior lending relationship (*Borrower-Lead Relationship*) and whether the borrower is rated as investment grade (*Investment Rating*). I further include loan characteristics, including the natural logarithm of facility amount (*Amount*), maturity (*Maturity*), whether the loan is a revolving line of credit (*Revolver*), whether the loan is a term loan B or below (*Term Loan B*), whether the loan is secured (*Collateral*), the existence of performance pricing provisions (*PP*), the number of covenants (*Covenants*), and the number of participant lenders (*# of Lenders*). Moreover, I include lender characteristics, such as size (*Lender Size*), deposit ratio (*Lender Deposit*), loan ratio (*Lender Loan*), and whether the lender was the lead arranger of a syndicate for the first time (*First Lead*). I include lender and year fixed effects and cluster standard errors by package ID to correct for within-package correlation in the error term.<sup>14</sup>

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<sup>14</sup> For a robustness check, I cluster standard errors by lead arrangers, and my inferences remain unchanged.

I present my results in Table 3. The coefficient on *Merger* is significant and positive, indicating that the probability that a participant with no previous syndication relationship with a lead bank joins the syndicate is 12% higher following the lead bank’s merger completion. Conversely, this result suggests that the renewal of a past lead-participant relationship is less likely.

With respect to controls, the significantly positive coefficient on *Collateral* implies that it is more likely for secured loans to be funded by non-relationship participants. When a loan is syndicated by the lead arranger for the first time (*First Lead*), the lead arranger is less likely to have past relationships with other lenders. The renewal of a past lead-participant relationship is more likely when a lead arranger has a prior relationship with the borrower (*Borrower-Lead Relationship*). This evidence is consistent with the prior literature, which suggests that relationship participants are more willing to rejoin a lead arranger’s syndicate when it has superior borrower information (e.g., Champagne and Kryzanowski 2007).

#### 4.1.2. Bank Mergers and Syndicate Structure

Next, I examine how bank mergers affect the ownership structure of syndicated loans arranged by merged lead banks. I estimate the following OLS model at the facility-lead level:

$$\text{Syndicate Structure} = \alpha_0 + \beta_1 \text{Merger} + \beta_2 \text{Controls} \quad (2)$$

where the left-hand-side variables include *Lead Allocation*, the percentage of a loan retained by the lead arranger, and *Syndicate Concentration*, the sum of the squared individual shares in the loan.<sup>15</sup> *Merger* equals 1 if a syndicate is issued by a lead arranger who has been involved in an

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<sup>15</sup> For these analyses, my sample size is reduced because I require data on the percentage lead arrangers’ ownership for *Lead Allocation*, and data on the percentage of lead arrangers’ and participating lenders’ ownership for the *Syndicate Concentration*.

M&A during the one-year period preceding the loan issuance. I predict  $\beta_1 > 0$ . I include borrower-, loan-, and lender-specific characteristics as my controls in the regression model. I also include lender and year fixed effects and cluster standard errors by package level.

Table 4 presents my results. In the first column, consistent with my prediction, I find that *Lead Allocation* increases for lead banks that recently underwent mergers. In terms of economic significance, the share of loans retained by lead arrangers increases by 6% (at the mean of 21.1) after bank mergers. The magnitude of the effect is similar to the effect of a one standard deviation change in a key credit risk measure, *ROA* (4%), and a one standard deviation change in a monitoring mechanism, *Covenant* (6%).

With respect to control variables, lead banks that issue syndicated loans to bigger and more profitable borrowers retain a smaller proportion of their loans. A first-time lead bank also holds a higher loan share, which suggests that participants require new lead banks to put more skin in the game. Also, the coefficient on loan size is negative and significant, which is consistent with the idea that the size of loans reflects the overall syndicate risk exposure, as Ball et al. (2008) suggest. Lead arrangers of large loans retain a smaller ownership percentage because larger deals are expected to be financed by a larger number of syndicate members (due to capital requirement constraints or to limit risk exposure to one borrower).

In the second column, I present the results of performing the estimation model using *Syndicate Concentration* as the dependent variable. The coefficient on *Merger* is marginally significant and positive, and the directions of the coefficients of control variables are similar to those of the first column. For example, a syndicate is more dispersed when the borrower is large and profitable and when loans are large and have longer maturity.

In summary, these analyses presented in section 4.1 provide evidence that non-relationship participants are more likely to join syndicates arranged by lead banks engaged in merger activities. This evidence also suggests that the continuation of past syndication relationships between lead arrangers and participating lenders is less likely, consistent with prior research, which suggests that merger activities disturb merged entities' existing relationships with their business partners (e.g., Halinen et al. 1999; Anderson et al. 2001). Moreover, lead banks hold a greater portion of new loans and form more concentrated syndicates when they syndicate loans after their mergers are complete. This evidence is consistent with my prediction that lead banks increase their stakes in syndicates to mitigate the increased information asymmetry among syndicate members after the lead banks' mergers.

## **4.2. Cross-Sectional Analyses**

I next conduct analyses conditional on several mechanisms that are expected to reduce information asymmetry among the syndicate members. These are participants' prior lending relationships with the borrower, borrower transparency, and lender reputation.

### *4.2.1 Participants' Relationship with the Borrower*

I first examine whether the link between bank mergers and the post-merger syndicate structure varies by participating lenders' prior lending relationships with the borrower. I expect that the information participants have obtained through their interactions with lead lenders becomes less significant when participating lenders have learned about the borrowers through their past syndication experience. Therefore, I predict that merged lead arrangers retain a smaller fraction of new loans and create less concentrated syndicates at the margin when more participating lenders in a syndicate are familiar with the borrower.

I define an indicator variable, *Participant-Borrower Relationship*, to be equal to 1 if the ratio of the number of participants who have been involved in a deal with the borrower over the five years preceding the loan issue date to the total number of participants in a deal is above the sample median and 0 otherwise. I augment equation (2) with *Participant-Borrower Relationship* and the interaction term  $Merger \times Participant-Borrower Relationship$ .

I present my results in Table 5. Consistent with my prediction, the coefficient on  $Merger \times Participant-Borrower Relationship$  is significantly negative for both *Lead Allocation* and *Syndicate Concentration*. When a loan has fewer participant lenders who have prior relationships with the borrower, the share of the loan retained by a lead bank increases by 12%, and the level of loan concentration increases by 10% after the merger. However, these effects disappear when there are more participant banks with prior relationships with the borrower. These results are consistent with those of Sufi (2007) and Li (2017), who suggest the importance of participant-borrower relationships in reducing information asymmetry problems in syndicates. My analyses also indicate the interaction effects of participant-borrower and participant-lead relationships and suggest that these two relationship mechanisms substitute for each other.

#### 4.2.2 Borrower Transparency

I examine whether the effect of bank mergers on the syndicate structure varies by the level of a borrower's information transparency. I conjecture that when a borrower is more transparent, the relation between bank mergers and the syndicate structure will be weaker, as participating lenders have more sources of information to learn about and monitor the borrower. Conversely, when a borrower is more opaque, this relationship will be stronger, as participating lenders have fewer sources of information about the borrower. To conduct my empirical analyses, I use several measures of borrower transparency suggested by the literature.



First, as prior research suggests that equity analysts are informative to lenders (e.g., Guntay and Hackbarth 2010; Mansi et al. 2011), I use analyst coverage to measure the availability of information about the borrower. I expect that the link between bank mergers and the syndicate structure will be weaker when more equity analysts are following the borrower. To perform my analysis, I define *Analyst Coverage* as an indicator variable equal to 1 if the number of equity analysts following the borrower is above the sample median in the year of a loan's issuance and 0 otherwise. I augment equation (2) with *Analyst Coverage* and the interaction term  $Merger \times Analyst\ Coverage$ . I report the results of my analysis in Table 6. As I report in Panel A of Table 6, the coefficient on  $Merger \times Analyst\ Coverage$  is negative and significant for both *Lead Allocation* and *Syndicate Concentration*. Economically, after completing their mergers, lead arrangers hold 2.96% less of the loan (14% at the mean of 21.1) when the borrower is transparent. The results and inferences are similar when I use the Herfindhal index measure of concentration (*Syndicate Concentration*) as my dependent variable.

Second, I rely on a borrower's credit rating because it helps lenders assess borrower creditworthiness (e.g., Sufi 2007). I predict that the effects of bank mergers on the syndicate structure will be weaker when the borrower has a good credit rating. I assign an indicator variable, *Rated*, equal to 1 if the borrower has an investment-grade credit rating in the year of a loan's issuance and 0 otherwise. I augment equation (2) with *Rated* and the interaction term,  $Merger \times Rated$ . I report in Panel B of Table 6 that the coefficient on  $Merger \times Rated$  is negative and significant for both *Lead Allocation* and *Syndicate Concentration*. Lead arrangers hold 10% less (at the mean of 21.1) when the borrower has an investment-grade credit rating. Column (2) presents similar results using *Syndicate Concentration* as the dependent variable.

My third measure of the transparency of the borrower's information environment is based on a borrower's size, as smaller firms suffer more from asymmetric information problems (Berger and

Udell 1995). I predict that the effects of bank mergers on the syndicate structure will be stronger when the borrower is small. I define the *Small Borrower* indicator variable to be equal to 1 if the borrower's total assets are below the sample median in the year of a loan's issuance and 0 otherwise. As I report in Panel C of Table 6, the coefficient on  $Merger \times Small\ Borrower$  is positive and significant for both *Lead Allocation* and *Syndicate Concentration*. After their mergers, when lead arrangers issue loans to small borrowers, they hold 2.2% more of the loans (or 10% at the mean of 21.4).

#### 4.2.3 Bank Mergers and Lead Reputation

I next investigate whether the magnitude of the relation between bank mergers and the syndicate structure is conditional on a lead arranger's reputation in the syndicated loan market. Lead arrangers' reputation may serve as an information source for participant lenders, and lenders with a good reputation need to provide relatively fewer incentives to counteract information asymmetries (e.g., Ross 2010; Gopalan et al. 2011). Therefore, I conjecture that after their merger completion, more reputable lead arrangers hold a smaller fraction of loans and form less concentrated syndicates than those with less established reputations.

I define an indicator variable *Large Lead* to be equal to 1 if the lead arranger is in the top quartile in terms of market share during the year and 0 otherwise. I augment equation (2) with *Large Lead* and the interaction term  $Merger \times Large\ Lead$ . The coefficient on  $Merger \times Large\ Lead$  in Table 7 is negative and marginally significant for *Lead Allocation*. The coefficient on the interaction term is also negative and significant for *Syndicate Concentration*. Economically, a syndicate is 7% more concentrated (at the mean of 1,686) for smaller lead arrangers with merger activities. Larger lead arrangers are able to offset this effect, as the coefficient on the interaction term suggests.

Collectively, this set of analyses suggests that the link between bank mergers and the syndicate structure is less pronounced when more participant lenders in a syndicate have a previous relationship with the borrower. This result suggests a substitution effect between the participant-lead relationship and participant-borrower relationship in reducing the information asymmetry problems. Moreover, the effect of bank mergers on the syndicate structure is less pronounced for transparent borrowers and more pronounced for opaque borrowers. This evidence is consistent with a notion that when participating lenders have more sources of information with which to learn about and monitor the borrower, they rely less on information they obtain from their interactions with lead arrangers. Finally, the results indicate that the participant-lead relationship becomes less important in reducing information asymmetry among syndicate members when more reputable lead banks arrange syndicated loans.

### **4.3 Additional Analyses**

#### *4.3.1 Robustness Testing: Bank Mergers and Participant-Lead Syndication Relationship*

I perform several robustness checks relating to my analysis in section 4.1.1 (Table 3), in which I examine how bank mergers affect lead banks' syndication relationships with their participants.

First, I limit my sample to loans arranged by exactly one lead lender. When more than one lead arranger is present, it is difficult to determine which lead arranger brought a given participant to the syndicate. For example, in the presence of multiple lead arrangers (i.e., Bank A and Bank B), it is unclear whether Bank C joined the syndicate because of Bank A or Bank B. Therefore, as a robustness check, I exclude all loans with multiple lenders and repeat the analysis. While this

significantly reduces my sample size (to 58,240), the inferences from the untabulated results remain unchanged.

Second, rather than using a one-year window, I use a three-year window to define relationship and non-relationship participants. In other words, I define relationship participants (non-relationship participants) as those who have (not) participated in a syndicated loan arranged by the loan's lead arranger in the three years preceding the loan's issuance. I re-perform my analysis using this alternative measure, and the untabulated results are quantitatively and qualitatively similar to those reported in Table 3.

Third, given my dichotomous dependent variable, I re-perform my analysis using logistic specifications. As my main estimation model, I use OLS specifications instead of logistic specifications because Greene (2004) notes that consistency issues can arise when fixed effects are used in non-linear models. When I repeat my analysis using a logit model, my inferences from the untabulated results remain unchanged.

#### *4.3.2 Alternative Measure for Syndicate Structure*

While I use the percentage of a loan retained by the lead bank and the Herfindhal index of loan shares for my main analyses, for a robustness check, I use the total number of lenders and the total number of participating lenders in a syndicate as the dependent variables (e.g., Sufi 2007; Lin, Malatesta, and Xuan. 2012). The mean (median) value of the total number of lenders is 13 (9). The mean (median) value of the total number of participant lenders is 11 (8). I repeat my analysis on the relation between bank mergers and syndicate structure using these two measures. The untabulated results indicate that the estimated coefficients for *Merger* are -0.562 and -0.603, respectively, and they are statistically significant. In economic terms, the total number of lenders and participant lenders joining syndicates decreases by 4% and 6%, respectively, when the

syndicates are arranged by lead banks that have recently experienced mergers. Consistent with my previous inferences, these results suggest that lead banks form more concentrated syndicates and have greater stakes in their loans following their mergers.

## **CHAPTER 5**

### **Conclusion**

In this study, I examine whether and how syndicated loan structure is affected by the merger activity of lead banks. Prior research on business relationships has conjectured that an entity's critical events can trigger a radical change in its business relationships (e.g., Halinen et al. 1999). This conjecture can be applied to syndication relationships between a lead arranger and participating lenders, yet there is little empirical evidence on the matter. Using bank mergers and the syndicated loan market in the United States as my setting, I first examine the relation between lead bank mergers and the post-merger syndicate membership. I find that participant lenders with no prior syndication relationship with merged lead banks are more likely to join their post-merger syndicates. This result suggests that the continuation of past syndication relationships between merged lead arrangers and participating lenders is less likely, which is consistent with the literature suggesting that merged entities' existing relationships with their business partners are disturbed after their merger activity.

I then investigate how a lead bank's merger activity influences the level of its exposure and commitment to post-merger loans. I expect that there is greater information asymmetry among syndicate members after lead banks complete mergers; as a result, the lead banks put more skin in the game. I find that merged lead banks retain a higher share of new loans and form more concentrated syndicates. Further, I provide evidence that the relation between bank mergers and syndicate structure varies by syndicate participants' prior lending relationships with the borrower,

borrower transparency, and the lead arranger's reputation. The directions of these variations are consistent with prior research. Specifically, I find that merged banks retain a smaller fraction of new loans and create less concentrated syndicates at the margin when (1) more participating lenders in a syndicate are familiar with the borrower, (2) the borrowers are more transparent, and (3) the lead banks themselves have more established reputations. While I document these results, I am unable to comment on the overall net benefit or cost of bank mergers on the syndicated loan market, as the syndicated loan involves multiple parties—lead arrangers, participants, and borrowers. More evidence is necessary to complete the picture.

This study contributes to the extensive literature on syndicated lending by focusing on lender characteristics as a driver of syndicate structure rather than borrower characteristics, which have been the primary focus of this stream of research. I also contribute to the literature investigating the consequences of bank mergers by documenting that merged lead banks form relationships with unfamiliar syndicate participants and increase their commitment to new loans by retaining a larger share of loans.

## TABLES

**Table 1 - Sample Selection**

Table 1 presents the sample selection process and is discussed in section 3.1. The sample period spans from 1989 to 2012. Loan data is from DealScan, and merger information comes from the SNL Financial Bank Mergers and Acquisitions Database.

<b>Filters</b>	<b>Number of Facilities</b>
Syndicated loans to public U.S. borrowers by U.S. banks, in U.S. dollars, issued from 1989 to 2012	26,033
After excluding:	
Financial firms	22,641
Loans with insufficient loan data	13,911
Loans with insufficient borrower and lender data	<u>9,752</u>



**Table 2 - Descriptive Statistics**

Table 2 reports summary statistics for the key variables in my sample of loans originated between 1989 and 2012. Each observation represents a facility-lead pair, except the observations for *Participant-Lead No-Relationship*, which represent facility-lead-participant pairs. All continuous variables are winsorized at the 1% and 99% level. Variable definitions are in Appendix A.

	<b>N</b>	<b>Mean</b>	<b>S.D.</b>	<b>Median</b>	<b>Q1</b>	<b>Q3</b>
<b>Merger Variable</b>						
<i>Merger</i>	9,752	0.275	0.447	0	0	1
<b>Outcome Variables</b>						
<i>Participant-Lead No-Relationship</i>	102,905	0.214	0.41	0	0	0
<i>Lead Allocation</i>	4,546	21.10	16.44	15	9.222	27.50
<i>Syndicate Concentration (Herfindhal Index)</i>	4,166	1,686	1,415	1,139	675.7	2,180
<b>Loan Characteristics</b>						
<i>Covenant</i>	9,752	1.735	1.295	2	1	3
<i>PP</i>	9,752	0.671	0.470	1	0	1
<i>Amount</i>	9,752	5.399	1.341	5.52	4.60	6.30
<i>Maturity</i>	9,752	3.772	0.615	4.094	3.584	4.094
<i>Spread</i>	9,752	4.903	0.787	5.091	4.443	5.521
<i>Revolver</i>	9,752	0.633	0.482	1	0	1
<i>Term Loan B</i>	9,752	0.0842	0.278	0	0	0
<i>Collateral</i>	9,752	0.610	0.488	1	0	1
<i>Borrower-Lead Relationship</i>	9,752	0.505	0.500	1	0	1
<b>Borrower Characteristics</b>						
<i>ROA</i>	9,752	0.009	0.024	0.011	0.003	0.02
<i>Interest Coverage</i>	9,752	14.03	46.92	3.927	1.647	9.230
<i>Leverage</i>	9,752	0.628	0.219	0.616	0.493	0.737
<i>Size</i>	9,752	7.331	1.601	7.277	6.134	8.439
<i>MTB</i>	9,752	2.494	3.923	1.912	1.195	3.125
<i>Rated</i>	9,752	0.624	0.485	1	0	1
<b>Lender Characteristics</b>						
<i>Lender Size</i>	9,752	12.93	1.241	13.11	12.05	14.03
<i>Lender Deposit</i>	9,752	0.548	0.117	0.559	0.459	0.643
<i>Lender Loan</i>	9,752	0.327	0.232	0.366	0	0.506

**Table 3 - Bank Mergers and Participation Decision**

Table 3 presents the analysis of the effect of bank mergers on syndicate participation decision by participating lenders. The variable of interest is in bold. Variable definitions are in Appendix A. All continuous variables are winsorized at the 1% and 99% level. T-statistics in parentheses are based on standard errors clustered by loan package level. \*\*\*, \*\*, and \* indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

	<i>Participant-Lead No-Relationship</i>
<b>Merger</b>	0.025*** (3.250)
<i>Amount</i>	-0.020*** (-5.262)
<i>Maturity</i>	-0.003 (-0.693)
<i>Collateral</i>	0.016** (2.134)
<i>Revolver</i>	0.002 (0.442)
<i>Term Loan B</i>	0.174*** (10.561)
<i># of Lenders</i>	0.073*** (9.863)
<i>ROA</i>	-0.513*** (-2.815)
<i>Interest Coverage</i>	0.000 (0.701)
<i>Leverage</i>	0.030 (1.567)
<i>Size</i>	-0.011*** (-3.092)
<i>MTB</i>	-0.001 (-1.478)
<i>Investment Rating</i>	-0.020** (-2.107)
<i>Borrower-Lead Relationship</i>	-0.047*** (-7.424)
<i>First Lead</i>	0.466*** (5.038)
<i>Lender Size</i>	-0.029 (-1.614)
<i>Lender Deposit</i>	-0.150 (-1.612)
<i>Lender Loan</i>	-0.192*** (-4.091)
Observations	102,903
R-squared	0.185
Lender/Year FE	YES

**Table 4 - Bank Mergers and Syndicate Structure**

Table 4 presents the analyses of the effect of bank mergers on syndicate structure measured by lead allocation and syndicate concentration (Herfindhal index). The variable of interest is in bold. Variable definitions are in Appendix A. All continuous variables are winsorized at the 1% and 99% level. T-statistics in parentheses are based on standard errors clustered by loan package level. \*\*\*, \*\*, and \* indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

	<i>Lead Allocation</i>	<i>Syndicate Concentration</i>
	<b>(1)</b>	<b>(2)</b>
<b><i>Merger</i></b>	1.327** (2.279)	79.06* (1.670)
<i>Amount</i>	-4.352*** (-14.12)	-434.2*** (-15.26)
<i>Maturity</i>	-2.360*** (-5.912)	-240.2*** (-6.729)
<i>Spread</i>	-0.505 (-1.192)	-68.78* (-1.913)
<i>PP</i>	-2.519*** (-3.454)	-167.5*** (-2.625)
<i>Collateral</i>	-0.471 (-0.843)	-5.247 (-0.108)
<i>Covenant</i>	-1.014*** (-3.741)	-101.6*** (-4.362)
<i>Revolver</i>	2.104*** (4.665)	166.5*** (4.113)
<i>Term Loan B</i>	13.92*** (5.687)	849.8*** (3.219)
<i>ROA</i>	-35.48*** (-2.948)	-3,386*** (-3.282)
<i>Interest Coverage</i>	0.00368 (0.741)	0.153 (0.334)
<i>Leverage</i>	-5.340*** (-3.566)	-516.4*** (-4.402)
<i>Size</i>	-3.326*** (-11.57)	-279.0*** (-10.71)
<i>MTB</i>	-0.146** (-2.379)	-10.76** (-1.985)
<i>Investment Rating</i>	-1.018 (-1.609)	-57.79 (-1.066)
<i>Borrower-Lead Relationship</i>	-0.709 (-1.643)	-119.4*** (-3.230)
<i>First Lead</i>	6.192** (2.374)	216.8 (1.025)
<i>Lender Size</i>	-1.018 (-0.838)	-164.3* (-1.708)
<i>Lender Deposit</i>	12.01** (2.191)	403.7 (0.895)
<i>Lender Loan</i>	-8.720*** (-3.050)	-655.4*** (-2.643)
Observations	4,535	4,156
R-squared	0.549	0.586
Lender/Year FE	YES	YES

**Table 5 - Participant-Borrower Relationship**

Table 5 presents results on whether the effect of bank mergers on syndicate structure is attenuated by a prior relationship between a participant lender and the borrower. *Participant-Borrower Relationship* is an indicator variable that equals 1 if the ratio of the number of participants who have been involved in a deal with the borrower over the five-year period preceding the loan issue date to the total number of participants in a deal is above the sample median and 0 otherwise. The variable of interest is in bold. Variable definitions are in Appendix A. All continuous variables are winsorized at the 1% and 99% level. T-statistics in parentheses are based on standard errors clustered by loan package level. \*\*\*, \*\*, and \* indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

	<i>Lead Allocation</i>	<i>Syndicate Concentration</i>
	(1)	(2)
<i>Merger</i>	2.523*** (2.838)	169.7** (2.405)
<i>Participant-Borrower Relationship</i>	-0.178 (-0.352)	-7.938 (-0.177)
<b><i>Merger * Participant-Borrower Relationship</i></b>	<b>-2.343** (-2.324)</b>	<b>-173.9** (-2.118)</b>
<i>Amount</i>	-4.348*** (-14.03)	-434.0*** (-15.18)
<i>Maturity</i>	-2.363*** (-5.900)	-240.5*** (-6.703)
<i>Spread</i>	-0.513 (-1.216)	-68.86* (-1.916)
<i>PP</i>	-2.558*** (-3.512)	-170.6*** (-2.678)
<i>Collateral</i>	-0.527 (-0.940)	-9.969 (-0.205)
<i>Covenant</i>	-1.006*** (-3.714)	-101.5*** (-4.350)
<i>Revolver</i>	2.103*** (4.676)	166.1*** (4.110)
<i>Term Loan B</i>	13.81*** (5.667)	845.3*** (3.197)
<i>ROA</i>	-35.75*** (-2.953)	-3,407*** (-3.287)
<i>Interest Coverage</i>	0.00310 (0.617)	0.116 (0.252)
<i>Leverage</i>	-5.177*** (-3.434)	-505.4*** (-4.264)
<i>Size</i>	-3.294*** (-11.36)	-277.2*** (-10.58)
<i>MTB</i>	-0.146** (-2.387)	-10.91** (-2.023)
<i>Investment Rating</i>	-1.048* (-1.656)	-59.24 (-1.091)
<i>Borrower-Lead Relationship</i>	-0.427 (-0.952)	-100.1*** (-2.607)
<i>First Lead</i>	6.446** (2.484)	243.2 (1.158)
<i>Lender Size</i>	-0.865 (-0.719)	-152.0 (-1.596)
<i>Lender Deposit</i>	12.09** (2.210)	416.8 (0.927)
<i>Lender Loan</i>	-8.873*** (-3.104)	-664.5*** (-2.681)
Observations	4,535	4,156
R-squared	0.551	0.587
Lender/Year FE	YES	YES

**Table 6 - Transparency of the Borrower's Information Environment**

Table 6 investigates whether the effect of bank mergers on syndicate structure varies by borrower transparency. Panels A, B, and C report results of the analyses in which borrower transparency is measured based on a borrower's analyst coverage intensity (*Analyst Coverage*), a borrower's credit rating (*Rated*), and a borrower's size (*Small Borrower*). *Analyst Coverage* equals 1 if the number of equity analysts following the borrower is above the sample median in the year of a loan's issuance and 0 otherwise. *Rated* equals 1 if the borrower has an investment-grade credit rating in the year of a loan's issuance and 0 otherwise. *Small Borrower* equals 1 if the borrower's total assets are below the sample median in the year of a loan's issuance and 0 otherwise. The variables of interest are in bold. Variable definitions are in Appendix A. All continuous variables are winsorized at the 1% and 99% level. T-statistics in parentheses are based on standard errors clustered by loan package level. \*\*\*, \*\*, and \* indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

*Panel A: Analyst Coverage*

	<i>Lead Allocation</i>	<i>Syndicate Concentration</i>
	(1)	(2)
<b><i>Merger</i></b>	2.790*** (3.320)	216.9*** (3.012)
<b><i>Analyst Coverage</i></b>	0.226 (0.404)	11.5 -0.242
<b><i>Merger * Analyst Coverage</i></b>	-2.955*** (-2.987)	-277.4*** (-3.513)
Controls	YES	YES
Observations	4,535	4,156
R-squared	0.551	0.588
Lender/Year FE	YES	YES

*Panel B: Borrower Credit Rating*

	<i>Lead Allocation</i>	<i>Syndicate Concentration</i>
	(1)	(2)
<b><i>Merger</i></b>	2.415*** (2.860)	201.6*** (2.776)
<b><i>Rated</i></b>	-0.417 (-0.618)	10.58 (0.182)
<b><i>Merger * Rated</i></b>	-2.037** (-2.004)	-235.2*** (-2.826)
Controls	YES	YES
Observations	4,535	4,156
R-squared	0.551	0.588
Lender/Year FE	YES	YES

**Table 6 (Continued)***Panel C: Borrower Size*

	<i>Lead Allocation</i>	<i>Syndicate Concentration</i>
	<b>(1)</b>	<b>(2)</b>
<i>Merger</i>	2.243** (2.219)	-10.34 (-0.203)
<i>Small Borrower</i>	-0.0422 (-0.0536)	-20.99 (-0.323)
<i>Merger * Small Borrower</i>	2.243** (2.219)	167.0** (2.084)
Controls	YES	YES
Observations	4,535	4,156
R-squared	0.550	0.587
Lender/Year FE	YES	YES

**Table 7 – Lead Reputation**

Table 7 presents results on whether the effect of bank mergers on syndicate structure is attenuated by a lead bank's reputation. *Large Lead* equals 1 if the lead arranger is in the top quartile of market share during the year and 0 otherwise. The variable of interest is in bold. Variable definitions are in Appendix A. All continuous variables are winsorized at the 1% and 99% level. T-statistics in parentheses are based on standard errors clustered by loan package level. \*\*\*, \*\*, and \* indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

	<i>Lead Allocation</i>	<i>Syndicate Concentration</i>
	(1)	(2)
<i>Merger</i>	1.723*** (2.603)	122.3** (2.235)
<i>Large Lead</i>	-1.462 (-1.146)	31.31 (0.330)
<b><i>Merger * Large Lead</i></b>	<b>-2.085*</b> <b>(-1.898)</b>	<b>-194.2**</b> <b>(-2.243)</b>
<i>Amount</i>	-4.367*** (-14.24)	-434.7*** (-15.34)
<i>Maturity</i>	-2.357*** (-5.920)	-238.5*** (-6.677)
<i>Spread</i>	-0.474 (-1.120)	-66.53* (-1.850)
<i>PP</i>	-2.498*** (-3.427)	-166.0*** (-2.604)
<i>Collateral</i>	-0.484 (-0.865)	-6.065 (-0.125)
<i>Covenant</i>	-1.013*** (-3.732)	-102.2*** (-4.385)
<i>Revolver</i>	2.115*** (4.684)	165.1*** (4.067)
<i>Term Loan B</i>	13.84*** (5.663)	849.2*** (3.227)
<i>ROA</i>	-35.61*** (-2.963)	-3,405*** (-3.298)
<i>Interest Coverage</i>	0.00337 (0.675)	0.128 (0.279)
<i>Leverage</i>	-5.381*** (-3.595)	-517.5*** (-4.403)
<i>Size</i>	-3.326*** (-11.56)	-278.7*** (-10.72)
<i>MTB</i>	-0.145** (-2.376)	-10.61** (-1.973)
<i>Investment Rating</i>	-0.996 (-1.577)	-56.82 (-1.048)
<i>Borrower-Lead Relationship</i>	-0.724* (-1.681)	-121.7*** (-3.290)
<i>First Lead</i>	6.194** (2.368)	215.0 (1.025)
<i>Lender Size</i>	-0.690 (-0.577)	-152.1 (-1.571)
<i>Lender Deposit</i>	13.93** (2.484)	420.6 (0.909)
<i>Lender Loan</i>	-8.143*** (-2.811)	-653.3*** (-2.623)
Observations	4,535	4,156
R-squared	0.553	0.587
Lender/Year FE	YES	YES

## **APPENDIX**



## Appendix A – Variable Definitions

Variable	Definition
<i>Merger</i>	An indicator variable equal to 1 if the lead bank was involved in a merger over the one-year period preceding the loan issuance date, 0 otherwise.
<i>Lead Allocation</i>	The percentage of the loan financed by the lead arranger.
<i>Syndicate Concentration (Herfindhal Index)</i>	The Herfindahl-Hirschmann index of loan holdings among syndicate members. It is the sum of the squared individual shares in the loan and varies from 0 to 10,000, with 10,000 being the Herfindahl when a lender holds 100% of the loan.
<i>Participant-Lead No-Relationship</i>	An indicator variable equal to 1 if the participant has not been involved in a deal with the lead arranger over the one-year period preceding the loan issuance date, 0 otherwise.
<i>ROA</i>	The ratio of the borrower's income before extraordinary items to its total assets, estimated in the quarter preceding a loan's issuance.
<i>Interest Coverage</i>	The ratio of earnings before interest and tax to the interest expense, estimated in the quarter preceding a loan's issuance.
<i>Leverage</i>	The ratio of total liabilities to the book value of assets, estimated in the quarter preceding a loan's issuance.
<i>Size</i>	The natural logarithm of the book value of assets, estimated in the quarter preceding a loan's issuance.
<i>MTB</i>	The ratio of the market value of equity to the book value of equity, estimated in the quarter preceding a loan's issuance.
<i>Investment Rating</i>	An indicator variable equal to 1 if the borrower has an investment-grade senior debt rating from S&P, 0 otherwise.
<i>Amount</i>	The natural logarithm of the facility amount in U.S. dollars.
<i>Maturity</i>	The natural logarithm of the number of months to maturity.
<i>Spread</i>	The natural logarithm of the all-in-drawn spread over LIBOR.
<i>PP</i>	An indicator variable equal to 1 if the loan has a performance pricing provision, 0 otherwise.
<i>Collateral</i>	An indicator variable equal to 1 if the loan is secured, 0 otherwise.
<i>Covenants</i>	The number of financial covenants.
<i>Revolver</i>	An indicator variable equal to 1 if the loan is a revolving line of credit, 0 otherwise.
<i>Term Loan B</i>	An indicator variable equal to 1 if the loan type is a term loan B or below (C, D, E and F), 0 otherwise.
<i>Borrower-Lead Relationship</i>	An indicator variable equal to 1 if a loan's lead arranger has syndicated a loan to the borrower over the five-year period preceding the loan issuance date, 0 otherwise.
<i># of Lenders</i>	The number of participating lenders in a syndicate.

<i>Lender Size</i>	The natural logarithm of the bank holding company's (BHC's) book value of total assets, estimated in the quarter preceding a loan's issuance.
<i>Lender Deposits</i>	The ratio of the BHC's total deposits to its total book assets, estimated in the quarter preceding a loan's issuance.
<i>Lender Loans</i>	The ratio of the BHC's total loans (net of unearned income) to its total book assets, estimated in the quarter preceding a loan's issuance.
<i>First Time Lead</i>	An indicator variable equal to 1 if the lender serves as the lead arranger for the first time, 0 otherwise.

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