

**Agency and Renegotiation in Corporate Finance:
Evidence from Syndicated Loans**

Amir Sufi*
Massachusetts Institute of Technology
sufi@mit.edu

January 26, 2005

Abstract

Syndicated lending is an increasingly important source of corporate finance, with over \$1 trillion in new syndicated loans signed annually. This paper empirically explores the syndicated loan market with an emphasis on how information asymmetry and renegotiation considerations influence syndicate structure and the choice of participant lenders. There are two principal findings. First, when the borrower requires more intense investigation and monitoring effort by a financial institution, the lead arranger retains a larger portion of the loan, forms a more concentrated syndicate, and chooses participants that are closer to the borrower (both geographically and in terms of previous relationships). The evidence is consistent with moral hazard in a setting of information asymmetry. The lead arranger attempts to guarantee due diligence effort by increasing its risk exposure, and the lead arranger chooses lenders that minimize information asymmetry. Second, when the borrower is more likely to need to renegotiate the loan agreement, lead arrangers add participants with very small portions of the loan to the syndicate. Given that unanimity of lenders is needed to renegotiate major terms of the loan, adding participants with small portions of the loan reduces the renegotiation surplus expected by the borrower. The evidence suggests that lenders form syndicates to reduce inefficient behavior and strategic default by borrowers.

* I am especially grateful to James Poterba, Antoinette Schoar, and Philip Strahan for their continuous support and help with this project. I also thank Dan Bergstresser, Mark Carey, Benjamin Esty, Robert Gibbons, Michael Greenstone, Bengt Holmstrom, Dirk Jenter, Asim Khwaja, Randall Kroszner, David Matsa, Donald Mullineaux, Stewart Myers, Joshua Rauh, David Scharfstein, Edward Sellers, Lucy White, Peter Wysocki. This paper benefited greatly from seminar participants at MIT (Sloan), NYU (Stern), Chicago GSB, Columbia GSB, Northwestern (Kellogg), Harvard Business School and Yale SOM.

I. Introduction

Non-financial U.S. businesses obtain over \$1 trillion in new syndicated loans each year, which represents more than 15 percent of their aggregate debt outstanding. Of the top 500 non-financial firms in the Compustat universe in 2002, over 90 percent obtained a syndicated loan between 1994 and 2002. According to the American Banker, syndicated lending represents 51 percent of U.S. corporate finance originated and represents more underwriting revenue for the financial sector than both equity and debt underwriting (Weidner, 2000). The market has experienced strong growth, going from \$137 million in 1987 to over a \$1 trillion today. Despite the importance of syndicated loans in corporate finance, research on the role of syndicated loans in U.S. corporate finance is limited.¹

A syndicated loan is a loan where at least two lenders jointly offer funds to a borrowing firm. There is (at least) one “lead arranger” that establishes a relationship with the firm, negotiates terms of the contract, and guarantees an amount for a price range. The lead arranger then turns to “participant” lenders that fund part of the loan. In this paper, I analyze 14,021 syndicated loan deals to 5,011 U.S. non-financial firms from 1991 to 2003. I use this sample of syndicated loans to explore two of the theoretical foundations of modern corporate finance: information asymmetry and renegotiation. More specifically, I exploit variation in the credit reputation of borrowing firms to explain how information asymmetry and *ex-post* renegotiation considerations affect the structure of syndicates and the choice of participant lenders. Syndicated loans are especially promising as an empirical laboratory because, unlike most financial products, firms from *all* points of the credit spectrum (privately-held, high yield, investment grade, etc.) utilize this form of finance. I find evidence that both information asymmetry and renegotiation concerns affect syndicate structure and participant choice in a manner consistent with previous theoretical research.

The first contribution of this paper is to document that information asymmetry shapes syndicate structure and the choice of participants in a manner consistent with prominent theories of agency and moral hazard (Holmstrom, 1979; Holmstrom and Tirole, 1997). A basic assumption in these models is that firms with limited public information require investigation and monitoring by an “informed” lender before “uninformed” lenders invest in the firm. In this framework, there exists a moral hazard problem for the informed lender because the informed lender’s monitoring and investigation effort is unobservable. In order

¹ Exceptions include Simons (1993), Dennis and Mullineaux (2000), and Lee and Mullineaux (2004). There is also a literature on syndicated loans to non-U.S. companies, the pricing and default risk of syndicated loans, and the effect on firm value of loan announcements. I discuss these papers below.

to ensure diligence, a lender with monitoring and investigation responsibilities must retain a large financial stake in the borrowing firm; only a bank with a stake in the firm's performance exerts the necessary effort in due diligence and monitoring. My findings support this theoretical prediction. When borrowing firms require more intense investigation and monitoring (by a variety of measures), the lead arranger (informed lender) retains a larger share of the loan, there are fewer participants (uninformed lenders), and the syndicate structure is more concentrated. For example, after controlling for the size of the loan and the size of the firm, I find that syndicated loans to firms without publicly-available SEC filings have 25 percent fewer participant lenders and the lead arranger holds 10 percent more of the loan. This result is robust when comparing firms with and without publicly-available SEC filings, and when using within-firm variation (when the same firm goes from private to public or vice versa). I also find evidence that information asymmetry shapes syndicate structure *among* firms with publicly-available SEC filings. Following previous literature, I use the ratio of positive accruals to total assets and the ratio of R&D investment to sales as measures of the need for monitoring and due diligence among public firms. Using these alternative measures, I find similar results: lead arrangers on loans to public firms that require more intense monitoring and due diligence retain a larger share of the loan and form a more concentrated syndicate.

This finding underscores the importance of “informed” capital in the financial health of firms that require more investigation and monitoring by a financial institution. The evidence presented in this paper supports the *foundation* of models that predict that small, informational-opaque companies are disproportionately affected by shocks to balance sheets of commercial banks (Holmstrom and Tirole 1997; Kashyap, Stein, and Wilcox 1993). In the syndicated loan market, firms that require investigation and monitoring obtain financing from third parties only after an informed lender takes a large financial stake in the firm.

I further document the importance of information asymmetry in syndicate formation by analyzing which participants are chosen as syndicate members. When the borrowing firm has no publicly available SEC filings or no publicly available credit rating, participant lenders on syndicates are “closer” to the borrowing firm, both geographically and in terms of previous relationships. In other words, when there is limited information about a borrower, lead arrangers attempt to reduce the need for information gathering by choosing participants that already “know” the firm.

I also examine whether reputation “build-up” may improve the ability for lead arrangers to successfully originate loans for borrowers with limited information. That is, repeated interactions between a lead arranger and a participant may lead to reputation effects that reduce the moral hazard problem when originating loans for opaque borrowers. However, the evidence is weak. First, previous lead arranger-participant relationships influence participant choice, but previous lead arranger-participant relationships are much less important (both in magnitude and statistical significance) than previous relationships between the borrowing firm and the participant lender. Second, while it is true that relationships between the borrowing firm and participants are stronger among firms without SEC filings, relationships between lead arrangers and participants do not appear to vary systematically across the credit reputation spectrum. The results suggest that a lead arranger selects participants based on the participant’s familiarity with the *borrowing firm*, not based on the participant’s familiarity with the *lead arranger itself*. This finding is in contrast to syndicates in IPO issues and venture capital, and suggests that potential information asymmetry problems cannot be overcome by lead arranger reputation alone.

The second contribution of this paper is to demonstrate that *ex-post* renegotiation considerations influence the *ex-ante* structure of the syndicate in a manner consistent with incomplete contract theory and strategic default (Hart and Moore, 1988; Bolton and Scharfstein, 1996). Renegotiation is an important aspect of the syndicated loan market, and the number of creditors is a choice variable. Both of these factors make this market a promising empirical laboratory for analyzing these models. Bolton and Scharfstein (1996) document two opposing effects of renegotiation considerations on the optimal number of creditors. When firms are more likely to strategically default, lending syndicates should be larger and make renegotiation more difficult to discourage inefficient behavior by the firm. When firms are more likely to default due to exogenous shocks (“liquidity default”), lending syndicates should be smaller to facilitate renegotiation. Both theoretically and empirically, the two propensities are highly correlated; only firms with a realistic probability of liquidity default have the ability to “lie” and strategically default. The model therefore provides an ambiguous and testable prediction in the syndicated loan market: is liquidity or strategic default the more important factor in syndicate formation?

I find evidence that strategic default is the more important consideration in syndicate formation. Lenders appear to add participants to the syndicate to make renegotiation more difficult when firms are more likely to default. I isolate the analysis to rated firms with

public filings, and I use variation in default risk *across* firms (proxied by senior unsecured debt ratings and leverage ratio) and *within* firms (proxied by credit downgrades). I find that loans to high yield firms, which are more likely to renegotiate loan terms due to default, have 15 to 20 percent more participant lenders. This result does not appear to be driven by diversification alone; while the number of participants increases with firm default risk, the actual concentration of the loan and the percentage (or amount) held by the lead does not. Finally, the larger number of participants is driven by lenders who hold very small amounts of the loan. The average number of lenders holding less than 2 percent of a loan for firms likely to renegotiate is 65% higher than loans to other firms. Given that *unanimity* of syndicate members is required for renegotiation of loan terms, the evidence suggests that lenders form larger syndicates to make renegotiation more difficult. In other words, each syndicate member has veto power over renegotiation, and so “participant-loading” reduces the expected payoff to the borrowing firm from renegotiation. By reducing the expected value from renegotiation, lenders can reduce strategic default by borrowers. This result implies that *ex-post* renegotiation considerations affect *ex-ante* contract structure in a manner consistent with incomplete contract theory.

The rest of the paper is outlined as follows. The next section describes the syndicated loan market, the syndication process, and existing research related to this paper. The third section describes the data and basic summary statistics. The fourth section explores how information asymmetry affects syndicate structure and the participants chosen as syndicate members. The fifth section focuses on renegotiation in the syndicated loan market and how it affects syndicate structure. The sixth section concludes.

II. The syndicated loan market: background and existing research

A. Background²

A syndicated loan is a loan made to a firm jointly by more than one financial institution. As Hitchings (1994) notes, “... it is fundamental to syndicated lending that the terms and conditions of the loan are similar for each of the lenders (32)”. Members of the syndicate fall into one of two groups: lead arrangers and participant lenders. The distinction is important, and the two groups vary on three major dimensions. First, participant lenders rarely directly negotiate with the borrowing firm, and typically have an “arm’s-length” relationship with the borrowing firm through the lead arranger. Lead arrangers establish and

² The information in this section comes from practitioners working in financial institutions and lawyers who specialize in syndicated loan contracts. In addition, Wienke (1994), Hitchings (1994), and Esty (2001) are excellent descriptions of syndicated loan arrangements.

maintain a relationship with the borrower, and take on the primary information collection and monitoring responsibilities. (An often-cited “advantage” of a syndicated loan for a borrowing firm is being able to deal with only one bank while accessing funds of many banks.) Second, the lead arranger typically holds a larger share of the loan than any of the participants. Third, in terms of renegotiation rights, unanimity of all syndicate members is always required to change terms related to principal, interest, maturity, or collateral.³ For example, if a borrowing firm enters into a state of default by missing a payment, all members must agree to change contract terms in order to avoid acceleration of the loan. Renegotiation of contracts is common, and is done through amendments to the original loan agreement.

The syndication process works as follows. The lead arranger signs a preliminary loan agreement (“mandate”) with the borrowing firm that specifies covenants, fees, and collateral. The preliminary loan agreement also specifies a loan amount, and a range for the interest rate. Once the preliminary loan agreement is signed, the lead arranger then turns to potential participant lenders to fund part of the loan. The lead arranger provides potential participants with an information memorandum on the borrowing firm. Once the participants (and the amount they are to fund) agree to fund part of the loan, the loan agreement is signed by all parties.⁴ Each participant member is responsible for a share of the loan. As noted above, the terms of the loan are identical for all syndicate members. In addition to interest and commitment fee income, the lead arranger receives a fee for arranging and managing the syndicated loan, which is paid by the borrowing firm.⁵ During the life of the loan, the lead arranger typically also acts as the “agent” bank that monitors the firm, governs the terms of the loan, administers the drawdown of funds, calculates interest payments, and enforces financial covenants.

Three additional facts about the market are important. First, borrowing firms can hire more than one lead arranger. Lead arrangers are sometimes assigned a particular function (origination, loan administration, publicity, documentation, etc.), and work by Francois and Missonier-Piera (2004) suggests that multiple lead arrangers are the result of competitive

³ Of the syndicated loans in my sample where the number of votes needed to change terms is available, 99.5 percent require unanimity of syndicate members to agree to a change in the contract. Minor changes that do not involve principal, interest payments, maturity, or collateral do not always require full unanimity.

⁴ I use the language that participants are “chosen” on deals by the lead arranger throughout this paper. In reality, the choice process can be more complex. Lead arrangers typically select a group of potential participants and the participants may agree or refuse to be part of the syndicate.

⁵ This fee is an up-front payment from the borrower to the lead arranger and is not listed on the contract. Lead arrangers typically retain the largest portion of the fee, but can share the fee with participant lenders. Interviews suggest that fees vary between 25 and 175 basis points of the total loan amount.

advantages in various duties. Second, there is an “agency” section of the loan agreement that gives conditions for the removal of the lead arranging bank. As is noted in Dennis and Mullineaux (2000), the agreement usually exculpates the lead arranger from liability except where it results from gross negligence or willful misconduct. Third, a borrower defaults on a loan if it misses any required interest payment or if it violates any of the financial or non-financial covenants listed in the agreement. Covenants, default, and renegotiation are very important in this market, and I explore them in greater detail below.

The loan sales market is an important parallel to syndicated loans. There are a few key distinctions. First, the contracting behavior for a syndicated loan is distinct. As noted in Gorton and Pennachi (1995), a loan sale leaves the existing contract between the firm and the original lender unaltered. A new secondary participation contract is signed that gives the loan buyer access to cash flows. The terms of the new loan agreement can be altered significantly from the original contract. While the theory of loan sales presented in Gorton and Pennachi (1995) applies to syndicated loans, the problems of moral hazard are less severe in a syndicated loan setting. Lenders are mutually tied to one contract, and the lead arranger holds part of the loan. Second, as Dahiya, Puri, and Saunders (2003) demonstrate, the market for loan sales has developed into a market for mostly distressed debt. Over half of the firms in their sample of loan sales file for bankruptcy within 3 years of the initial sale of one of their loans. By 2001, according to the Loan Pricing Corporation, over half of the loan sales in the syndicated loan market were distressed. The majority of the syndicated loan market consists of firms outside financial distress.

B. Existing research

Previous research on syndicated loans is limited when compared to research on public equity and debt underwriting markets. Most relevant to my analysis are three papers that evaluate syndicate structure. Simons (1993) examines the incentives to syndicate and finds evidence that diversification is the main reason behind syndication. She also finds that lead arrangers syndicate more of “quality” loans, where quality comes from *ex-post* examiner ratings. Dennis and Mullineaux (2000) find that lead arrangers are more likely to syndicate loans when the loan is large, the borrowing firm is public, and when the lead arranger has a strong reputation. They also find that, conditional on a loan being syndicated, a larger percentage of the loan is syndicated when there is public information on the borrowing firm and when the lead arranging bank has a strong reputation. Lee and Mullineaux (2004) find that syndicates are more concentrated when the quality of information on firms is worse.

They also find that syndicate structure is more concentrated with fewer lenders when firms have a higher default probability.⁶

There are also two recent working papers that evaluate syndicate structure. Jones, Lang, and Nigro (2000) find that information asymmetry, loan credit quality, capital constraints, and maturity affect the amount of the loan retained by the agent bank. Panyagometh and Roberts (2002) find evidence that the lead bank syndicates a larger proportion of loans that are subsequently upgraded, which they interpret as evidence that the lead bank does not exploit any additional information unavailable to participant lenders.

The work presented here extends the existing research on syndicated loans in several new directions. First, with regard to information asymmetry, this paper is the first, to my knowledge, that explicitly addresses how the characteristics of lenders might mitigate or exacerbate information asymmetries between lenders and borrowers. It is also the first to explore how relationships *among* syndicate members evolve. The participant choice analysis in the syndicated loan market is new and helps enrich the understanding of how information asymmetry affects relationships. Second, this paper is the first, to my knowledge, that explores how information asymmetry affects syndicate structure *among* public firms. Third, there is an implicit assumption in the previous literature that adverse selection is the key result of information asymmetry and little attention is given to moral hazard. I distinguish between adverse selection and moral hazard predictions, and I show that moral hazard is the more prominent feature of this market. Fourth, this paper is the first, to my knowledge, to find evidence that renegotiation considerations influence syndicate structure in the U.S. market in a manner consistent with incomplete contract theory and strategic default.

In addition to these papers on syndicate structure in the U.S. market, there are other lines of research on syndicated loans. Preece and Mullineaux (1996) and Megginson, Poulsen, and Sinkey (1995) do event studies using the market value of the firm and syndicated loan announcements. Esty and Megginson (2003) evaluate syndicate structure on project finance syndicated loans to firms in 61 different countries. They find that loans in countries with weaker creditor protection have more syndicate members, which they interpret as a mechanism to prevent strategic default by borrowers. Esty (2004) and Qian and Strahan (2004) examine syndicated loans to firms in different countries with a focus on how legal and financial systems affect syndicated loan composition. There is also a recent literature on the

⁶ This finding is in contrast to the findings of my analysis. I give reasons for this discrepancy below.

pricing of syndicated loans and default risk (Thomas and Wang, 2004; Altman and Suggitt, 2000; and Angbazo, Mei, and Saunders, 1998).

This paper also fits into a wider area of research that examines the importance of syndicate structure in venture capital and securities underwriting markets. Corwin and Schultz (2005) examine IPO syndicates and find evidence that co-managers serve an important information production role and previous relationships among syndicate members are strong determinants of future syndicate relationships. Narayanan, Rangan, and Rangan (2004) examine SEO syndicates and find evidence that commercial banks with lending relationships with the borrower tend to co-manage with reputable investment banks. Lerner (1994) and Amit, Brander, and Antweiler (2001) evaluate venture capital syndicates. This paper is the first, to my knowledge, that explores how syndicate relationships are formed and how they persist in the syndicated loan market.

III. Data and summary statistics

A. Data

The primary data source used to evaluate syndicated loans is Dealscan by the Loan Pricing Corporation. Dealscan contains detailed information on syndicated loan contract terms, lead arrangers, and participant lenders. The primary sources of data for Dealscan are attachments on SEC filings, reports from loan originators, and the financial press. The sample I employ includes 14,021 syndicated loan deals to 5,011 U.S. non-financial firms from 1991 through the first half of 2003. The full Dealscan database includes 19,892 unsponsored confirmed syndicated loan deals to firms for these years. I drop syndicated loans without data on industry (1,383), firm sales information (3,381), or firm state (142). Of the remaining 14,986 loans deals, I drop any loan to a firm that has a ticker available, but I could not link the firm to Compustat. The remaining sample contains the final 14,021 loans. Firms in the sample with ticker and/or credit rating data available are subsequently matched to Compustat to get a richer set of financial variables. This matching process yields detailed financial data for 10,703 of the loans in the sample (76 percent).

The analysis presented here evaluates syndicated loan deals. A syndicated loan deal may contain more than 1 loan tranche. In my sample, 75 percent of the loan deals contain only 1 tranche, 20 percent of the loan deals have 2 tranches, and there are a total of 18,993 loan tranches for the 14,021 loan deals. A deal-level analysis, as opposed to a tranche-level analysis, is the appropriate technique for two reasons. First, the actual syndicated loan contract is drafted at the deal level, and covenants and all lenders are listed together on this

contract, even if a lender loans only on 1 tranche. While the maturity and pricing of the loan tranches can vary within a syndicated loan deal, there is one contract, and all lenders are chosen on the tranches collectively, not independently. Second, multiple tranches on the same syndicated loan deal cannot be treated as independent observations, and such an analysis produces standard errors that are improperly small. All results presented below are robust to a tranche-level analysis; the results are very similar quantitatively and significance levels are actually *stronger* in the tranche level analysis (as should be expected given a larger number of tranches than deals). For this analysis, the number of lenders and the amount held by each lender are calculated at the deal level.

Part of the analysis below focuses on which participant lenders are chosen as syndicate members. For this analysis, I collect data on the characteristics of the lenders. For the sample of loans, there are 689 financial institutions that ever serve as lead arrangers and 2,341 that serve as participants.⁷ To make data collection manageable, I collect data on the top 100 lead arrangers and top 125 participants, by number of loans.⁸ These “top lenders” represent 96 percent of the total number of lead arrangers serving on loans and 83 percent of total number of participants serving on loans. Data on lenders comes from (1) the Federal Reserve Y9C filings for U.S. regulated commercial banks, (2) the Compustat Industrial Annual tapes for other U.S. financial firms, and (3) the Compustat Global Financial Services tapes for non-U.S. financial firms. From these sources, I extract data on location, total assets, and equity to asset ratios for participants in my sample.

All financial institutions are aggregated to their parent company and inherit the characteristics of the parent company. I am careful to control for mergers among my sample, and acquired firms are aggregated to their acquirers at the effective date of the merger. In addition, acquiring financial firms inherit both previous lead arranger-participant relationships and previous borrowing firm relationships of the acquired firm. Using the entire sample of syndicated and sole lender loans from 1990 to 2003, I calculate measures of previous relationships for any firm that has a previous loan in the Dealscan sample.

B. Summary Statistics

⁷I use two variables to classify lenders as either lead arrangers or participants. Both are available using the custom report feature in Dealscan’s web-based LoanConnector. One variable is labeled “Lenders-Lead Arranger” and the other is “Lenders-All Lenders.” If the variable “Lenders-Lead Arranger” is available, I classify the lender listed in this field as the lead arranger, and all other lenders are considered participants. If this field is unavailable, any lender listed as having a “Lead Role” in the “Lenders-All Lenders” is a lead arranger. A data appendix is available upon request to further explain the data construction.

⁸ A full list of all lenders and all mergers is included in a data appendix available upon request.

Table 1 presents syndicated loan summary statistics. Borrowing firms on average have \$3.1 billion in sales, and median sales is \$629 million. About 46 percent of loans are to firms with an S&P senior unsecured debt rating, and the average firm has a rating of BBB-. I also include summary statistics for firms linked to Compustat and show data on assets (*data6*), leverage ($((data9+data34)/data6)$), return on assets ($((data14+data18)/data6)$), the R&D to sales ratio ($data46/data12$), and the accruals to total assets ratio.⁹ In terms of loan characteristics, the average loan is \$358 million with a maturity of 1,140 days. About 23 percent of deals include a term loan tranche.

For syndicate structure, the average loan has 8.1 lenders, 1.8 lead arrangers, and 6.3 participant lenders. For a sub-sample of 5,066 loans, I have the share held by each lender in the syndicate. I use this data to construct a variety of measures. First, I construct the percentage of the loan kept by the lead arranger (which is the average of all lead arrangers' shares if more than one lead arranger is present). Second, I use a Herfindahl index as a measure of the concentration of holdings within a syndicate. The Herfindahl is calculated using each syndicate members' share in the loan; 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. Third, I create measures of how many participants hold "small amounts" of the loan, defined as less than \$5 million or less than 2 percent of the loan.

Table 2 lists the top 5 lead arrangers (by volume) and top 5 participants (by number of deals) for syndicated loan deals to private and public firms from 2001 to 2003. With the exception of Fleet and Deutsche Bank, the top 5 lead arrangers are the same in both markets. The third column of Table 2 lists the most common syndicate participant for each of the top 5 lead arrangers, and the percentage of the lead arrangers' arranged loans on which the participant was a syndicate member. Column 3 shows that repeat interactions among syndicate members are not extreme; for example, Bank of America chose Fleet as a participant on only 20 percent of its arranged loans. While repeat interactions are higher with Citigroup and JPMorganChase, this is an exception. On average, a given participant for a lead arranger has been on 13 percent of the arranged loans for the lead arranger in the past

⁹ I follow Sloan (1996) in defining accruals as: $[(\Delta Data4 - \Delta Data1) - (\Delta Data5 - \Delta Data34 - \Delta Data71) - Data14]$.

year. Corwin and Schultz (2005) examine IPO syndicates in the 1990s and find higher average persistence in relationships between syndicate members.¹⁰

IV. Information asymmetry

Information asymmetry between firms and their investors and the resulting agency problems are key aspects of models that explain macroeconomic fluctuations (Bernanke and Gertler 1989; Holmstrom & Tirole 1997), external financing constraints (Bernanke, Gertler, and Gilchrist 1999), and the fragility of the small business sector (Rajan 1992; Kashyap, Stein, and Wilcox 1993). Models of information asymmetry in corporate finance, such as Diamond (1991), have been used empirically to explore the differences between relationship-driven bank loans (where an informed lender retains the entire loan), and public debt issues (where an informed lender/underwriter sells the entire loan). Syndicated loans are positioned between these two extremes, having characteristics of both private sole-lender loans and public debt issues underwritten by a financial institution. In addition, firms from the entire credit spectrum use syndicated loans. These two facts make empirical analysis of how information asymmetry affects financial arrangements promising in this market.

A. Theoretical framework & empirical implementation

The basic theoretical framework I use is inspired by models in Holmstrom (1979), Holmstrom and Tirole (1997), and Gorton and Pennachi (1995). In this framework, the lead arranger is an “informed lender” who is able to monitor and learn about the firm through unobservable and costly effort. Potential participant lenders are “uninformed lenders” who rely on the information and monitoring provided by the informed lender to make profitable investments in firms. There exists a moral hazard problem at the lead arranger level, given that informed lender effort is unobservable. The informed lender’s potential loss is increasing in the portion of the loan it holds, and so the amount of effort exerted by the lead arranger in due diligence and monitoring is declining in the portion of the loan it syndicates out to participants. At the extreme, only long run reputation considerations govern due diligence by the lead arranger if the lead arranger holds none of the loan (as in a debt underwriting, for example). In this framework, a lead arranger exerts less effort than it would if its actions were fully observable. Participant lenders correctly predict such “shirking” by the lead arranger, and they choose to hold less of the loan. Holmstrom and Tirole (1997) succinctly describe this aspect of their model by noting that “[uninformed lenders] invest

¹⁰ For example, Corwin and Schultz (2005) show that Solomon Smith Barney served as a syndicate member on 83 percent of IPOs where the book manager was DLJ, and Merrill Lynch served as a syndicate member for 57 percent of IPOs where the book manager was Lehman Brothers.

directly in the firm, but only after the monitor has taken a large enough financial interest in the firm that the investors can be assured that the firm will behave diligently” (674).

In order to empirically implement this framework, I classify borrowing firms based on the need for monitoring and due diligence; I refer to firms that need more monitoring and due diligence as “opaque.” When borrowers are relatively transparent and easy to monitor, the moral hazard problem for the lead arranger is less severe. With transparent firms, traditional diversification incentives likely determine the syndicate structure, and the lead arranger does not need to hold a relatively large share of the loan.¹¹ As the borrowing firm becomes more difficult to investigate and monitor (more “opaque”), lead arrangers cannot credibly commit to the proper effort, and so they must hold a larger share of the loan.

I use a variety of measures to classify firms as “opaque” and “transparent”; they are shaped both by previous literature and by data limitations. The Dealscan data contain information about borrowing firms limited to three variables: firm sales, ticker, and S&P senior unsecured debt rating. Using these measures, I rank firms into three categories. First, “private” firms are firms with no ticker and no S&P senior unsecured credit rating which lack publicly available SEC filings. Although audited accounting information may be available for private firms, the identifying assumption is that participant lenders are more dependent on the lead arranger for both its monitoring skills and its ability to collect detailed information when the borrowing firm is not registered with the SEC. In addition, the penalties for falsifying accounting information are less severe when a borrower is not SEC-supervised, which makes monitoring by a lead arranger more important. The second group includes “unrated” firms; these are public borrowers with publicly available accounting data that lack an S&P senior unsecured debt rating. Finally, “transparent” firms are public with S&P senior unsecured debt ratings; these firms have publicly available accounting information with credit quality measured by an independent third party. Information asymmetry between lenders and the borrower and moral hazard are least severe on loans to these firms.

As noted above, I link all public firms (unrated and transparent) to Compustat. Among these public firms, I follow previous literature and use the ratio of R&D investment to sales and the ratio of accruals to total assets as measures of opacity *among* firms with publicly available SEC filings. Firms with high R&D investment to sales ratios have earnings that depend on the realization of future investment opportunities (Lorek, Stone, and

¹¹ When borrowing firms are perfectly transparent, one prediction is that the monitoring and due diligence duties are completely independent of holding a portion of the loan. This is precisely the case in a debt underwriting, when the underwriter holds none of the debt issue.

Willinger, 1999); the evaluation of such future earnings realizations is difficult and requires additional effort by the lead arranger. The use of positive accruals has been shown to be associated with earnings inflation and opacity of cash flows (Teoh, Welch, and Wong, 1998; Sloan, 1996). Firms that report positive accruals require more rigorous monitoring by a financial institution, which exacerbates the moral hazard problem. I also use alternative measures which I describe in the results.

Table 3 presents cell means and standard errors for private, unrated, and transparent borrowing firms. Transparent firms are larger and obtain larger loans. In terms of syndicate structure, transparent firms have a larger number of lenders, lead arrangers, and participant lenders. On average, the lead arranger holds almost twice the share of the loan when the borrowing firm is private (38 percent) or unrated (35 percent) compared to transparent (20 percent), and the syndicate is more concentrated (Herfindahls of 3400 and 3100 compared to 1600). These last two facts give preliminary evidence of the effect of information asymmetry on syndicate structure; I show in the next section that these patterns are robust in a more rigorous empirical specification that controls for size differences.

B. Information asymmetry syndicate structure regressions

In this section, I examine how variation in the opacity of borrowing firms affects syndicate structure, and whether the effect is consistent with the information asymmetry hypotheses outlined above. The general formulation of equations estimated in Table 4 is:

$$Synd_i = \alpha + \sum_{t=1}^{12} Year_{it} + X_i\beta + Opaque_i\gamma + \varepsilon_i \quad (1)$$

The left hand side variables are measures of the syndicate, such as number of lead arrangers, number of participants, and the percentage retained by the lead arranger. The key right hand side variable of interest is *Opaque*, which represents measures, described above, of the need for a financial institution to investigate and monitor the borrower. The control variables (*X*) include industry indicator variables, the natural log of firm sales, the natural log of maturity of the loan in days, the natural log of the number of loan tranches, and an indicator variable for whether a loan deal contains a term loan.¹² As is evidenced in Table 3, the size of the loan varies widely between private, unrated, and investment grade firms; I control for the size of the loan by sorting the sample into three groups based on the size of the loan, and allowing

¹² Another loan characteristic available for some loans in the sample is whether the loan is collateralized. Unfortunately, these data are available for only about 40 percent of the sample. For this sub-sample, I have run all regressions with the inclusion of a collateral indicator variable. The core results are unchanged.

the intercept and the natural log of the size of the loan to vary by each group.¹³ The key coefficient of interest is γ , or how increased “opacity” affects syndicate structure. In other words, γ measures whether lead arrangers hold more of the loan, form a more concentrated syndicate, or select fewer participants when the borrowing firm is more difficult to investigate or monitor. Finally, all standard errors are heteroskedasticity robust, and clustered at the firm level.¹⁴

Table 4, Panel A presents the estimates using transparent borrowing firms as the omitted group. The top 2 rows show that loans to private and unrated firms have fewer participant lenders, a more concentrated syndicate, and the lead arranger holds more of the loan (whether measured by the percent or amount of the loan). Columns (1) and (2) show the results on the full sample. Column (2) shows that private firms have 25 percent fewer participant lenders than transparent firms at the mean, after controlling for the size of the loan and the size of the firm. Columns (3) through (7) isolate the sample to loans where the amount held by each syndicate member is available. In the sub-sample, the number of lead arrangers does not appear to be different, but the number of participants for more opaque firms is lower. The percent held by the lead arranger is 10 percent higher for private firms at the mean, and the syndicate structure is 10 percent more concentrated using the Herfindahl index.

The results in Table 4, Panel A are consistent with the theoretical framework of agency and moral hazard outlined above. Firms that lack SEC filings are more difficult to investigate and monitor, which exacerbates the moral hazard problem of the lead arranger. When borrowing firms lack publicly available SEC filings, participant lenders are more reliant on the lead arranger for detailed information on the borrower. Also, the absence of SEC oversight reduces the penalties for borrowing firms from manipulating or overstating financial health or earnings. Thus, firms that lack SEC filings also require additional monitoring. Unrated firms have public SEC filings, but lack a publicly available third party debt evaluation. The point estimates in Table 4, Panel A present an ordering consistent with moral hazard in a setting of information asymmetry. Lead arrangers retain the largest share of the loan and form the most concentrated syndicates with the fewest participants when borrowing firms are private. The same pattern is observed, to a weaker degree, when

¹³ In robustness checks in Section 5, I address the concern that syndicate structure and the size of the loan are jointly determined, and so the size of the loan should not be treated as exogenous.

¹⁴ Between and random effects estimation yields almost identical results as the clustering on firm approach. I also do fixed effects estimates that I report in the text.

borrowing firms are public but unrated. The ordering of the estimated coefficients in column (2) for private and unrated firms is statistically significant at the 5 percent level.

Table 4, Panel B offers additional specifications to test the robustness of these results. One possible problem with the results in Table 4, Panel A is that private and unrated borrowing firms are not comparable to transparent firms given differences in unobservable characteristics correlated with (but not perfectly captured by) size.¹⁵ In columns (1) through (3), I limit the sample to all transparent firms and only private and unrated firms above median sales (\$250M). When comparing the largest private and unrated firms, the point estimates are very similar (with standard errors slightly higher due to a smaller sample). I use various measures from Compustat to see if the core predictions of the information asymmetry framework hold true when looking *among* public firms. Columns (4) through (6) use an alternative measure of opacity for public firms based on the R&D to sales ratio. Firms with higher R&D to sales ratio have fewer participants and a more concentrated syndicate. In columns (7) through (9), I use the accrual to assets ratio as a measure of the necessity of monitoring. Public firms that require more intense monitoring, measured with the accruals to total assets ratio, have a higher percentage of the loan retained by the lead arranger, and a more concentrated syndicate. In addition to these two measures, I also use years since IPO (older firms are more transparent) and the number of times a firm has accessed the syndicated loan market (firms that have already accessed market are more transparent). All results are robust to these two measures. Even among public firms, when the borrowing firms requires more intense effort for due diligence and monitoring, the lead arranger retains a larger share in the loan and forms a more concentrated syndicate.

I interpret these results as evidence of moral hazard with respect to lead arranger effort in monitoring and due diligence. An alternative explanation is a signaling model based on adverse selection. If a lead arranger has private information on a borrower unavailable to participant lenders, it may be tempted to syndicate out more of a loan when private information is negative. Participant lenders correctly predict such behavior, and the lead arranger is forced to “signal” that the loan is of high quality; the lead arranger retains a larger share of the loan and forms a more concentrated syndicate when information asymmetry is severe. Can these two hypotheses be empirically distinguished? The key distinction in the adverse selection and moral hazard hypotheses is the assumption of where information

¹⁵ I use a set of comprehensive controls for the size of the loan and size of the firm in order to partial out this effect. Below, I also address this worry using fixed effects regressions and evaluating the within-firm change in syndicate structure when a given firm goes from private to transparent or vice versa.

asymmetry lies. In the adverse selection hypothesis, the lead arranger has private information on the firm that is unknown to participant lenders. In the moral hazard hypothesis, all lenders are unfamiliar with the borrower and the moral hazard problem is most severe when the lead arranger must itself learn about the firm.

To distinguish these two hypotheses, I use previous lending relationships between the borrower and the lead arranger as a measure of the information advantage of the lead arranger with respect to participant lenders. If the adverse selection hypothesis is true, then a lead arranger with a previous relationship with the borrower should be forced to retain more of the loan and form a more concentrated syndicate. The prediction is the opposite under the moral hazard hypothesis; a lead arranger with a previous lending relationship with the borrower has already put in the effort required to learn about the firm, and so should be able to retain less of the loan and form a more diffuse syndicate. Table 4, Panel C tests these alternative hypotheses. I group both private and unrated firms into an “opaque” group and include an indicator variable for the presence of a previous lending relationship between the borrower and lead arranger. In addition, I interact these two variables and control for the number of previous loans by a borrower. The results support the moral hazard hypothesis. On deals where a previous lending relationship is present, the lead arranger retains a smaller portion of the loan and forms a more diffuse syndicate with more participants. While the result is true for all firms for the percentage retained by the lead arranger and the concentration of the syndicate (the level effect of a previous loan is significant), it is only true for opaque firms for the number of participants (the interaction term is significant). The results suggest that problems of information asymmetry are less severe when the lead arranger has a previous lending relationship with the borrower, which supports the moral hazard interpretation.

C. Participant choice and information asymmetry

1. Characteristics of Participant Lenders

This section explores how information asymmetry between lenders and borrowers in the syndicated loan market affects which participant lenders end up as syndicate members. I examine whether lead arrangers select potential participants that are more familiar with the borrowing firm when information asymmetry problems are potentially severe.¹⁶ In particular, I focus on two different questions. First, what are the characteristics of the lender given that

¹⁶ I use the language that the lead arranger “chooses” the participant lenders. This is the most common direction of “choice” in the market, but it is a simplification. All theoretical predictions are identical if participants “choose” deals on which to serve. I am interested more in the efficiency of syndicate membership than how that efficiency is reached.

the lender is chosen as a participant, and how do these characteristics vary with the opacity of the borrower? Second, what lender characteristics affect the probability that a given lender is chosen as a participant, and how do these characteristics differentially affect the probability when the borrower is opaque? For example, I am interested in the percentage of *chosen* participants that are foreign financial institutions, and whether that percentage increases or decreases when the borrowing firm is opaque. I am also interested in how *being* a foreign financial institution affects the *probability of being chosen* as a participant, and how this effect varies with the opacity of the firm.

The analysis in this section focuses only on lenders in the top 125 participants or top 100 lead arrangers, by number of deals. These top lenders account for 72,401 out of the total of 87,956 participants in the sample, or about 83 percent. The inclusion ratio is similar across all types of firms: 78 percent for opaque firms, 81 percent for unrated firms, and 84 percent for transparent firms. There is one important limitation in the Dealscan data with regard to lead arranger-participant relationships. When more than one lead arranger is present, I cannot distinguish which lead arranger brought a given participant to the syndicate. For example, if Bank 1 and Bank 2 are lead arrangers and Bank 3 is a participant, I cannot infer which lead arranger brought Bank 3 to the deal. This presents a problem in tracking previous relationships between lead arrangers and participants, and in analyzing how the relationship affects the current deal. When I analyze lead arranger-participant relationships, I limit the sample to loans where there is exactly one lead arranger. This limitation reduces the sample to 8,960 loans and 44,845 participants.¹⁷

Table 5 presents the characteristics of chosen participants by the credit reputation of the borrower. Participants on loans to private borrowers are smaller and better-capitalized. The participants are more likely to be foreign when the borrowing firm is transparent. Relative to when borrowers have public credit ratings, chosen participant lenders are 8 percent more likely to be in the same region or census division, and 4 percent more likely to be in the same state as the borrowing firm when the borrowing firm is private or unrated. In other words, participant lenders for rated companies are more likely to be foreign banks, and more likely to be further away from the borrowing firm even conditional on being a domestic bank. Compared to rated firms, the lead arranger chooses participants that are geographically closer to the borrowing firm when the borrowing firm has no public financial information.

¹⁷ I limit the sample to deals with exactly 1 lead arranger *only* when evaluating relationships between lead arrangers and participants. For the rest of the analysis, I use the entire sample.

In terms of previous direct lending relationships, chosen participant lenders are more likely to have been a former lead or former participant for the borrowing firm when the borrowing firm is transparent. A total of 18 percent of participants on transparent deals are previous leads for the borrowing firm, and 65 percent are previous participants. The numbers are 10 percent and 48 percent when the borrowing firm is private. This last result, however, should be viewed with caution. Transparent firms have far more previous loans in the sample, and more lead arrangers and participants per previous loan. Transparent firms thus mechanically have a higher probability of having a previous relationship with a given participant. Using the fraction of previous firm loans on which a participant lender was a previous lead or participant is one way to adjust for this problem, and the results show no statistical difference between transparent, unrated, and private firms. However, even this statistic is problematic because transparent firms have more leads and participants per previous loan, so again there is a mechanical relationship. As I demonstrate below, a better way to understand how previous relationships impact the choice of participants is to ask the converse question: how do previous relationships with a firm affect the probability of being chosen as a participant?

The bottom section of Table 5 displays the basic differences in lead arranger-participant relationships for the sub-sample of loans with exactly 1 lead arranger. The overall percentage of participants that are in the same region, census division, or state as the lead arranger is relatively small compared to the percentage in the same region as the borrowing firm.¹⁸ In addition, the variation across the credit spectrum is limited. In terms of the fraction of previous deals led by the lead arranger, participants are on a lower fraction when the borrowing firm is private or unrated. These results suggest that lead arranger-participant relationships are in fact slightly more persistent on transparent loans.

2. Participant choice probit analysis

The second part of the participant analysis asks the converse question: what factors influence the probability of a lender being chosen as a participant on a given deal? To answer this question, I employ a maximum likelihood probit choice model similar to the model used in Corwin and Schultz (2005) to describe the choice of IPO syndicate members. I define the “potential” participant choice set as all financial institutions that represent at least 0.5 percent of all participants for syndicated loans for the year of the loan in question. The

¹⁸ Foreign participants are considered in the same state and census division if they are in the same country as the lead arranger, and the same region if they are from the same continent.

probit analysis seeks to explain what factors influence the probability of a financial institution being chosen. More specifically, I estimate a probit of the following form:

$$\Pr(\text{Participant} = \text{Bank}_{ij}) = f(\alpha + \beta * \text{Loan}_i + \gamma * \text{Bank}_j + \varepsilon_{ij}) \quad (2)$$

I am interested in how the characteristics of loan i and the characteristics of bank j influence the probability that bank j is chosen as a participant on loan i . The critical parameter of interest is γ , and I am particularly interested in how γ varies with the opacity of the borrowing firm. For example, how does the existence of a previous relationship between a lender and a borrowing firm influence the probability of being chosen as a participant, and how does this vary by the opacity of the borrowing firm?

This analysis is not a standard multinomial choice model as in McFadden's (1974) multinomial logit framework where there are x potential outcomes and one is chosen. Instead, there are x potential outcomes and any number of them can be chosen. Amemiya (1974) addresses maximum likelihood probit estimation in a setting where multiple outcomes can be simultaneously chosen. His analysis implies that the proper maximum likelihood technique in this setting is to fit a probit estimation where one analyzes the probability that any given potential lender is chosen as a participant. One critical component of the analysis is the correlation structure of the error terms within a choice set. For example, the fact that bank j is chosen on deal i affects whether or not bank k is chosen on deal i . Instead of imposing any specific structure on the joint distribution of error terms for potential participants on the same loan, I allow the correlation to vary through clustering. My approach is more rigorous than that proposed by Amemiya (1974); I allow the error terms to be freely correlated across all potential syndicate members on a given loan *for all of a given firm's loans*. Some firms have more than 1 loan, and I allow errors to be correlated for all potential participants on any of the loans.

Table 6 presents the estimates. Transparent firms are the omitted group. Coefficients in Table 6 are marginal changes in probability and coefficients and standard errors are multiplied by 100. In addition to the variables reported, the estimation includes all deal level variables included in the syndicate structure analysis in Table 4, the size and capital position of the potential participant lenders, and the intercept is allowed to vary by credit reputation. Columns (1) and (2) ignore previous lending relationships between the borrowing firm and potential participants in order to examine the entire sample that includes first time borrowers. The results in column (1) demonstrate that being in the same region as the borrowing firm increases the probability of being chosen as a participant by 6.5 percent (on a mean of 8.3

percent), and being a foreign or unregulated domestic financial institution is negatively related to being chosen as a participant. Column (2) examines how these effects vary as firms require more intense due diligence and monitoring effort. The results in column (2) show that being in the same region as the borrowing firm increases the probability that a lender is chosen by 5.3 percent for transparent firms; the interaction terms show that this effect becomes 6.7 to 7.1 percent for private and unrated firms.

Columns (3) and (4) limit the sample to borrowing firms that have at least one previous loan in the entire Dealscan data set of loans from 1990 to 2003. One result is immediately apparent: there is a large amount of persistence in lender-borrowing firm relationships. Column (3) shows that a former participant for a borrowing firm is 26.7 percent more likely to be chosen as participant on the current deal. When I interact previous relationships with the credit reputation of the borrowing firm (column 4), I find that former relationships are relatively more important when the borrowing firm is private or unrated. For example, a lender that is a former lead arranger for a borrowing firm is 5.9 percent more likely to be chosen as a participant, but the effect is 50 percent stronger when the borrowing firm is private. A lender that is a former participant for a firm is 25 percent more likely to be chosen as a participant, but the effect is more than 10 percent stronger if the borrowing firm is private or unrated.

The results in Tables 5 and 6 provide further evidence to support the moral hazard interpretation of earlier results. If the lead arranger cannot commit to exert costly and unobservable effort in its monitoring and investigation of the firm, one strategy is to choose participants that are closer to the borrowing firm (both in terms of geographical location and previous relationships). The results in Tables 5 and 6 show that lead arrangers pursue this strategy, and do so more strongly when public information on the borrowing firm is limited.

How do lead arranger-participant relationships affect participant choice? Table 7 presents a probit analysis identical to Table 6, but on the sub-sample of loans with exactly one lead arranger and with the inclusion of lead arranger-participant relationship measures. The results in columns (1) and (3) imply that being in the same region as the lead arranger and having been on a recent syndicate with the lead arranger both positively affect the probability of being chosen as a participant. However, the effects are rather small, especially when compared with the effects of being a former lead or participant for the borrowing firm. Column (3) shows that a lender that served on a syndicate with the lead arranger in the previous quarter is 2.4 percent more likely to be chosen as a participant. A lender that served

as a participant for the borrowing firm is 27.5 percent more likely to be chosen as a participant. Moreover, the effect of lead arranger-participant relationships does not vary by borrowing firm opacity. Neither the effect of being in the same region as the lead arranger nor the effect of being on a recent syndicate with the lead arranger differs when the firm is private or unrated. The overall results in Table 7 suggest that previous lead arranger-participant relationships are relatively less important than previous borrowing firm-participant relationships, and that lead arranger-participant relationships are no more persistent on loans to private or unrated firms. The findings suggest that a lead arranger selects participants based on the participant's familiarity with the *borrowing firm*, not based on the participant's familiarity with the *lead arranger itself*.

V. Renegotiation

Incomplete contract theory (Grossman and Hart, 1986; Hart and Moore, 1988; Hart and Moore, 1990; and Hart, 1995) emphasizes the importance of control rights and renegotiation when contracts cannot be made contingent on all possible future outcomes. Incomplete contract theory has been used to explain corporate financial policy (Hart, 1995; Dewatripont & Tirole, 1994), the structure and terms of debt contracts (Bolton and Scharfstein, 1996) and the instruments used by venture capital firms (Kaplan and Stromberg, 2002). While there is an increasing empirical literature on the impact of control rights on financial contracts, empirical research that examines the importance of renegotiation on *ex-ante* contract structure remains scarce.

Renegotiation is a prevalent and important part of the syndicated loan market. Amendments to original loan agreements are common and practitioners say that renegotiation considerations are a factor when the original loan agreement is signed. In the syndicated loan market, unanimity of all syndicate members is required for any change in major terms of the original loan. Both the prevalence of renegotiation and the unanimity provision in renegotiation make this market a promising empirical laboratory for exploring incomplete contract theory and renegotiation.

A. Theoretical framework & empirical implementation

The theoretical framework presented here is based on models by Hart and Moore (1988) and Bolton and Scharfstein (1996). In this framework, borrowing firms are able to engage in actions, such as cash diversion, that are observable to lenders but non-verifiable in a court of law. Diversion makes default (violating a financial covenant or missing a payment) on a syndicated loan more likely. Once the borrowing firm enters into a state of

default, it wants to renegotiate the terms of the loan. Given the required unanimity of syndicate members to change loan terms, renegotiation occurs when there is enough surplus to induce all lenders to agree to a new contract. While renegotiation may be desirable *ex-post*, the ability of the borrower to easily extract renegotiation surplus is *ex-ante* bad for managerial incentives at the borrowing firm. If management at the borrowing firm can extract a large portion of the renegotiation surplus, shirking and diversion of cash flows will be more common. If the lead arranger wants to prevent diversion, then it may choose a syndicate structure that reduces the expected value from renegotiation for the borrower in order to improve managerial incentives. Bolton and Scharfstein (1996) show that lenders are able to discipline managers by increasing the number of lenders. Through Nash bargaining, more lenders lead to a smaller surplus retained by the borrower in the renegotiation.

The Bolton and Scharfstein (1996) model predicts a larger syndicate when firms are more likely to *strategically default*. Of course, borrowers may default through no fault of their own (*liquidity default*). Both in theory and practice, the firms that are more likely to have a liquidity default are the same firms that are able to strategically default. In the context of Bolton and Scharfstein (1996) where outcomes are observable but not verifiable, courts will likely be able to dismiss a claim by cash-rich high quality borrowers with low leverage ratios that true default is pending.¹⁹ In an alternative model where outcomes are not fully observable to lenders, a borrower that lacks a credible probability of liquidity default is fully revealed as lying when it attempts to strategically default. In theory, therefore, firms that are more likely to default through no fault of their own are precisely the same firms that are able to strategically default. There are two effects that ultimately shape the optimal number of syndicate members for loans to these firms. Lenders want to facilitate renegotiation when a true liquidity default occurs. At the same time, lenders want to make renegotiation more difficult when borrowers attempt to strategically default. The key question I answer in this section is: which type of default is more influential in syndicate formation?

I answer this question by examining the differences in syndicate structure on loans to “safe” firms versus firms that have an *ex-ante* non-trivial probability of default. In order to limit the interaction with information asymmetry predictions, the empirical analysis in this section focuses only on firms with publicly available credit ratings. I use credit ratings,

¹⁹ In the model, a borrower strategically defaults by claiming it has low earnings when it actually has high earnings. Such a claim is only reasonable if the low earnings outcome is possible. That is, firms that have very low probabilities of low earnings are “outside” the framework of strategic default.

leverage ratios, and interest coverage ratios to measure the *ex-ante* probability that default and subsequent renegotiation will occur.

Standard diversification motivations also influence the optimal number of creditors. Lenders want to limit exposure on loans where potential losses are more likely. A main empirical challenge is to determine whether the optimal number of creditors is shaped by renegotiation considerations or standard diversification motives. The unanimity clause in the syndicated loan market is the key feature I use to distinguish between the two. Absolute unanimity is required to renegotiate major terms of the loan (amount, principal, interest, or maturity). In some cases, unanimity is also required to renegotiate financial covenant violations. This disproportionate voting power for syndicate members holding even small amounts of the loan is a key feature I exploit in my empirical strategy.

Table 8 presents data that show the importance of financial covenants and renegotiation in the syndicated loan market. Panel A of Table 8 shows the prevalence of covenants restricting asset sales and mergers, and financial covenants. Asset sales and financial covenants are more common on loans to high yield firms (37 percent and 62 percent, respectively) than loans to investment grade firms (5 percent and 38 percent respectively). Table 8 also lists the 3 most common types of financial covenants.

A syndicated loan is technically in “default” if the borrower fails to meet one of these financial covenants or fails to make a specified interest payment. The lending syndicate has the option to accelerate the loan which can force the borrower into Chapter 11 proceedings. However, immediate acceleration of the loan is not common. Instead, syndicate members usually agree to a loan “amendment,” or a restructuring plan or new set of covenants, in exchange for a renegotiation fee paid by the borrowing firm. If the amendment changes any aspect with regard to interest payments, maturity, the amount of the loan, or collateral, all syndicate members must agree to the new contract amendment. Practitioner interviews suggest that even lenders holding very small portions of the loan have the *effective* power of rejecting the renegotiated contract and forcing the acceleration of the loan.

Panel B of Table 8 examines renegotiation data available in Dealscan. The Loan Pricing Corporation only reports amendment data where they are self-reported by the lending syndicate members. The renegotiation data are therefore incomplete, and should be viewed only as a window into the types of renegotiation, not a comprehensive inventory of all renegotiations that occur. The data are more widely reported on deals to high yield firms (21 percent versus 5 percent). Table 8 also lists the 4 most common amendments to the loan,

which include a relaxation of financial covenants, increasing the amount of the loan, changing the pricing of the loan, and relaxation of covenants restricting asset sales.

B. Renegotiation syndicate structure regressions

In this section, I use syndicate structure regressions to examine how variation in the default risk of borrowing firms affects syndicate structure. I examine this effect to see whether strategic or liquidity default considerations are more important in syndicate formation. The analysis is limited to loans to public firms with S&P senior unsecured debt ratings. The general formulation of equations estimated in Table 9 is:

$$Synd_i = \alpha + \sum_{t=1}^{12} Year_{it} + X_i\beta + Default_i\gamma + \varepsilon_i \quad (3)$$

The left hand side variables are measures of the syndicate, such as number of lead arrangers, number of participants, and the percentage retained by the lead arranger. The key right hand side variable of interest is *Default*, which is a measure of the borrower's likelihood of missing an interest payment or violating a financial covenant. The likelihood of default is measured with the senior unsecured debt rating and the leverage ratio. Firms with a rating of BB+ or worse are classified as "high yield" and firms with a rating of BBB- or better are "investment grade." The leverage ratio is a continuous measure of the default probability.²⁰ The control variables are identical to those described in Section 4. All standard errors are heteroskedasticity robust, and clustered at the firm level.

Table 9, Panel A presents the estimated coefficients. Columns (1) and (2) use the entire set of loans to rated companies, and show that the number of participants is higher for high yield firms, a result that is statistically different from 0 at the 5 percent level. Columns (3) through (8) limit the sample to only loans where the share held by each syndicate member is available. As shown in columns (3) and (4), the number of lead arrangers is higher on loans to high yield firms and firms with high leverage. Consistent with column (2), columns (5) and (6) show that firms more likely to default, whether measured by credit ratings or leverage ratios, have more participant lenders.²¹ Columns (7) and (8) show that lead

²⁰All results in this section are robust to using the interest coverage ratio and the lagged three year standard deviation of return on assets as alternative measures of default probability.

²¹This result is the opposite of those in Lee and Mullineaux (2004), Table V, who find that syndicate size is decreasing in credit risk. This discrepancy is due to the fact that Lee and Mullineaux (2004) do not control for borrower size. Investment grade firms are on average 3 times larger than high yield firms in my sample. In addition, Lee and Mullineaux (2004) control only for the *level* of the loan amount. In my sample, the natural logarithm of loan amount is significantly stronger in predicting syndicate size; univariate R² is 0.27 when regressing syndicate size on the *level* of the loan amount and 0.49 when using the *natural logarithm* of the loan amount. I am able to replicate very similar findings as Lee and

arrangers do not hold less of the loan when borrowing firms are more likely to default. In other words, the lead arranger adds participants to the syndicate, but it does not syndicate out more of the loan. This finding suggests that lead arrangers do not add participants for their own diversification needs.

Table 9, Panel B further explores the effect of renegotiation considerations on syndicate structure. Columns (1) and (2) show that lending syndicates for borrowers more likely to default are no less concentrated. In fact, the point estimates imply that the syndicate structure is slightly more concentrated (although the results are only significantly different than 0 at the 20 percent level). Columns (1) and (2) point to a conundrum; lead arrangers add more participants to the syndicate when the borrowing firm has a higher probability of default, but they do not syndicate out more of the loan, and do not spread the loan more evenly among more participants. This moves us away from diversification as a sole explanation for the added lenders. Syndicates on loans to firms more likely to default have more lenders, but the same concentration. This is possible only if some lenders hold very small portions of the loan. Columns (3) through (6) document this phenomenon. When the borrowing firm has a higher probability of default, the lead arranger is more likely to add participants who hold very small portions of the loan. The result is robust whether I measure “small portions” using an absolute amount (less than \$5 million) or a share of the loan (less than 2 percent). The coefficient on the high yield indicator indicates that a firm likely to default has on average 0.62 more participants holding less than 2 percent of the loan (on a mean of 1.5 in this sample).

All lenders can veto renegotiation; therefore, participant lenders holding even small portions of the loan have disproportionate voting power in the syndicate. The results suggest that lead arrangers add participant lenders holding small amounts to make renegotiation more difficult. If lead arrangers form large syndicates only to better diversify risk, then larger syndicates would be more disperse and the lead arranger would choose to hold a smaller portion of the loan. This is not the case. Diversification alone cannot explain the fact that participant lenders with very small amounts are added to the syndicate.

Distinguishing between diversification incentives and renegotiation considerations is difficult. Clearly, both play an important role in syndicate formation to firms with high default probability. Figure 1 provides further evidence that it is not diversification alone that

Mullineaux (2004) when using their specification, but show that the findings change when controlling for log assets and log amount (all data work available from author upon request).

drives syndicate formation. It maps the difference in the number of participants on loans to high yield and investment grade firms that hold a given percentage of the loan, after controlling for the size of the loan. The difference between the number of lenders holding a given percentage of the loan is most pronounced among very small percentages (< 2 percent) and quickly disappears at 4 percent of the loan and above. High yield firms have on average 1 more participant holding less than 2 percent of the loan than investment grade firms, which is 65 percent more at the mean. To put this into perspective, 2 percent of the average loan to rated firms is about \$11 million, or less than ½ of 1 basis point of the total average assets of a lender in the sample. A standard diversification argument implies that participant lenders want to limit their exposure; it does not explain why the difference is so pronounced at extremely small portions of the loan, and non-existent at levels just above 2 percent.

One alternative explanation of the above result is that the choice set of participant lenders facing lead arrangers for high yield firms is different than the choice set for investment grade firms. Perhaps the types of lenders in the high yield market are peripheral players that only accept small amounts of the loan. This, however, does not appear to be the case. Of the top 20 lenders that most often hold less than 2 percent of loans to high yield firms, 19 are commercial banks and none are small peripheral participants. Bank of America, Bank of New York, and ABN-AMRO are major players for all sectors of the syndicated loan market, and are the top 3 participants that hold less than 2 percent of loans to high yield firms.

Overall, the results suggest that lenders choose to make renegotiation more difficult when borrowers have a high probability of default. The results suggest that potential strategic default is more influential in syndicate formation than liquidity default.

C. Robustness of results

1. Fixed effects estimates

All identification of coefficients in Tables 4 and 9 come from between-firm variation in credit reputation. One possible concern is that a regression analysis comparing different firms might be biased due to firm-specific omitted variables. Table 10 exploits within-firm variation for 2,889 firms which have 2 or more loans in the sample in order to see if the core results are robust to a within-firm analysis. Of these firms, there are 89 firms that go from private to the unrated or transparent category (mostly through IPOs) and 93 that go from the transparent or unrated category to private (mostly by emerging from bankruptcy). In addition to variation in the availability of public filings, there is also within-firm variation in credit

ratings. To exploit the within-firm variation in the sample, I estimate the following fixed effects specification:

$$Synd_{ij} = \alpha_j + \sum_{t=1}^{12} Year_{it} + X_{ij}\beta + \beta_1 CreditQuality_{ij} + \varepsilon_{ij} \quad (3)$$

That is, I estimate how within-firm variation in the credit quality of firm j affects the syndicate structure for loan i . Standard errors reported in the tables are heteroskedasticity robust and clustered at the borrowing firm level.

Columns (1) through (3) of Table 10 test whether the core information asymmetry results in Table 4 are robust to a fixed effects specification. The result that private and unrated firms have fewer lenders on their syndicates is robust and is driven by a fall in the number of participants. The point estimate in column (3) indicates that a given private firm has almost 25 percent fewer lenders relative to the period when the same firm is public with a credit rating. Columns (4) and (5) of Table 10 test whether the core renegotiation results in Table 9 are robust to a fixed effects specification. In these tables, I isolate the sample to rated firms. The point estimate in Column (4) shows that a given firm has more participants when it is high yield relative to when it is investment grade, but the estimate is not statistically distinct from 0 at the 10 percent level. Column (5) uses a sharper measure of the within-firm change in credit rating. I construct an upgrade and downgrade indicator variable that is turned on if the firm switches from investment grade to high yield or vice versa, respectively. Column (5) reports an increase in the number of participants when a firm experiences a downgrade. The point estimate is even stronger than the cross-section analysis, and is significant at the 5 percent level.

The results in Table 10 show that the core results of the between-firm analysis are robust to a fixed effects specification. In other words, syndicate structure responds in the hypothesized manner even when looking at within-firm changes in credit reputation. This helps to allay concerns that unobservable firm differences are inducing bias in the cross-section estimates in Tables 4 and 9.

The sample size for fixed effects analysis of the shares held by each lender is too small to obtain precise estimates. As noted above, the amount of the loan held by each lender is available only for about one third of the overall sample, and even a smaller share for the fixed-effects sample. I do not report coefficients from the fixed effects regressions where the Herfindahl of the syndicate or the amount held by each lead arranger is the dependent

variable. In these regressions, the coefficient estimates are similar to those reported in Tables 4 through 9, but none of the estimates are statistically significant.

2. *Exogeneity of loan characteristics*

One important concern with the results in the syndicate structure regressions is the proposed exogeneity of loan characteristics to the structure of the syndicate. I use loan amount and loan maturity as exogenous right hand side variables when explaining syndicate structure, but they may implicitly be a function of the syndicate structure itself. The exogeneity assumption is motivated by the actual process of loan syndication; the general terms of the loan are decided before the lead arranger forms the syndicate. However, loan characteristics could be determined by *potential* syndicate structure considerations. For example, a lead arranger could know with certainty that 5 participants will each contribute \$5 million for a given firm, and the amount of the loan becomes a function of the number of participant lenders. The core empirical tests of this paper are not concerned with the coefficients on the loan characteristics such as loan amount or maturity. Instead, the key coefficient estimates of interest are those measuring the effect of the credit reputation of the firm on syndicate structure. However, if endogeneity of loan characteristics (loan amount, maturity, etc.) affects syndicate structure in a manner that also biases coefficients on credit reputation, then the core results may be questioned.

I do a variety of robustness checks to address this concern. First, all core results are robust to the complete exclusion of all loan characteristics. Even without controlling for the loan amount, the loan maturity, the number of loan tranches, and the presence of a term loan tranche, I find that firms that are more opaque, by a number of measures, have fewer lenders with more concentrated syndicates. I also find that firms with higher *ex-post* default probabilities have more participants but no less concentrated lending syndicates. Second, I use an instrumental variables strategy to instrument for the loan amount.²² I instrument loan amount using lagged capital expenditures at the borrowing firm, with the identifying assumption being that lagged capital expenditures affect the syndicate structure of a given loan only through its effect on the loan amount. All results from the IV specification are almost identical to those found in Tables 4 and 9. These results are not reported but are available from the author.

²² I instrument for loan amount, as opposed to loan maturity or any other loan characteristic, because it is the only loan characteristic that has a meaningful effect on the credit reputation variables.

VI. Conclusion & future research

Syndicated lending represents an important source of corporate finance. Privately-held, high yield, and investment grade firms all utilize this financial product, and almost \$1 trillion in new syndicated loans are signed every year. The Federal Reserve Shared National Credit program reports over \$1.3 trillion in outstanding syndicated loan commitments to non-financial businesses in 2003. This paper explores this market and finds important results that help explain how it functions. In particular, I focus on two hypotheses derived from corporate finance theory: how information asymmetry and *ex-post* renegotiation concerns affect syndicate structure and choice of participants.

My results suggest that syndicate structure and the choice of participant lenders reflect basic hypotheses of existing theory literature on moral hazard and renegotiation. First, I find that when borrowing firms need more intense investigation and monitoring effort by the lead arranger, the syndicate structure has fewer participants, a higher percentage retained by the lead arranger, and a higher general concentration. In addition, lead arrangers are more likely to choose participants that are “close” to these firms. These results are robust when using numerous variables to measure “opacity,” or the need for monitoring and investigation. These findings are also robust to within-firm, fixed effects analysis. The evidence suggests that, when the borrower requires more intense investigation and monitoring, the lead arranger commits by taking a large financial stake in the credit. These findings also provide support for models that emphasize the importance of “informed” capital to the financial health of small firms with little or no public information (for example, Holmstrom and Tirole, 1997). The importance of lead arranger capital in syndicated loans to opaque firms provides insight into why these firms might be the most adversely affected in banking credit crunches.

Second, I document the importance of renegotiation in this market, and find evidence that *ex-ante* syndicate structure is influenced by *ex-post* renegotiation concerns. In my results, lenders appear to form syndicates in order to make renegotiation difficult and deter strategic default. I conduct several empirical tests to show that lead arrangers appear to engage in “participant-loading” when borrowing firms have non-trivial probabilities of default; that is, lead arrangers add participants with small portions of the loan to syndicates when renegotiation is a real possibility. The core results are robust to within-firm and between-firm variation, and to a variety of measurements of default probability. Given that unanimity of syndicate members is required to renegotiate terms of the loan, participant loading decreases both the probability of and payoff to successful renegotiation. The

disproportionate voting power of lenders with even very small portions of the loan allows me to distinguish between renegotiation and standard diversification motives. The evidence suggests that lead arrangers attempt to reduce strategic default behavior by reducing the attractiveness of default. Liquidity default considerations do not appear as important in syndicate formation as strategic default considerations.

The findings of this paper point to new avenues for future research, two of which I outline here. First, I have not explored what explains the rapid growth of the syndicated loan market in the last two decades. In a related area, I have not focused on whether the growth of the syndicated loan market has resulted in a lower cost of capital or improved liquidity management for borrowing firms. There is anecdotal evidence that the syndicated loan market is an attractive alternative to the high yield bond market (in terms of lower prices and the ability to renegotiate), and that it allows privately-held firms access to previously untapped large sources of capital. The primary data source used by corporate finance researchers, Compustat, does not break out bank debt from public debt, and contains no information on unused lines of credit. An examination of 10-Ks is the most direct research strategy for answering these questions, and something I am currently pursuing.

Second, syndicated loans are an avenue for continued empirical research on the importance of renegotiation in corporate finance. While this paper analyzes the effect of renegotiation on *ex-ante* syndicate structure, another important line of research would help explain how larger lending syndicates affect *ex-post* renegotiation and Chapter 11 filings when firms become financially distressed.²³ In other words, this paper asks, how do future renegotiation considerations affect initial syndicate structure? An equally interesting question is, how does the syndicate structure affect future renegotiation in financial distress? Further exploration of the exact contracting strategies used by banks (and the renegotiation outcomes) would be informative for researchers focused on the importance of renegotiation.

²³Renegotiation in financial distress has been examined by Asquith, Gertner, and Scharfstein (1994) and Gilson, John, and Lang (1990). These papers do not, however, focus specifically on syndicated loans.

References

- Altman, Edward I. and Heather J. Suggitt, 2000, Default Rates in the Syndicated Bank Loan Market: A Mortality Analysis,” *Journal of Banking and Finance*, 24, 229-253.
- Amemiya, Takeshi, 1974, Bivariate Probit Analysis: Minimum Chi-Square Methods, *Journal of the American Statistical Association*, 69, 940-944.
- Angbazo, Lazrus, Jianping Mei, and Anthony Saunders, 1998, Credit Spreads in the Market for Highly Leveraged Transaction Loans, *Journal of Banking and Finance* 22: 1249-82
- Asquith, Paul, Robert Gertner, and David Scharfstein, 1994, Anatomy of Financial Distress: An Examination of Junk-Bond Issuers, *Quarterly Journal of Economics*, August: 625-658.
- Bernanke, Ben and Mark Gertler, 1989, Agency Costs, Net Worth and Business Fluctuations, *American Economic Review*, 79, 14-31
- Bernanke, Ben, Mark Gertler and Simon Gilchrist, 1996, The Financial Accelerator and the Flight to Quality, *Review of Economics and Statistics*, 78, 1-15.
- Bolton, Patrick and David Scharfstein, 1996, Optimal Debt Structure and the Number of Creditors, *Journal of Political Economy*, 104, 1-25.
- Corwin, Shane A. and Paul Schultz, 2005, The Role of IPO Underwriting Syndicates: Pricing, Information Production, and Underwriter Competition, *Journal of Finance*, forthcoming.
- Dahiya, Sandeep, Manju Puri, and Anthony Saunders, 2003, Bank Borrowers and Loan Sales: New Evidence on the Uniqueness of Bank Loans, *Journal of Business*, October, 563-582.
- Dennis, Steven A. and Donald J. Mullineaux, 2000, Syndicated Loans, *Journal of Financial Intermediation*, 9, 404-426.
- Dewatripont, Mathias and Jean Tirole, 1994, A Theory of Debt and Equity: Diversity of Securities and Manager-Shareholder Congruence, *Quarterly Journal of Economics*, 109: 1027-1054.
- Diamond, Douglas, 1991, Monitoring and Reputation: The Choice between Bank Loans and Privately Placed Debt, *Journal of Political Economy*, 99: 689-721
- Esty, Benjamin and William Megginson, 2003, Creditor Rights, Enforcement, and Debt Ownership Structure: Evidence from the Global Syndicated Loan Market, *Journal of Financial and Quantitative Analysis*, March, 37-59.
- Esty, Benjamin, 2001, Structuring Loan Syndicates: A Case Study of the Hong Kong Disneyland Project Loan, *Journal of Applied Corporate Finance*, 13:4, 3-23
- , 2004, When Do Foreign Banks Finance Domestic Projects? New Evidence on the

- Importance of Legal and Financial Systems, Working Paper, September.
- Francois, Pascal and Franck Missonier-Piera, 2004, The Agency Structure of Loan Syndicates, Working Paper, June 22.
- Gilson, Stuart, Kose John, and Larry Lang, 1990, Troubled Debt Restructurings: An Empirical Study of Private Reorganization of Firms in Default, *Journal of Financial Economics*, 27: 315-353.
- Gorton, Gary B. and George G. Pennachi, 1995, Banks and Loan Sales: Marketing Nonmarketable Assets, *Journal of Monetary Economics*, 35: 389-411
- Grossman, Sanford and Oliver Hart, 1986, The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration, *Journal of Political Economy*, 94: 691-719.
- Hart, Oliver and John Moore, 1988, Incomplete Contracts and Renegotiation, *Econometrica*, 56, 755-785.
- , 1990, Property Rights and the Nature of the Firm, *Journal of Political Economy*, 98:1119-1158
- Hart, Oliver, 1995, *Firms, Contracts, and Financial Structure*, Oxford University Press.
- Hitchings, Robert, 1994, Syndicated Loans, *Banking World*, July: 32.
- Holmstrom, Bengt, 1979, Moral Hazard and Observability, *Bell Journal of Economics* 10, 74-91.
- Holmstrom, Bengt and Jean Tirole, 1997, Financial Intermediation, Loanable Funds, and the Real Sector, *Quarterly Journal of Economics*, CXII, 663-691.
- Jones, Jonathan, William Lang, and Peter Nigro, 2000, Recent Trends in Bank Loan Syndications: Evidence for 1995-1999, Office of the Controller of the Currency Working Paper, December.
- Kaplan, Steven and Per Stromberg, 2002, Financial Contracting Meets the Real World: An Empirical Analysis of Venture Capital Contracts, *Review of Economic Studies*, 1-35.
- Kashyap, Anil K., Jeremy C. Stein and David W. Wilcox, 1993, Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance, *American Economic Review*, 83, 78-98.
- Lee, Sang Whi and Donald J. Mullineaux, 2004, Monitoring, Financial Distress, and the Structure of Commercial Lending Syndicates, *Financial Management*, August, 107-130.
- Lorek, Kenneth S., Mary S. Stone, and G. Lee Willinger, 1999, The Differential Predictive Ability of Opaque and Transparent Firms' Earnings Numbers, *Quarterly Journal of Business and Economics*, 38, 3-19.
- McFadden, Daniel, 1974, The Measurement of Urban Travel Demand, *Journal of Public*

- Economics, 3, 303-328.
- Megginson, William, Annette Poulsen, and Joseph Sinkey, 1995, Syndicated Loan Announcements and the Market Value of the Banking Firm, *Journal of Money, Credit, and Banking* 27: 457-475
- Narayanan, Rajesh, Kasturi Rangan, and Nanda Rangan, 2004, The Role of Syndicate Structure in Bank Underwriting, *Journal of Financial Economics*, forthcoming.
- Panyagometh, Kamphol, and Gordon Roberts, 2002, Private Information, Agency Problems, and Determinants of Loan Syndications: Evidence from 1987-1999, Working Paper, April.
- Preece, Dianna and Donald J. Mullineaux, 1996, Monitoring, Loan Renegotiability, and Firm Value: The Role of Lending Syndicates, *Journal of Banking and Finance*, 20, 577-593.
- Qian, Jun and Philip Strahan, 2004, How Laws and Institutions Shape Financial Contracts: The Case of Bank Loans, Working Paper, April.
- Rajan, Raghuram G., 1992, Insiders and Outsiders: The Choice between Informed and Arm's Length Debt, *Journal of Finance*, 47, 1367-1400.
- Simons, Katerina, 1993, Why do Banks Syndicate Loans?, *New England Economic Review of the Federal Reserve Bank of Boston*, 45-52.
- Skinner, D.J., 1993, The Investment Opportunity Set and Accounting Procedure Choice, *Journal of Accounting & Economics*, 16, 407-455.
- Sloan, Richard G., 1996, Do Stock Prices Fully Reflect Information in Accruals and Cash Flows?, *Accounting Review*, Spring, 289-316.
- Sufi, Amir, 2004, Does Joint Production of Lending and Underwriting Help or Hurt Firms? A Fixed Effects Approach, Working Paper, August.
- Teoh, Siew Hong, Ivo Welch, and T.J. Wong, 1998, Earnings Management and the Underperformance of Seasoned Equity Offerings, 50, 63-99.
- Thomas, Hugh and Zhiqiang Wang, 2004, The Integration of Bank Syndicated Loan and Junk Bond Markets, *Journal of Banking and Finance*, 28, 299-329.
- Weidner, David, 2000, Syndicated Lending Closes out '90s on a Tear, *The American Banker*, January 10th, 1.
- Wienke, Robert O., 1994, Loan Syndications and Participations: Trends and Tactics, *Commercial Lending Review*, Vol 9, Issue 2: 4-10.

Table 1
Summary Statistics for Syndicated Loan Deals

This table presents summary statistics on the sample of 14,021 syndicated loan deals representing 5,011 firms from 1991-2003.

Firm Characteristics	N	Mean	SD	Distribution		
				10 th	50 th	90 th
Total sales (\$M)	14021	3127	9715	72	629	7800
S&P unsecured debt rating (1 = AAA)	6464	10.1	3.78	6	10	14
<i>Compustat data available</i>						
Total assets (book value, \$M)	10703	4970	14249	132	1020	13307
Leverage (book debt/book assets)	10703	0.35	0.2	0.1	0.33	0.6
Earnings to assets	10703	0.08	0.08	0	0.08	0.16
R&D expense to sales ratio	4659	0.03	0.04	0	0.01	0.08
Accruals to total assets ratio	9909	-0.04	0.08	-0.12	-0.04	0.05
Syndicated loan characteristics						
Size of deal (\$M)	14021	358	706	35	150	809
Maturity (days)	14021	1140	801	364	1095	2113
Number of loan tranches	14021	1.35	0.69	1	1	2
Deal includes term loan	14021	0.23	0.42	0	0	1
Syndicate structure						
Total number of lenders	14021	8.1	7.8	2	5	18
Total number of lead arrangers	14021	1.8	2.4	1	1	3
Total number of participant banks	14021	6.3	7.2	0	4	18
% of loan kept by each lead	5066	29	20	8	24	56
Concentration of syndicate (herfindahl)	5066	2495	1820	604	2000	5098
# participants holding < \$5 M	5066	0.49	1.97	0	0	1
# participants holding < 2%	5066	0.83	3.21	0	0	1

Table 2**Top Lead Arrangers and Participant Banks, by Market**

This table lists the top 5 lead arrangers (by deal amount) and top 5 participants (by total number of deals) for syndicated loans in the sample from 2001-2003. Market share figures for lead arrangers split the amount of a given syndicated loan equally over all lead arrangers when there are multiple leads. Firms are considered “private” if they have no publicly available SEC filings. The third column reports the most common participants for the top lead arrangers (and the fraction of all deals they participate with the lead arranger) on deals with exactly one lead arranger.

	(1) <u>Loans to private firms</u>	(2) <u>Loans to public firms</u>	(3) <u>Most common participant</u>
Lead arrangers			
	<u>Mkt. share</u>		<u>Mkt share</u>
Bank of America	0.22	JPMorganChase	0.34
JPMorganChase	0.17	Citigroup	0.19
Citigroup	0.10	Bank of America	0.16
Bank One	0.05	Bank One	0.06
Fleet	0.05	Deutsche Bank	0.02
			<u>% lead deals</u>
Total amount (\$B)	162	Total amount (\$B)	1401
Market herfindahl	1015	Market herfindahl	1826
			Citigroup
			JPMorganChase
			0.49
Participants			
	<u># deals</u>		<u># deals</u>
U.S. Bancorp	150	Fleet	783
ABN-AMRO	138	Bank of Tokyo-Mitsubishi	782
Fleet	136	Bank of America	723
National City	121	Bank One	717
Bank One	118	Wachovia	715
			Bank One
			US Bancorp
			0.27
			Fleet
			Wachovia
			0.24
			Deutsche Bank
			Fleet
			0.35
Total number of participants	3586	Total number of participants	23521

Table 3
Information Asymmetry Evidence

This table presents cell means and standard errors, by group, for the sample of 14,021 syndicated loan deals representing 5,011 firms from 1991-2003. A “private” firm is a firm with no publicly available SEC filings. An “unrated” firm is a firm with publicly available SEC filings and no S&P senior unsecured debt rating. A “transparent” firm is a firm with publicly available SEC filings and an S&P senior unsecured debt rating

	Private	Unrated	Transparent
<i>Percentage of sample loans</i>	0.21	0.33	0.46
Total sales (\$M)	797 (68)	1039 (71)	5692 (162)
Size of deal (\$M)	153 (6)	171 (4)	586 (12)
Maturity (average, days)	1100 (16)	1203 (11)	1118 (10)
Number of loan tranches	1.42 (0.01)	1.35 (0.01)	1.32 (0.01)
Deal includes term loan	0.31 (0.01)	0.24 (0.01)	0.18 (0.1)
<i>Syndicate Structure Characteristics</i>			
Total number of lenders	4.83 (0.09)	6.06 (0.08)	11.02 (0.11)
Total number of lead arrangers	1.46 (0.03)	1.54 (0.02)	2.18 (0.04)
Total number of participant banks	3.37 (0.08)	4.52 (0.07)	8.84 (0.11)
% of loan kept by each lead (avg)	37.8 (0.8)	35.3 (0.4)	19.9 (0.3)
Conc. of syndicate (herfindahl)	3357 (68)	3107 (38)	1641 (32)

Table 4, Panel A
Information Asymmetry Syndicate Structure Regressions

This table reports coefficient estimates from a regression relating syndicate structure to the firm's credit reputation. A "private" firm is a firm with no publicly available SEC filings, an "unrated" firm is a firm with no publicly available SEC filings and no S&P senior unsecured credit rating, and a "transparent" firm is a firm with publicly available SEC filings and a credit rating. To control for the size of the loan, I split the sample into thirds based on size, and the intercept (not reported) and natural log of size (reported) is allowed to vary for each third. In addition to variables reported, all regressions include a constant and year and industry dummies, and standard errors are heteroskedasticity-robust, clustered at the firm level. "Transparent" firms are the omitted group.

Sample	(1)	(2)	(3) (4) (5) (6) (7)				
	Full	Full	Loans where amount held by each syndicate member available				
Dependent Variable:	# Leads	# Participants	# Leads	# Participants	Herfindahl	% held, each lead	Amount held, each lead (\$M)
Private firm	0.17* (0.08)	-1.45**,+ (0.16)	0.03 (0.08)	-0.72** (0.26)	260** (79)	2.53** (0.89)	6.42** (2.58)
Unrated firm	0.06 (0.05)	-0.76**,+ (0.14)	0.09 (0.07)	-0.69** (0.18)	230** (54)	2.08** (0.60)	4.77** (2.00)
Ln[firm sales]	-0.03 (0.02)	0.19** (0.05)	-0.03 (0.03)	0.61** (0.09)	-119** (21)	-1.40** (0.24)	-3.80** (0.96)
Ln[maturity, in days]	-0.01 (0.01)	0.44** (0.03)	0.10** (0.03)	0.29** (0.08)	-102** (23)	-1.49** (0.30)	-4.08** (0.91)
Ln[loan amount]	0.20** (0.04)	0.77** (0.13)	0.17** (0.05)	0.35 (0.23)	-596** (70)	-4.18** (0.83)	12.02** (0.93)
Ln[loan amount]*middle	0.46** (0.08)	1.69** (0.22)	0.63** (0.16)	2.97** (0.33)	-371** (106)	-5.96** (1.21)	5.67** (1.94)
Ln[loan amount]*large	1.21** (0.15)	2.92** (0.28)	1.35** (0.23)	4.57** (0.42)	420** (73)	2.06** (0.86)	78.90** (10.67)
Ln[# tranches]	0.14 (0.09)	1.03** (0.24)	0.02 (0.12)	0.22 (0.28)	47 (72)	1.08 (0.80)	-2.89 (3.42)
Term loan tranche in deal	0.00 (0.06)	0.23 (0.19)	0.06 (0.08)	0.49* (0.25)	235** (76)	1.47 (0.86)	4.25 (2.54)
N	14021	14021	5066	5066	5066	5066	5066
R ²	0.23	0.37	0.24	0.60	0.51	0.48	0.43

**Significant at 1 percent level, *Significant at 5 percent level, + coefficients distinct from each other at 5 percent level

Table 4, Panel B
Information Asymmetry Syndicate Structure Regressions

This table presents additional evidence of the effect of information asymmetry on syndicate structure. Coefficients in columns (1) through (3) are estimated using all loans to transparent firms, but only loans to private and unrated firms that have greater than \$250 M in sales. Columns (4) through (6) isolate the sample to firms with Compustat data on R&D expenses available, where the R&D expense to sales ratio proxies for information asymmetry. Columns (7) through (9) isolate the sample to firms with Compustat data on accruals available, where the accruals to total assets ratio proxies for a need for monitoring. In addition to variables reported, all regressions include all control variables in Table 4, Panel A. Also, all regressions include a constant and year and industry dummies. Standard errors are heteroskedasticity-robust, clustered at the firm level. Transparent firms are the omitted group for columns (1) through (3).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sample:	Transparent firms + (private and unrated with >\$250 M in sales)			Compustat R&D data available			Compustat accrual data available		
Dependent Variable:	# Parts	% held by each lead	Herfindahl	# Parts	% held by each lead	Herfindahl	# Parts	% held by each lead	Herfindahl
Private firm	-1.76**,+ (0.22)	2.30 (1.21)	219* (105)						
Unrated firm	-0.75**,+ (0.18)	1.56* (0.69)	183** (64)						
R&D to sales ratio				-7.42** (2.24)	17.39* (8.85)	2377** (810)			
Accruals to assets							-0.46 (0.78)	8.92** (3.18)	625* (280)
Leverage ratio				1.15 (0.60)	2.91 (2.07)	331 (187)	1.90** (0.40)	-0.71 (1.42)	76 (127)
Ln[firm sales]	0.11 (0.10)	-1.30** (0.31)	-94** (29)						
Ln[total assets]				0.25* (0.12)	-2.14** (0.39)	-185** (37)	0.23** (0.07)	-2.22** (0.30)	-168** (27)
N	9866	3468	3468	4659	1875	1875	9668	3829	3829
R ²	0.32	0.42	0.42	0.36	0.53	0.56	0.36	0.50	0.52

**Significant at 1 percent level, *Significant at 5 percent level, + coefficients distinct from each other at 5 percent level

Table 4, Panel C
Information Asymmetry Syndicate Structure Regressions

This table presents evidence that moral hazard, as opposed to adverse selection, is driving the information asymmetry results. *Previous lending relationship* is an indicator variable turned on if the borrower has a previous lending relationship with any of the lead arrangers. *Opaque firms* are private and unrated firms. In addition to variables reported, all regressions include all control variables in Table 4, Panel A. Also, all regressions include a constant and year and industry dummies. Standard errors are heteroskedasticity-robust, clustered at the firm level. Transparent firms are the omitted group for columns (1) through (3).

	(1)	(2)	(3)
Dependent Variable:	# Participants	% held by each lead	Herfindahl
Opaque Firm	-1.12** (0.20)	2.27** (0.85)	225** (76)
Previous lending relationship	-0.17 (0.22)	-3.31** (0.85)	-340** (81)
Opaque * Previous lending relationship	0.62** (0.23)	0.33 (0.91)	23 (85)
Ln[1 + # previous loans]	0.13 (0.11)	0.82** (0.41)	120** (41)
Ln[total sales]	0.13* (0.05)	-1.42** (0.23)	-120** (21)
N	14021	5066	5066
R ²	0.26	0.55	0.42

**Significant at 1 percent level, *Significant at 5 percent level

Table 5**Characteristics of Participants, by Borrowing Firm Credit Reputation**

This table examines the characteristics of 72,401 participants on 14,021 syndicated loan deals. There are 7,345 participants for private firms, 17,125 participants for unrated firms, 47,931 for transparent firms. Lead arranger-participant relationships are calculated on a subsample of 44,845 participants on 8,960 deals where there is exactly one lead arranger.

	Private	Unrated	Transparent
<u>General Characteristics</u>			
Total assets (\$bln)	239*	230*	290
Equity to total assets ratio	0.066*	0.065*	0.061
Unregulated, domestic (Finance company/I-Bank)	0.072	0.046*	0.066
Foreign	0.41*	0.41*	0.51
<u>Borrowing Firm-Participant Variables</u>			
<u>Conditional on being in U.S.</u>			
In same region as borrowing firm	0.44*	0.44*	0.36
In same census division as borrowing firm	0.31*	0.30*	0.23
In same state as borrowing firm	0.14*	0.14*	0.10
<u>Conditional on firm having previous loan:</u>			
Former lead for firm indicator variable	0.10*	0.11*	0.18
Fraction of previous firm loans lead on	0.05	0.05*	0.06
<u>Conditional on firm having previous syndicated loan:</u>			
Former participant for firm indicator variable	0.48*	0.52*	0.65
Fraction of previous firm syndicated loans participant on	0.34	0.34	0.34
<u>Lead Arranger-Participant Variables</u>			
<u>Calculated on sample where only 1 lead arranger</u>			
In same region as lead arranger	0.23*	0.23*	0.20
In same census division as lead arranger	0.16	0.16*	0.14
In same state as lead arranger	0.09	0.09*	0.10
On a deal with lead arranger in previous quarter	0.65*	0.66*	0.75
On a deal with lead arranger in previous year	0.84*	0.84*	0.90
Fraction of syndicated loans with L.A. in previous qtr	0.12*	0.13*	0.14
Fraction of syndicated loans with L.A. in previous year	0.12*	0.13*	0.14

*Significantly different from transparent firms at 5% level (errors clustered at firm level)

Table 6
Participant Choice Probits

This table presents coefficient estimates for a probit specification estimating how bank characteristics affect the probability of being chosen as participant. All coefficients represent the effect on probability when indicator goes from 0 to 1, and coefficients and standard errors are multiplied by 100. The choice set includes all banks with at least 0.5 percent market share in the year of the loan. Estimations include deal level controls described in Table 4, Panel A, year and industry dummies, and the constant is allowed to vary by group. In addition, the natural log of the total assets and the leverage ratio of the potential participant is included in all specifications and allowed to vary by group for columns 2 and 4. Columns 2 and 4 have transparent firms as the omitted group. Standard errors are allowed to be correlated for all potential participants for all of a given firm's loans in the sample.

	Without Relationships		With Relationships	
	(1)	(2)	(3)	(4)
<i>Dependent variable mean:</i>	8.26	8.26	9.53	9.53
Former lead for borrowing firm indicator			6.14*	5.88*
Private			(0.66)	(0.66)
Unrated				3.17*
				(1.25)
				-0.22
				(0.57)
Former participant for borrowing firm indicator			26.74*	24.94*
Private			(0.68)	(0.70)
Unrated				2.50*
				(1.06)
				2.10*
				(0.51)
Same region as borrowing firm indicator	6.47*	5.32*	3.91*	3.21*
Private	(0.21)	(0.27)	(0.18)	(0.22)
Unrated		1.39*		1.30*
		(0.39)		(0.43)
		1.80*		1.21*
		(0.32)		(0.31)
Foreign indicator	-4.34*	-4.61*	-2.89*	-2.87*
Private	(0.15)	(0.21)	(0.13)	(0.17)
Unrated		1.06*		0.31
		(0.40)		(0.39)
		0.33		-0.13
		(0.29)		(0.28)
Unregulated domestic indicator	-5.15*	-5.31	-3.10*	-3.06*
Private	(0.09)	(0.11)	(0.14)	(0.17)
Unrated		3.76*		0.84
		(0.92)		(0.75)
		0.69		-0.58
		(0.67)		(0.54)
N	799796	799796	545493	545493
Number of Loans	14021	14021	9628	9628
Pseudo R ²	0.11	0.12	0.26	0.26

* Significant at the 1 percent level

Table 7**Participant Choice Probits, on Sub-Sample of Deals with One Lead Arranger**

This table replicates Table 6 on the sub-sample of deals with exactly one lead arranger. In addition to all variables included in estimation in Table 6, two new variables (same region as lead arranger indicator and on syndicate with lead arranger in previous quarter indicator) are included.

	Without Relationships		With Relationships	
	(1)	(2)	(3)	(4)
<i>Dependent variable mean:</i>	7.94	7.94	9.22	9.22
Former lead for borrowing firm indicator			7.12*	6.78*
Private			(0.66)	(0.68)
Unrated				3.25*
				(1.32)
				-0.16
				(0.61)
Former participant for borrowing firm indicator			27.50*	24.80*
Private			(0.72)	(0.76)
Unrated				2.52
				(1.53)
				2.86*
				(0.62)
Same region as borrowing firm indicator	6.27*	5.37*	3.75*	3.17*
Private	(0.22)	(0.30)	(0.20)	(0.24)
Unrated		0.97*		0.94
		(0.40)		(0.44)
		1.15*		0.70
		(0.33)		(0.32)
Same region as lead arranger	1.21*	1.15*	0.73*	0.59*
Private	(0.15)	(0.21)	(0.14)	(0.17)
Unrated		0.04		0.33
		(0.36)		(0.45)
		0.03		0.25
		(0.29)		(0.30)
On syndicate with lead arranger in last quarter	3.63*	3.65*	2.39*	2.31*
Private	(0.11)	(0.16)	(0.13)	(0.17)
Unrated		-0.63		-0.22
		(0.26)		(0.45)
		0.22		0.22
		(0.25)		(0.29)
N	520069	520069	348746	348746
Number of Loans	8960	8960	6029	6029
Pseudo R ²	0.14	0.14	0.30	0.30

* Significant at the 1 percent level

Table 8
A Window into Covenants & Renegotiation

This table presents covenant and renegotiation data on the syndicated loans sample from 1996 to 2003 for public firms with an S&P senior unsecured debt rating. Of the 4,946 syndicated loan deals for this time period, 2,499 contain financial covenant data and 674 contain renegotiation data. Renegotiation data is for a random sub-sample of 200 deals where renegotiation data is available. A high yield firm has an S&P senior unsecured debt rating of BB+ or worse. An investment grade firm has a credit rating of BBB- or better. Standard errors are in parentheses.

PANEL A: Covenants	High yield	Investment grade
Asset sales/merger covenant listed, percent	0.374 (0.01)	0.051 (0.005)
Financial covenant listed, percent	0.623 (0.010)	0.377 (0.010)
<i>Conditional on FC listed:</i>		
Debt to cash flow	0.633 (0.012)	0.279 (0.015)
Interest coverage	0.531 (0.013)	0.376 (0.016)
Fixed charge coverage	0.470 (0.013)	0.141 (0.012)
PANEL B: Renegotiation	High yield	Inv. grade
Renegotiation data available	0.214 (0.008)	0.051 (0.005)
<i>Conditional on data available:</i>		
Financial covenants relaxed	0.252 (0.046)	0.153 (0.07)
Amount of loan increased	0.103 (0.032)	0.109 (0.062)
Pricing of loan terms changed	0.151 (0.038)	0.110 (0.062)
Asset sales/merger covenants relaxed	0.141 (0.037)	0.186 (0.076)

Table 9, Panel A
Renegotiation Syndicate Structure Regressions

This table reports coefficient estimates from a regression relating syndicate structure to the firm's credit reputation, with a focus on how *ex post* renegotiation concerns affect *ex ante* syndicate structure. The sample for these regressions includes only firms with publicly available SEC filings and an S&P senior unsecured debt rating. A high yield firm is a firm with a credit rating of BB+ or worse and an investment grade firm is a firm with a credit rating of BBB- or better. In addition to variables reported, all maturity, loan size, and tranche controls listed in Table 4, Panel A are included in the regressions. All regressions also include a constant and year and industry dummies, and standard errors are heteroskedasticity-robust, clustered at the firm level. Investment grade firms are the omitted group.

Sample:	(1) All loans to rated firms	(2) All loans to rated firms	(3) (4) (5) (6) (7) (8) Loans to rated firms where amount held by each syndicate member available					
Dependent Variable:	# Leads	# Participants	# Leads	# Leads	# Participants	# Participants	% held by each lead	% held by each lead
High yield firm	0.26 (0.14)	0.60* (0.28)	0.39* (0.18)		0.60* (0.29)		0.24 (0.68)	
Leverage ratio				1.24** (0.39)		1.86* (0.88)		1.12 (1.91)
Income to assets ratio	-0.22 (0.65)	-3.03 (1.56)	-1.08 (1.01)	-1.00 (0.99)	-4.14 (2.27)	-4.05* (2.07)	-7.05 (6.21)	-6.78 (6.06)
Ln[total assets]	0.01 (0.04)	0.27* (0.12)	-0.07 (0.09)	-0.07 (0.08)	1.20** (0.22)	1.19** (0.22)	-1.55** (0.40)	-1.54** (0.39)
N	6259	6259	2159	2159	2159	2159	2159	2159
R ²	0.23	0.30	0.24	0.24	0.51	0.51	0.40	0.40

**Significant at 1 percent level, *Significant at 5 percent level

Table 9, Panel B
Renegotiation Syndicate Structure Regressions

This table reports coefficient estimates from a regression relating syndicate structure to the firm's credit reputation, with a focus on how *ex post* renegotiation concerns affect *ex ante* syndicate structure. The sample for these regressions includes only firms with publicly available SEC filings and an S&P senior unsecured debt rating. A high yield firm is a firm with a credit rating of BB+ or worse and an investment grade firm is a firm with a credit rating of BBB- or better. In addition to variables reported, all maturity, loan size, and tranche controls listed in Table 4, Panel A are included in the regressions. All regressions also include a constant and year and industry dummies, and standard errors are heteroskedasticity-robust, clustered at the firm level. Investment grade firms are the omitted group.

Dependent Variable:	(1) Herfindahl	(2) Herfindahl	(3) # Participants with <= \$5M	(4) # Participants with <= \$5M	(5) # Participants with <= 2%	(6) # Participants with <= 2%
High yield firm	85 (64)		0.33** (0.11)		0.62* (0.25)	
Leverage ratio		230 (174)		0.73* (0.35)		1.14* (0.50)
Income to assets ratio	-550 (526)	-557 (521)	-1.73 (1.39)	-1.86 (1.34)	-4.15** (1.35)	-4.54** (1.39)
Ln[total assets]	-100** (38)	-103** (37)	0.35** (0.10)	0.33** (0.10)	0.25 (0.14)	0.21 (0.13)
N	2159	2159	2159	2159	2159	2159
R ²	0.40	0.40	0.09	0.09	0.35	0.35

**Significant at 1 percent level, *Significant at 5 percent level

Table 10
Fixed Effects Syndicate Structure Regressions

This table reports fixed effects coefficient estimates from relating syndicate structure characteristics to the firm's credit reputation. Identification of credit reputation coefficients comes from a given firm switching from one category to another. For example, out of 2889 firms with more than one loan in the sample, 89 switch from being private to a public category (most through IPOs), and 93 switch from a public category to being private (mostly by emerging from bankruptcy). Columns (4) and (5) limit the sample to rated companies only. In column (5) *UPGRADE* takes on the value 1 if a firm moves from high yield to investment grade and *DOWNGRADE* takes on the value 1 if a firm moves from investment grade to high yield. In addition to variables reported, all maturity, loan size, and tranche controls listed in Table 4, Panel A are included in the regressions. Standard errors are heteroskedasticity-robust, clustered at the firm level.

Sample:	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	# Lenders	# Leads	# Participants	# Participants	# Participants
Private firm	-1.64* (0.73)	0.13 (0.33)	-1.77** (0.62)		
Unrated firm	-0.77** (0.29)	0.06 (0.10)	-0.83** (0.28)		
High yield firm				0.13 (0.65)	
Upgrade					0.57 (0.93)
Downgrade					1.43* (0.74)
Leverage ratio				-1.18 (1.72)	-1.27 (1.74)
Income to asset ratio				-2.90 (3.23)	-2.94 (3.20)
Ln[firm sales]	0.45** (0.17)	-0.08 (0.08)	0.54** (0.17)	0.79** (0.27)	0.79** (0.28)
N	11897	11897	11897	5764	5764
# Firms	2889	2889	2889	1248	1248
R ²	0.47	0.33	0.39	0.35	0.36

**Significant at 1 percent level, *Significant at 5 percent level

Figure 1

More participants hold small percentage of loan on high yield deals

This graph plots the difference in the average number of participants holding a certain percentage of a loan between high yield and investment grade loans, after controlling for the size of the loan.

