The Effects of Syndicate Structure on Loan Spreads

Victoria Ivashina*
Stern School of Business
New York University

Preliminary version: May, 2005
This version: November, 2005

Abstract

This paper shows that the structure of the syndicate affects the spread in addition to the borrower's characteristics. Because the lead bank is the principal syndicate member collecting information about the borrower, there is an information asymmetry within the lending syndicate that leads to moral hazard and/or adverse selection problems, thereby, impacting the loan spread. Consequently, the share retained by the lead bank can help to mitigate these problems. However, the observed relationship between syndicate structure and the loan spread is influenced, not only by information asymmetry, but also by diversification considerations. I use an instrumental variables approach to separate these two effects. By combining loan information with novel data on default correlations, I construct a direct measure of the risk-based loan spread premium required by the lead bank. This variable exogenously affects the diversification of the lead bank and has no direct effect on information asymmetry within a syndicate. The main results are that informational frictions between the lead and participant banks have an important economic impact on the spread, and an increase in the size of the lead bank's share causes a reduction in the loan spread. To the best of my knowledge, this is the first paper that addresses the endogenous relationship between loan spread and syndicate structure.

* Leonard N. Stern School of Business, Henry Kaufman Management Center, 44 West Fourth Street, Suite 9-153, New York, NY 10012-1126. Phone: 212-998-0376. E-mail: vivashin@stern.nyu.edu .
I am grateful for helpful discussions provided by members of my thesis committee: Kose John, Anthony Saunders, Alexander Ljungqvist, Holger Muller and Daniel Wolfenzon. I also thank Edward Altman, Bill Greene, Anil Shivdasani and Greg Udell for especially insightful comments. This paper largely benefited from suggestions by participants at the NYU Finance Department Seminar. All errors are my own.

1. Introduction

Syndication in financial markets goes back in time for over a century. First used in insurance and security underwriting, syndication became increasingly important in venture capital, the hedge fund industry and, more recently, in the corporate loan market.[1] Although, loan syndication is a relatively new practice for corporate loans, syndicated loan issuance in the United States alone grew from approximately $150 billion in 1987 to $1.3 trillion in 2004, representing half of the private debt market. Despite the importance of the syndicated loan market, there is a limited understanding of the importance of the private information collected in this market, its relationship to the structure of the syndicate and, ultimately, its impact on the loan spread charged to the borrower.

A traditional bank loan involves a relationship between a borrower and a single lender. The lender issues the loan based on a previous evaluation and monitors it until its maturity. A syndicate loan is issued by a group of banks with each holding a fraction of the loan. To reduce managing costs, information collection – including ex-ante due diligence and ex-post monitoring of the loan – is delegated to the lead bank. In a traditional bank loan, spread is determined by the characteristics of the borrower. However, due to the private content of the information collected by the lead bank, loan syndication would induce an additional premium driven by information asymmetry between the lead and participant banks.[2]

Cases of wrongdoing by the lead bank include the collapse of Penn Square Bank that, at the moment of the default, was servicing over $2 billion in participations. A recent example involved Chase Manhattan. In their $245 million loan to AroChem., after Chase charged a direct underwriting fee of $4.95 million, the borrower could not meet the minimum financial

[1] See Galston (1928) for a discussion on syndication in the early bond underwriting market.
[2] As Diamond (1994) points out "An interesting implication of the delegated monitoring model is that intermediary assets will be illiquid".

covenants specified in the loan agreement. However, to the keep the participant lenders from abandoning the loan at closing, Chase attributed the missed covenants to market conditions.[3] Consequently, costs induced by information asymmetry between the lead and participant banks can be significant and the share of the loan retained by the lead bank can help to reduce it.

This is the first paper to study the effect that syndicate structure has on the loan spreads. This relationship is difficult to address because of the simultaneous relationship between the two variables: in practice, the price and structure of the loans are determined in a bargaining process that takes place between the lead bank and the potential participants after the non-price characteristics of the loan are set. Thus, the loan spreads and syndicate structure that we observe in the data represent a set of equilibrium points.

To understand the economic nature of the instruments required to address the underlying effects of the syndicated structure on the loan spreads, we need to understand the key tradeoff that determines the equilibrium. On the one hand, a decrease in share of the loan retained by the lead bank increases spread demanded by *participant* banks due to an increase in information asymmetry costs. On the other hand, a decrease in share of the loan retained by the lead decreases spread demanded by *lead* banks due to reduction in its credit risk exposure. Accordingly, to identify information asymmetry and diversification effects, I use instruments that exogenously affect the pricing behavior of the lead, but not participant banks, and vice versa. In particular, for each loan, I construct the lead bank's loan portfolio and use annual information on industry level default correlations to measure the credit risk premium demanded by the lead bank. This direct diversification measure is used as an

[3] *Bank Brussels Lambert and Skopbank v. Chase Manhattan Bank*, 1996 US Dist. LEXIS 15631 (Oct.17, 1996). In general, cases of litigations among members of the syndicate are rare because syndicate loans are not considered a security and a loan agreement typically limits the lead bank's liability.

instrument that, due to its specificity to the lead bank portfolio, exogenously impacts the risk premium demanded by the lead bank, but does not affect the pricing behavior of the participants banks. I find that asymmetry of information with the syndicate participants has a large economic cost, as reflected in the spread charged to the borrower: a 10% increase in the share retained by the lead bank reduced the spread required by participants by approximately 50 basis points (34% change in spread at the mean of 149 basis points).

It is important to note that there are two types of problems – moral hazard and adverse selection – that occur due to the informational frictions within the syndicate. The moral hazard problem is an ex-post problem of the alignment of monitoring incentives. When the lead bank retains monitoring duties, but sells parts of the loan to "passive" participant lenders, its incentives to continue the monitoring are reduced. This leads to a suboptimal level of monitoring similar to that discussed in Jensen and Meckling (1976), Pennacchi (1988) and Gorton and Pennacchi (1995). The adverse selection problem is an ex-ante problem. It arises from private information about the borrower that the lead bank collects through due diligence or through a lending relationship prior to the syndication process. If information about the borrower cannot be credibly communicated to the participants in the syndicate, it will cause a "lemons" problem, since the lead bank would have incentives to sell shares of bad or risky loans while keeping long-run private profits from forming a customer relationship with the borrower. Similar to Leland and Pyle (1977), private information about the credit risk of a borrower would allow the lead lender to signal the good quality of a loan by retaining a larger share in the syndicate.

Moral hazard and adverse selection effects produce the same predictions in my model: as the loan share retained by the lead bank increases, the information-based premium demanded

by the participant banks will be lower. My central test separates the diversification and information asymmetry premium, but does not distinguish between the two potential sources of information frictions. Given the above, the paper offers an extensive discussion regarding the possibility of distinguishing between moral hazard and adverse selection effects.

Despite the popularity of syndication in the financial industry, there are relatively few papers that look at patterns of syndication and the motives behind it. In general, research on different aspects of syndication remains fragmented. Wilson (1968) looks at syndication in re-insurance and Lerner (1997) investigates reasons to join the venture-capital syndicates. More recently, a number of papers, such as Pichler and Wilhelm (2001), Naratanan, Rangan and Rangan (2004), Song (2004), and Corwin and Stultz (2005), have investigated security-underwriting syndicates.

Previous research directly linked to the syndicated loan market mainly developed in two directions. On the one hand, Pennacchi (1988), Pavel and Phillis (1987), Gorton and Pennacchi (1995), and Demsetz (1999), investigate reasons for loan sales, including syndication as a form of loan sale. These papers show that the main reasons for loan sales are credit risk management diversification and regulatory restrictions (capital requirements and sole lender exposure). On the other hand, Simons (1993), Dennis and Mullineaux (2000), Jones, Lang and Nigro (2000), Lee and Mullineaux (2001), Panyagometh and Roberts (2002), Esty and Megginson (2003) and Sufi (2005), looks at the determinants of the syndicate structure. The common finding is that, together with loan contract characteristics and the credit risk of the borrower, the availability of public information about the borrower is a key determinant of the share retained by the lead bank, the number of participants in the syndicate and the distribution of the loan among syndicate participants. In addition, a larger

fraction of the loan is likely to be syndicated as information about the borrower becomes more transparent (less opaque). This relationship between syndicate structure and information "opaqueness" of the borrower was previously interpreted by Lee and Mullineaux (2001), Panyagometh and Roberts (2002), and Sufi (2005) as evidence of an information asymmetry problem between the lead bank and the participants of the lending syndicate. The general weakness of this literature is that it excludes loan spreads from analysis by assuming that spreads are exogenous. Therefore, observed changes in the syndicate structure can have multiple interpretations since we cannot distinguish between diversification and information asymmetry effects.

The remainder of the paper is structured as follows. Section 2 outlines the empirical model. In Section 3, we discuss the data source and the instrumental variables. Section 4 presents the empirical results, and Section 5 concludes.

2. Empirical model

2.1 Contracting environment

In basic terms, loan syndication is a process whereby, at the moment of loan issuance, a bank sells a share of the loan to other financial institutions. The lead (selling) bank is appointed by the borrower to originate and syndicate the loan and is usually called the "arranger". After the company assigns the arranger mandate, the lead bank conducts due diligence and negotiates the terms of the loan with the borrower setting non-price characteristics of the loan such as amount, maturity, collateral, and covenants.[4] The lead then presents a confidential

[4] The standard that allowed the lead arranger to change the pricing terms of the loan during the syndication process wasn't adopted until 1998. However before that, while the pricing terms were set prior to the award of the mandate, loans were underwritten under the best-effort criteria. In that sense, if at a given spread the deal wasn't fully subscribed, the loan wouldn't go through. .Also, the generally accepted fact that banks compete for

memorandum that summarize the results of due diligence to institutions potentially interested in providing part of the loan. The loan spread and the syndicate structure are simultaneously determined in the process of syndication. The fee for the syndication, including due diligence, is typically set forth in a separate agreement between the borrower and arranger.[5]

Every syndicate member has a separate claim against the borrower; however, these claims are not independent and are governed by a single loan contract. As part of the syndication process, the arranger will typically retain a share of the loan and act as "administrative agent" on behalf of the rest of the lenders. Also, information presented by the lead arranger represents the basis of sale, and, as the agent, the lead bank is responsible for monitoring the borrower: there is no fiduciary duty between the lead bank and the syndicate members. Such disclaimers of any duty between the lead and the rest of the lenders are extensively covered in a typical loan agreement.[6]

After syndication, fractions of the loan can be resold on the secondary loan market. Even though loan contracts don't explicitly prohibit the lead bank from selling its share of the loan on the secondary market, it is safe to say that the lead bank is committed to holding the share that it retained at loan origination. First, loan sales in the secondary market are typically conditioned to the borrowers and syndicate majority consent. Second, the syndicated loan market is private and illiquid. In this context, any secondary loan sale is likely to be transparent to the members of the syndicate. Analysis of the secondary market data indicates that trading of the loans typically occurs at the participant level and most traded loans are loans syndicated to institutional investors.

---

the mandate awards based on their syndication strategies further supports the simultaneous nature of the pricing terms and syndicate structure.

[5] Alternatively, the compensation is included in an up-front fee. While it is believed to be between 0.1 and 0.2 of a percentage point of the value of the loan, these fees are generally not disclosed to participants.

[6] More detail on the origination and management of a syndicated loan can be found in Esty (2001).

2.2 Econometric framework

[FIGURE 1]

The intuition for the empirical model is summarized in Figure1. Diversification and information asymmetry implications on the spread can be thought of as an interaction between the two types of agents: lead bank and participant banks. Because the loan commitment of the lead bank is typically much larger than the individual exposure of the participants, its main concern is credit risk. Hence, the spread demanded by the lead bank is a function of diversification and should be positively related to the lead bank's share of the loan. The costs that could arise due to asymmetry of information are the main concern of participant banks. This implies a negative relationship between the spread required by the participants and the share retained by the lead arranger. The equilibrium relationship between spread and lead bank share is determined by the point where the lead bank's required marginal premium (driven by credit risk) is equal to the participants' required marginal premium (driven by information asymmetry).

The loan spreads and syndicate structure that we observe in the data represent a set of equilibrium points. Similar to a regression of price against quantity in the context of a supply and demand analysis, a regression of loan spread against the lead bank share would be meaningless, since it would be fitting a scatter of equilibrium. [7]

The full specification of the model seeks to distinguish between diversification and information asymmetry induced costs, and it includes pricing behavior of both lead and participant banks. However, because of the importance of information production in the private debt market, my central question is to identify and measure costs attributed to

[7] For more information on the instrumental variable approach, consult Angrist and Krueger (2001).

information frictions within the syndicate. These costs should be reflected in the relationship between the lead share of the loan and the spread demanded by the participant.

The structural model consists of three equations:

$$Required\ loan\ spread_P = \beta_1 Lead\ bank\ share + \gamma_1 Controls + \delta_1 Instruments_L + \upsilon_1 \quad (1)$$

$$Required\ loan\ spread_L = \beta_2 Lead\ bank\ share + \gamma_2 Controls + \delta_2 Instruments_P + \upsilon_2 \quad (2)$$

$$Required\ loan\ spread_P = Required\ loan\ spread_L \quad (3)$$

Equations (1) and (2) model the spread required by participants and lead bank respectively, and equation (3) sets the equilibrium condition. Intuitively, since we observe only the equilibrium outcomes, to identify the required spread of, let's say, *participants*, we need some factor that exogenously shifts the *lead's* required spread but does not affect the premium demanded by participants. The sub-indexes on the set of instruments indicate the agent (lead or participant) that is being identified, not the agent whose required spread is being shifted.[8] In other words, similar to the problem with one equation and one endogenous variable, identifying instruments have to be excluded from the structural equation that they identify. To estimate the model, I use 2SLS method. Accordingly, the results of estimating the system would be identical if I would just estimate each equation by 2SLS using instruments excluded from the regression in the first stage. Overall, I want to control for factors that would affect the level of information asymmetry within the syndicate and factors that reflect the borrower's credit risk. Therefore, the common set of controls includes loan non-price characteristics, lender and borrower characteristics and market conditions.

The regression corresponding to the reduced form for the lead bank share obtained from the structural model can be expressed as follows:

[8] Typically an instrument is any variable that is orthogonal to the error term in the equation that presents an endogenous dependent variable. For clarity purposes, I separate controls common to the two regressions from those instruments that identify the system.

$$Lead\ bank\ share_F = \gamma Controls + \delta_P Instruments_P + \delta_L Instruments_L + \varepsilon \quad (4)$$

The fitted value, by the definition, is orthogonal to the error terms in the structural equations. To address the endogeneity of the syndicate structure, the pricing behavior of the participant and lead banks is estimated recursively using the fitted lead bank share.

3. Data and variables overview

3.1 Sample

In analyzing the relationship between the loan spread and the structure of the syndicate, I use a number of data sets. Construction of the variables, descriptive statistics and data source can be found in the Data Appendix. Each observation in the analysis corresponds to a separate loan agreement. The data was collected using the Reuters/Loan Pricing Corporation (LPC) Dealscan database that contains detailed information on loan origination dating back to 1987.[9] Originally, the data was collected from SEC and Federal Reserve filings and confirmed with LPC contributors. According to LPC, the data collection process had changed, and over the past few years, it was relying mainly on information provided by contacts within the private debt market. Overall, the data is accurate in registering syndicate loans since LPC is the major data managing company associated with the Loan Syndications and Trading Association (LSTA). In addition, lenders have incentives to report these data, because, in the syndicated loan market, league tables are a powerful marketing tool.[10]

The starting sample includes information on 23,087 completed dollar-denominated syndicated loans issued between 1993 and 2004 and involving 9,931 different U.S.

[9] While only 1993-2004 sample is used in the regression analysis, information available for the previous years is indirectly used in the tests. To calculate credit risk of the lead bank's portfolio I construct loan portfolio using all U.S. loans available in the Dealscan. To avoid problems due to the data truncations I consider the last twelve years. Also, several variables in the analysis, including reputation and lending relationship, are calculated based on the information in the 3 year previous to the loan.

[10] For more information about the Dealscan data see Carey, Post and Sharpe (1998).

borrowers, excluding regulated and financial industries identified with 2-digit SIC 40 through 45 and 60 through 64. The central explanatory variable in the analysis – loan share retained by the lead bank – is only available in 30% of the cases. Some other variables considered in the analysis, including loan spread, sales at close and maturity, also have limited availability resulting in a smaller number of observations used in the regressions.[11]

Syndicated loans can be structured in several tranches also called facilities. For U.S. companies, a syndicated loan, on average, consists of 1.4 facilities per loan with a median equal to 1. Larger loans are likely to be structured in several facilities. Deals structured in multiple facilities represent 30% of the sample. The main differences across the facilities are active date, maturity, amount and loan type (term loan vs. revolver line). Participants, structure of the syndicate and general pricing terms are typically determined at a deal level. Thus, for the deals with multiple facilities, I look at the loan characteristics of the largest tranche with the earliest active date. This classification doesn't significantly affect the distribution of loan type in the final sample.

Working with loan non-price characteristics many times requires subjective criteria since many of the features of the contract are not standardized. In particular, for the US market alone, there are 54 titles (roles) that can be given to a bank in a lending syndicate; none of them are mutually exclusive. However, many of these titles are largely meaningless and are used to distinguish the level of commitment across the participants for use in league tables. I divide the syndicate into lead banks and participants. Where available, the administrative agent is defined to be the lead bank, as it is the bank that monitors the loan and handles all payments (S&P, 2004). Other roles that receive the status of lead bank are book runner, lead arranger, lead bank, lead manager, agent and arranger. As a consequence, 4.7% of the deals have more than

[11] Each regression will indicate the actual number of observations used in the analysis.

one lead arranger. In these cases, I calculate the share retained by the lead arranger as the sum of the shares corresponding to the multiple arrangers.

[TABLE 1]

I measure the spread using the Dealscan variable All in Spread Drawn (AISD). The two main types of commercial loans are term loans and revolver lines. Revolver lines work very similarly to a credit card allowing the borrower to use funds available under commitment in a flexible way. Thus, the cost to the borrower varies depending on weather or not the funds available under commitment are used. AISD is defined as the total annual spread paid over LIBOR for each dollar drawn down under loan commitment, which includes both the fees and the fixed spread charged over a floating benchmark. Table 1 presents the distribution of different components of the spread. Between 1993 and 2004, the median AISD was 175 basis points. The average LIBOR for the same period was 4.36 percent. LIBOR, CD and prime rates are the main pricing options. Loans priced at a spread over a bank's prime lending rate are reset daily. By choosing as its base the CD or LIBOR rate, the borrower can lock in a given rate for up to one year. The prime option is more costly to the borrower, but it allows the borrower to prepay the loan without a penalty.

Interestingly, a glance at the loan prices in Table 1 shows that syndicated loans, as a group, are cheaper than sole lender loans. A different study by Angbazo, Mei and Saunders (1998) that investigated the determinants of spreads on highly leveraged loans also found evidence that syndicated loans have lower spreads. Dennis, Nandy and Sharpe (2000) examined the determinants of contract terms on revolving loans finding a similar result. The difference is even more pronounced for non-rated loans where information asymmetry within the syndicate tends to be more severe. However, there is an important difference between a

sole lender and a syndicated loan in term of the size of commitment. This observation reflects a likely fundamental difference in the types of borrowers that raise financing in the syndicated loan market.

A potential concern is that the conceptual framework presented in Figure 1 assumes that the syndicated loan market is a competitive market and doesn't account for the market power of the lead bank. Various industry sources do recognize that the syndicated loan market is highly competitive. However, an additional point is that the AISD reflects the return shared by members of the syndicate. If the lead bank holds an information monopoly on the borrower, rents extracted due to a hold-up problem should be charged directly through an upfront fee and not be shared with the participants in the syndicate. The upfront fee is typically not disclosed to the members of the syndicate and, therefore, it is not included in the calculation of the AISD.[12]

Other data sources used in the analysis include Compustat and S&P CreditPro. Since Dealscan provides only limited information about the borrower, I proceed to hand match the data with the Compustat data. CreditPro data contains information on default correlations, from which I construct a measure of credit risk used as the key instrument in the analysis.

3.2 Instrumental variables

The purpose of using exogenous instruments in computing the fitted value of the lead bank loan share is to "clean" the lead share of its correlation with the residuals in the structural equations. In general, for instrumental variables approach to provide a consistent estimate, the instruments must satisfy two conditions. The first condition requires that instruments must be correlated with the model's predicting variable. The second condition, also known as

[12] Upfront fee is only reported in 4 % of the cases. The reported results are robust to exclusion of the upfront fee from the AISD where available.

the excludability condition, says that instruments cannot be correlated with residuals in the second stage model.

3.2.1 Identification of information asymmetry effect

A. Credit risk: Change in loss volatility

My main instrument in the identification of information asymmetry effects on the loan spread is a direct proxy for the risk-based premium required by the lead bank. The commitment of the lead bank is much larger than the commitment of any other participant in the syndicate. Therefore, I expect that the risk-based premium demanded by the lead bank is unlikely to have any direct effect on the pricing behavior of the participant banks. Administrative cost and credit risk-based premium are the two main components of the spread required by the lead bank. Typically, measurement of credit risk is addressed within a Value at Risk (VaR) framework. However, in this paper I use the general theory of portfolio diversification to construct a simplified measure that captures credit risk of a loan portfolio.

To account for the fact that mere diversification may not be sufficient to decrease portfolio, I used industry level information on default correlations and calculate the loss volatility (LV) of the loan portfolio. LV has the convenience of being conceptually similar to the variance of a stock portfolio. At the same time, unexpected loss is an increasing function of the LV, and it is one of the basic concepts of credit risk measurement. Thus, for each loan I calculate LV of the *lead bank* as:

$$LV = w'\Omega w, \text{ where} \tag{5}$$

w: bank specific loan portfolio weights at 2-digit SIC level;

Ω: economy specific loss covariance matrix at 2-digit SIC level.

Default correlations used to compute omega can be calculated using the option pricing approach first proposed by Merton (1974). The limitation of this approach is that it requires several assumptions. I use an alternative empirical method which uses information on the past defaults to compute ex-post default correlations.[13] I obtain empirical default correlations from CreditPro, a new database constructed by Standard&Poor's. The format of the data allows me to compute default correlations annually. To calculate omega in (5) I restrict the data to the U.S. market. The data doesn't distinguish among different credit ratings. Thus, omega is constructed at the 2-digit SIC level (83 by 83 matrix), across different rating categories including non-rated companies, for the 3 year default horizon.

Portfolio weights are calculated at the lead bank level. My goal is to compute a proxy for the risk-based premium required by the lead bank for each individual loan in the analysis. The date of the analysis is the date when the analyzed loan becomes active. Accordingly, I first compute LV of the lead's loan portfolio outstanding prior to the date of the analysis. This portfolio is constructed using all the completed loans (including non-syndicated, sole lender loans) reported in Dealscan that were issued to U.S. borrowers during the previous 3 years and mature after the date of the analysis.[14] For example, if the analyzed loan was issued on July 1, 2004, then the relevant loan portfolio includes all the loans that are outstanding as of July 1, 2004 and were issued after July 1, 2001. Loan portfolios are constructed at the parent level and account for bank mergers.

The proxy for the risk-based premium required by the lead bank for a given loan is its contribution to the credit-risk of the lead bank's loan portfolio, as reflected in change in LV.

[13] For comparative analysis of the two methods of assessment of default correlations see De Servigny and Renault (2002).

[14] Due to flexibility of the loan, contract loans are often refinanced before its maturity. In the initial measure, I consider 3 year horizon previous to the analysis date, rather than all the loans outstanding. However, the results are robust to the inclusion of all the loans outstanding.

Thus, once I have the LV of the outstanding portfolio prior to the day of the analysis, I modify the portfolio weights by adding the analyzed loan and recalculate an augmented LV. Naturally, to satisfy the excludability condition, I cannot use the actual, ex-post lead bank share of the loan. Therefore, I use the median lead bank share to modify the weights. Finally, the change in LV is computed as the difference between the augmented LV and the LV prior to the loan.[15]

Dealscan only provides us with the data at the loan origination, thus, we do not observe an actual loan outstanding. To account for secondary market trading and to facilitate calculation, I divide syndicate participants in banks that take larger commitments and receive co-managing titles in the syndicate (Tier 2), from those participants whose commitment is below 4% and who don't receive any specific title in the syndicate (Tier 3). According to some industry sources, secondary market trading typically takes place among the latter group of participants. Therefore, I exclude Tier 3 participations from the portfolio calculations. Where information on the actual loan holding is not available, I use full sample median holdings: 20% for the lead bank and 8% for Tier 2 participant bank. These portfolio weights represent the total bank portfolio, however the relevant exposure for use in credit risk calculations is loss in the event of default.

Scaling revolver lines is another important aspect that can help us to better account for the bank exposure at default. Since a revolver loan works like a corporate credit card – a company can draw and repay any amount up to the total commitment as many times as it wishes – I calculate the exposure on revolver lines by scaling its amount by 50%.[16]

[15] Approximately 5% of the deals have multiple lead arrangers. In these cases I consider the maximum change in loss volatility

[16] A study conducted by JP Morgan Chase suggests that on average borrowers use 57% of the fund available under a revolver line (see Araten and Jacobs, 2001).

One might doubt that the loan portfolio that constructed using Dealscan is the relevant portfolio. It is likely that I am picking up only a fraction of the actual loan portfolio. However, Dealscan is recognized to be accurate in collecting information on the largest loans, which are likely to have the largest impact on the loan portfolio. I restrict the sample to the lead banks that have at least 10 loans in the portfolio. As a result, my sample contains 120 lead banks and with an average loan portfolio containing 3,049 deals. These numbers reflect that I am picking up an important fraction of the loan portfolio.

[TABLE 2]

Table 2 examines the constructed measure of change in loss volatility. The first row corresponds to the distribution of the variable used as an instrument in the analysis. Loss volatility is reported to validate the economic meaning of the numbers. If we use a naïve binomial approach to back up expected loss for the lead bank, we get approximately 0.3%, which is close in magnitude to the numbers quoted in the industry. As expected, the mean of the change in loss volatility is statistically and economically close to 0. Because change in loss volatility was calculated specific to the lead bank portfolio, I expected it to have no direct effect on the portfolio of the participant banks. To reflect that, I computed the change in loss volatility for the participant with the largest loan share (line 2) and a random participant with a commitment above 4% (line 3).[17] The correlation between the measure calculated for the lead bank and the measures calculated for the participant banks is very small and statistically equivalent to 0. In conclusion, my methodology produces economically sound numbers and, as anticipated, this is a lead bank specific measure that is

[17] Participant banks are likely to have smaller in-sample portfolios, because it seems that banks that enter syndicated loans as participants are unlikely to be syndicated loan underwriters (lead banks). This fact is reflected in the increase in loss volatility. In fact, if we pick up a random competitor from the pool of lead underwriters, by matching the banks by the loan size (line 4) or loan size and client size (line 5) the loss volatility is comparable to the lead bank.

unlikely to affect the pricing behavior of the participant bank making it a conceptually strong instrument.

It is important to note that credit risk is a function of the probability of default, exposure at default and loss given default. The way it is defined now, change in loss volatility does not account for the recovery rates in default. Since there is no conventional proxy for recovery rates, I will leave the issue for the robustness analysis.

B. Credit risk: Lending limit

Measurement shortcomings in the calculation of loss volatility and/or its impact on the risk-based spread should make my first instrument weak, biasing the results against an information asymmetry hypothesis. However, to account for potential measurement problems, and to assure that computationally and data intensive measurement of credit risk was constructive, I add the lead bank's lending limit.[18] Lending limit is a simple additional proxy for loan portfolio diversification. Since banking is a regulated industry, there are regulatory lending restrictions aimed to reduce banks' portfolio credit risk. In particular, loans to a single lender cannot exceed 15% of a bank's capital.[19] However, in additional to regulatory lending limits, banks have internal lending limits that are often associated with the internal structures of the bank. Internal lending limits can be very binding, for example an article by Bromiley and Stansifer (1994) points out that many banks with assets over $1 billion have loan-size limits in the $2 to $10 million range. I measure the lending limit within the Dealscan sample as a median dollar size of the lead bank share calculated over the year previous to the date of the analysis. As expected, the average lending limit is only $35 million, much smaller than the regulatory limit.

[18] The 2SLS of the two instruments is considered to be the best instrument. It also will give me additional flexibility allowing me to test for overidentifying restrictions.

[19] To be precise, this limit can be extended to 25% if the loan is collateralized.

3.2.2 Identification of diversification effect

Diversification effect should be reflected in the spread required by the lead bank. To identify it, I need an instrument that would exogenously change the level of asymmetric information within the syndicate without having any direct effect on the lead bank loan portfolio. I expect that syndicate specific reputation, measured by the previous relationship bonds between members of the syndicate, will be a valid instrument.

My main reputation measure is defined as a maximum number of deals that are arranged by the same lead bank and that have the same participant, measured over 3 year horizon and expressed as a percent of the total deals underwritten by this period. To illustrate, assume that for a given loan A is the lead bank and banks B and C are participants in the syndicate. If bank B and bank C participated respectively in 10% and 20% of the deals underwritten by the bank A over the past three years, then the reputation measure for this particular loan is 20%. The median and mean of this reputation measure in the sample is 11% and 12.5% respectively. These numbers show that there is little persistence in allocation of the loans to the same participants, confirming that syndicate specific reputation measure is an economically validity instrument. In general, reputation measure constructed using counts of past relationships with the same lead bank is a very strong instrument robust to alternative definitions.

To account for reciprocal relationship, I add a dummy to indicate a past relationship where participant and lead bank switch their roles. However, reciprocal reputation measure is a weak instrument. Since it only has marginal impact on the result, I report it for illustration purpose.

3.2.3 Comparative statics

Overall, comparative statics predictions are consistent with the results in Tables 3 and 4.

[TABLE 3 & 4]

Both, change in loss volatility and lending limit, are measures related to the lead bank portfolio credit risk. An increase in loss volatility should reflect a higher credit risk. Thus, holding lead bank loan share constant, lead bank should demand a larger risk-based premium. Alternatively, if we fix the spread, lead bank would need to syndicate a larger fraction of the loan to break even. Consistent with the results reported in Table 4, corresponding to the first-stage regression, this dynamic predicts a negative partial correlation between the share retained by the lead bank and the change in loss volatility. Larger lending limit is a reflection of a lower credit risk. It is negatively related to the change in loss volatility and, therefore, has exactly opposite predictions with respect to lead bank loan share.

Higher reputation measures reflect lower asymmetric information within the syndicate. For a given lead bank share increase in reputation would be associated with the lower spread required by the participants. Similarly, for a given spread, participants would allow the lead bank to syndicate a larger fraction of the loan. Thus, I expect a negative sign between lead loan share and reputation measures. The predictions are consistent with the results.

4. Results

4.1 Identification

The general rule for identification of a structural model is that both rank and order conditions are satisfied. Consistent with the rank condition, equations in my system are linearly independent. The order condition requires that the number of the instruments should not be

smaller than the number of endogenous variables in any equation. It is satisfied in my model, since both, the premium demanded by the participants and the premium demanded by the lead, are overidentified.

Having two instruments allows us to farther refine the sense in which the system is identified by testing the overidentifying restrictions. In both equations the overidentifying restriction is not rejected with *p*-values equal 0.30 and 0.15 respectively. This confirms that our instruments are valid by this criterion and gives additional meaningful evidence in favor of my economic model. Before estimating the equation by 2SLS, I first estimate the reduced form for lead bank loan share reported in Table 4 to ensure that identifying instruments are jointly significant. The *p*-value for the *F* test of joint significance is very small. Thus, we can proceed with 2SLS estimation of the loan spread equation.

4.2 Determinants of the loan yield spread

4.2.1 Spread required by the participant banks: information asymmetry effects

[TABLE 5]

The main result of this paper is presented in the Table 5. The dramatic difference between estimates corresponding to the OLS regression of loan spread against the lead bank share and the second stage results indicates the bias present in the estimates if we don't properly account for the joint underlying determinants of these two variables. The negative coefficient on the lead bank share confirms the hypothesis about presence of additional costs in the syndicated loan market due to the information asymmetry between the lead bank and the syndicate participants. The economic significance of the coefficient on the lead bank loan share is very large. One standard deviation change (17%) in the share retained by the lead bank implies approximately an 80 basis points increase in the loan spread, which at the mean

spread of 148 basis points is equivalent to a 54% increase. In fact, these numbers may appear to be too large. However, given that an average loan is $361 million, a 17% change in lead bank share of the loan is equivalent to $61 million.[20] This is nearly twice the size of the in-sample lending limit. Thus, a 10% change in the lead bank share is a more sensible unit of evaluation.

Also consistent with the information asymmetry hypothesis, I find that reputation is another important mechanism that reduces the premium required by the participants. This effect however is economically smaller than the impact of the lead share.

My analysis controls for a set of loan characteristics – including performance pricing, covenants and collateral – that affect level of information asymmetry within the syndicate. Performance pricing ties the loan spread to the performing grids. That is, loan spread automatically changes according to the evolution of the borrower's leverage and/or interest coverage indicators. Performance pricing can be increasing or decreasing, that is, the spread can be set in automatically escalating or descending mode. In my sample, 22.7% of the loans include performance pricing provision and 76.5% of those correspond to interest-decreasing contracts. These numbers are consistent with Asquith, Beatty and Webber (2004) who investigate inclusion of performance pricing in bank debt contracts finding that interest decreasing pricing is more likely when adverse selection costs between the bank and the borrower are higher while interest-increasing pricing is more common when moral hazard costs are higher. Overall, consistent with my finding presence of the performance pricing should reduce the asymmetric information costs within the lending syndicate, thus, reducing the premium demanded by the participant banks. The same intuition applies for the inclusion

[20] Because loans are syndicated at the deal level, I consider the total amount of the loan package.

of collateral and financial covenants. Both features reduce the asymmetric information in the syndicate and should have a negative coefficient in the tests reported in Table 5.[21]

In the reported tests I assume that contract characteristics are exogenous. Indeed, in term of the sequence of the events, all non-price characteristics of a loan contract are set previous to the determination of the spread and syndicate structure. However, it is reasonable to argue that lead bank sets non-price characteristic of the contract taking into account the syndication strategy and the final spread. As a result, there is a potential endogeneity between the spread and non-price contract features. It is likely that size, maturity and type of the loan would be dictated exogenously by the financial needs of the borrower. Yet, features such as presence of the collateral, performance pricing and financial covenants are likely to be influenced by the lead bank and have a direct impact on the asymmetric information with the lending syndicate. While I cannot fully account for this problem, I can evaluate the seriousness of the potential bias by perform Heckman (1978) treatment effects for endogenous dummies.[22] The results are qualitatively similar and available upon request.

An important issue that should be considered is that the lead bank might have synergies in monitoring borrowers within the same industry. If we only consider diversification effects, loan portfolio concentration in a particular industry should be associated with a higher credit risk and therefore a higher spread demanded by the lead bank. However, if industry concentration of the loan portfolio is associated with the synergies in information production, spread demanded by the lead bank should be lower. The last model presented in Table 5 tests the robustness of the results to the potential monitoring synergies. I

[21] I consider alternative definitions of the financial covenants indicator, including the one defined by Bradley and Roberts (2004). Overall, the results are qualitatively the same.

[22] It is likely that collateral, performance pricing and/or covenants are not independent characteristics of the loan. This farther complicates the analysis as the adjustments would need to be based on a joint normal distribution. My results don't account for this point.

constrain the sample to the loans issued to the industries in which lead bank's share of the loan portfolio is below the sample median (3%). Thus, the resulting sample corresponds to the cases where lead bank doesn't have monitoring expertise. The results stay qualitatively the same.

While the syndicated loan market is recognized as highly competitive today, it might not have been the case in the earlier years of my sample. Indeed, over the past decade, the syndicated loan market has grown dramatically. While it is still a private market, important changes in contract standardizations and secondary market trading were put in place with the creation of the Loan Syndication Trading Association (LSTA) at the end of 1995. These innovations significantly increased the pool of participants in this market, potentially affecting the underlying syndication dynamic. To account for the structural changes in the data, all of the reported results account for the year fixed effects. In a non-reported test, I also re-examine the results in two sub-samples: (1) the years after formation of the LSTA (1996-2004); and (2) the last five years, (2000-2004). The coefficient on the spread required by the participant banks and share of the loan retained by the lead bank remains economically large (point estimate -6.4 and -6.0 respectively) and statistically significant at 5% level.

4.2.2 Spread required by the lead bank: diversification effect

[TABLE 6]

Table 6 reports results of the second-stage regression corresponding to the lead bank required spread. I expected that lead bank pricing behavior is mainly determined by diversification considerations. The syndicate specific reputation measures are the identifying instruments in this context. Accordingly, reputation measures are not directly included in the regression analysis and only appear as exogenous shifts through the lead bank share fitted value As in

Table 5, the key coefficient corresponds to the lead bank loan share. The point estimate is, again, significantly different from the OLS analysis, providing additional support on the validity of the empirical framework. As predicted by the diversification hypothesis, I find positive relationship between the share retained by the lead bank and the required spread. The risk factors have similar impact on the pricing behavior of both lead and participant banks.

4.3 Robustness analysis

A. Private information measurement

It is important to measure availability and consistency of the public information (information transparency) about the borrower since it would have a direct effect on the asymmetry of information between the lead arranger and the syndicate participants. The idea is that if the borrower is less transparent syndicate members will have to rely more on the information collected and reported by the lead bank. In the Dealscan sample I measure information transparency by introducing a dummy for those companies that are publicly rated by any credit rating agency, a dummy for companies that are publicly traded and size of the borrower. I refine these measures by matching the sample with Compustat.

The finding of a strong information asymmetry effect on the loans spread also contributes with the discussion about governance role of the bank financing. This result shows that banks perform a unique role in collecting private information about the borrower even for very large companies.[23] This is despite the fact that borrower's size is positively related to information transparency. Thus, it is interesting to re-examine the information asymmetry hypothesis for the companies that publicly report their financial statements.

[TABLE 7]

[23] The median loan in the sample is $165 million and the minimum loan is $2.

Except for the borrower's characteristics, the specification and identification of the tests reported in Table 7 is similar to that in Table 5 and 6. With the accounting data available I now can control for the assets size and leverage of the company. While higher leverage is associated with the higher credit risk affecting overall spread charged to the borrower, as before, I find that larger size is associated with an improvement in information transparency. I use research and development expenses and accruals as measure of the financial information reliability. For both variables the expected sign in Panel A, corresponding to the spread required by the participants, is positive: larger R&D expense and larger accruals should make public information less reliable, thus, accentuating information asymmetry between the lead and participant banks. Point estimate on the accruals is consistent with the prediction. However I find that R&D only has this effect for non rated companies.

Borrower's information transparency is likely to impact lead pricing behavior in a similar way, since changes in public information quality affect the overall need for monitoring. Consequently, in Panel B, corresponding to the spread required by the lead, I find qualitatively similar results.

Reduction in statistical significance of the results is consistent with reduced importance of bank information production in a sample of publicly transparent companies. However, the economic strength of the results remains the same.

B. Credit risk measurement

[TABLE 8]

In the section 3.2.1 I discussed the construction if change in loss volatility, my central instrument in the identification of the information asymmetry effects. Table 8 examines robustness of the results presented in Tables 5 and 6 to alternative specifications of the

change in loss volatility. A general glance at the results indicates that economic and statistical significance of the central results remains qualitatively the same.

Perhaps, the most interesting part corresponds to the adjustments for recovery rates (lines 8 through 11). Loss in the event of the default is an important component of the expected loss and it wasn't considered in the calculation of the original instrument. I use four alternative proxies for the recovery rates. These include: (1) industry asset tangibility, (2) presence of the collateral, (3) leverage and (4) credit rating. I scale down the default probabilities for the companies that are likely to have high recovery rates. The results are not sensitive to the scaling factor. Overall, the adjusted measures are highly correlated with the original measure and the central results remains economically strong and robust.

4.4 Type of agency problem: moral hazard vs. adverse selection

The results of the previous section lead us to the conclusion that in the syndicated loan market there is an important economic cost induced by information asymmetry between the managing and participating banks. However, it is not clear what kind of information problem, moral hazard or adverse selection, is predominant. Both the ex-post monitoring effort and ex-ante "lemon" problem are consistent with the negative relationship between the spread required by the participants and the share of the loan retained by the lead bank. If you look at the numbers, the median sole lender loan to a non-rated borrower is $7 million, while a median lead arranger commitment in a syndicated loan to a non-rated company ranges from $15 million for smaller loans up to $60 million for large loans.[24] Intuitively, this magnitude of individual exposure in the syndicated loan market seems to suggest that a predominant problem is ex-ante adverse selection rather than ex-post monitoring effort alignment. The

[24] The numbers are calculated for the U.S. market using Dealscan. The median of 7 million for sole lender loans is overstated because Dealscan mainly covers syndicated loan market and only picks up large sole lender loans.

recent changes in the market, such as the introduction of a loan rating system, also point toward adverse selection. Naturally, this raw argument has its limitations.

Learning more about the type of problem is a hard and worthy question that would indicate what kind of improvements and standardization would be beneficial to this market. However, the limitation in comparing the two alternative explanations is that the current theoretical literature on adverse selection only has predictions for situations with and without private information, as opposed to degrees of private information. In particular, the Leland and Pyle (1977) model formulates implications for the companies with different asset volatilities and not for the companies with marginal improvements in informational transparency. Thus, the empirical task becomes challenging, because we need to separate situations where there is no information asymmetry within the lending syndicate from those cases where the lead bank has private information.

[FIGURE 2]

But assuming that we can do it successfully, Figure 3 shows predictions of the two alternative theories when we switch from one informational scenario to the other. The presence of private information about the borrower would reduce the need for monitoring in the case where the ex-post agency problem reduces the premium demanded by the participant banks. At the same time, the presence of private information would create an ex-ante "lemon" problem between the agent and the participant banks, which raises the premium demanded by the participant banks.[25]

[25] For illustration purposes we simplify the picture to reflect an increase (adverse selection) and decrease (moral hazard) in premium demanded by the participants as we compare scenarios with and without private information. However, in case of the adverse selection, there would be not only a shift of the curve but also a change of the slope. We should start from a flat curve (no asymmetric information within the syndicate) and go to a negative slope that corresponds to a signaling equilibrium.

Using the current theoretical framework, the central point to an empirical test is to distinguish between two informational scenarios. Sufi (2005) suggests that we can make this distinction by looking at whether or not an informationally non-transparent company had a previous relationship with the lead bank. If that is the case, then the lead bank has private information. Otherwise, the members of the syndicate are evenly informed. While Sufi's empirical results are inconclusive, this is still an appealing conceptual argument. The problem is that the presence of private information in the hands of a lead arranger is a fact. Even before the loan is syndicated to the participant banks, the lead arranger performs due diligence based on public and private information available from the corporate borrower. The lead bank presents the credit profile to the syndicate in the form of a "confidential information memorandum" disclaiming any responsibility for the accuracy of information contained in it.[26] Also, a syndicated loan is not considered to be a "security" for the purpose of application of the Security Act of 1933 and the Securities and Exchange Act of 1934, which leaves the due diligence standards to the judgment of the lead arranger. In this sense, the ex-ante asymmetry of information between the lead bank and syndicate participants is a regular setup, and situations where the borrower had a previous relationship with the lead arranger would, at best, indicate a situation where this asymmetry is *marginally* more pronounced. Also, this makes previous relationship as good as any other variable that reflects a marginal change in private information.

[TABLE 9]

Overall, given that Dealscan mainly covers syndicated loans, an indicator of a past, repeated, relationship with the lead is likely to reveal just the borrower's reputation in this

[26] Such disclaimers are a common practice and are enforceable in court. See for example Commercial Lending Review, May 2004 or American Banker, February 2005.

market. Consistent with this argument, Table 9 indicates that borrowers with a previous relationship are charged a lower spread by both the participants and the lead bank. I use the absence of credit rating as an indicator of informational opaqueness. Thus, the interaction term between the indicator of a previous relationship and the indicator of non-rated companies points out the cases where the lead bank has additional private information. Similar to the simple argument based on the magnitude of the lead bank's individual exposure, the positive sign on the interaction term suggests evidence of adverse selection. However, as expected, this evidence is very week. In fact, if we further refine the test by looking at the companies that appear in the syndicated loan market for the first time but had a previous sole lender relationship with the lead bank, statistically the results become even weaker.[27] In summary, the evidence on the type of agency problem remains inconclusive and requires further theoretical work to understand the implications of adverse selection in the context of marginal changes in private information.

5. Conclusions

This paper directly investigates how delegation of information production in the syndicated loan market affects the loan spread charged to the borrower. Using an empirical model that separates the pricing behavior of the lead and participant banks, I find that the information asymmetry problem within a syndicate has an important economic impact on loan spread. In particular, I find that a 10% increase in the share retained by the lead bank reduces - by approximately 50 basis points (34% change in spread at the mean of 149 basis points) - the spread required by participants.

[27] This result is not reported but available from the author.

I conclude that, in this market, information asymmetry and, therefore, the cost of borrowing, can be effectively reduced by controlling the share of the loan retained by the lead arranger. Overall, this paper provides a framework for understanding the syndicated loan market structure, as well as, banks' merger activity.

References

Angbazo, Lazarus, Jianping Mei and Anthony Saunders, 1998, Credit spreads in the market for highly leveraged transaction loans, *Journal of Banking and Finance* 22, 1249-1282.

Angrist, Joshua D. and Alan B. Krueger, 2001, Instrumental variables and the search for identification: From supply and demand to natural experiments, *Journal of Economic Perspectives* 15 (4), 69-85.

Araten, Michael and Michael Jacobs, 2001, Loan equivalent for revolving credits and advised lines, *RMA Journal*, May.

Asquith, Paul, Anne Beatty and Joseph Weber, 2004, Performance pricing in bank debt contract, Working Paper.

Bradley, Machael and Michael R. Roberts, 2004, The structure and pricing of corporate debt covenants, Working Paper, Fuqua School of Business.

Bromiley, Philip and William E. Stansifer, 1994, Loan-size limits: A simple model, *Journal of Commercial Lending*, December, 17-28.

Carey, Mark, Mitch Post, and Steven A. Sharpe, 1998, Does Corporate Lending by Banks and Finance Companies Differ? Evidence on Specialization in Private Debt Contracting, *Journal of Finance*, 845-878.

Corwin S.A. and Schultz P., 2005, The role of IPO underwriting syndicates: Pricing, information production, and underwriter competition, *Journal of Finance* 60, 443-486.

Diamond, Douglas W., 1984, Financial intermediation and delegated monitoring, *Review of Economic Studies* LI, 393-414.

De Seregviny, Arnauld and Olivier Renault, 2002, Default correlation: empirical evidence, Working Paper, Standard and Poors, Risk Solutions.

Demsetz, Rebecca S. 1999, Bank loan sales: A new look at the motivations for secondary market activity, FRB NY Staff Report 69.

Dennis, Steven and Donald J. Mullineaux, 2000, Syndicated loans, *Journal of Financial Intermediation* 9, 404-426.

Dennis, Steven, Debarshi Nandy and Ian G. Sharpe, 2000, The determinants of contract terms in bank revolving credit agreements, *Journal of Financial and Quantitative Analysis* 35, 87-110.

Esty, Benjamin C., 2001, Structuring Loan Syndicates: A Case Study of the Hong Kong Disneyland Project Loan, *Journal of Applied Corporate Finance* 14, 80-98.

Esty, Benjamin C. and William L. Megginson, 2003, Creditor Rights, Enforcement, and Debt Ownership Structure: Evidence from the Global Syndicated Loan Market, *Journal of Financial and Quantitative Analysis*, March, 689-721.

Galston, Arthur, 1928, *Security syndicate operations*, The Ronald Press Company, New York.

Gorton, G. and and George Pennacchi, 1995, Banks and loan sales: marketing nonmarketable assets, *Journal of Monetary Economics* 35, 389-411.

Heckman, James J., 1978, Dummy Endogenous Variables in a Simultaneous Equation System, *Econometrica* 46(4), 931-959.

Jensen, Michael C. and William H. Meckling, 1976, Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics* 3 (4), 305-360.

Jones, Jonathan, William Lang and Peter Nigro, 2000, Recent Trends in Bank Loan Syndications: Evidence form 1995 to 1999, Office of the Controller of the Currency, Working Paper.

Lerner, Josh, 1994, The syndication of venture capital investments, *Financial Management* 23, 16-27.

Lee, Sang Whi and Donald J. Mullineaux, 2004, Monitoring, financial distress, and the structure of commercial lending syndicate, *Financial Management*, Autumn, 107-130.

Leland, E.Hyne and David H. Pyle, 1977, Information asymmetries, financial structure, and financial intermediation, Journal of Finance 32 (2), 371-387.

Merton, Robert 1974, On the pricing of corporate debt: The risk structure of interest rates, *Journal of Finance* 29, 449-470.

Narayanan, Rajesh P., Kasturi P. Rangan and Nanda K. Rangan, 2004, The role of syndicate structure in bank underwrtiting, *Journal of Financial Economics* 72, 555-580.

Panyagometh, Kamphol and Gordon Roberts, 2002, Private Information, Agency Problems and Determinants of Loan Syndication: Evidence from 1987-1999, Working Paper.

Pavel, Christine and David Phillis, 1987, Why Commercial Banks Sell Loans: An Empirical Analysis, *Federal Reserve Bank of Chicago Economic Perspectives* 14, 3-14.

Pennacchi, G., 1988, Loan sales and the cost of bank capital, *Journal of Finance* 43 (2), 375-396.

Pichler, Pegaret and William Wilhelm, 2001, A Theory of the Syndicate: Form Follows Function, *Journal of Finance* 56, 2237-2264.

Preece, Dianna and Donald J. Mullineaux, 1996, Monitoring, loan renegotiability, and firm value: the role of lending syndicate, *Journal of Banking and Finance* 20, 577-593.

Simons, Katherine, 1993, Why do banks syndicate loans?, *New England Economic Review*, Federal Reserve bank of Boston, 45-52.

Song, Wei-Ling, 2004, Competition and coalition among underwriters: The decision to join a syndicate, *Journal of Finance*, 2421-2444.

Standard & Poor's, 2004, *A Guide to the Loan Market*.

Sufi, Amir, 2005, Agency and renegotiation in corporate finance: Evidence from syndicate loans, Job market paper.

Wilson, R., 1968, The theory of syndicates, *Econometrica* 36, 119-132.

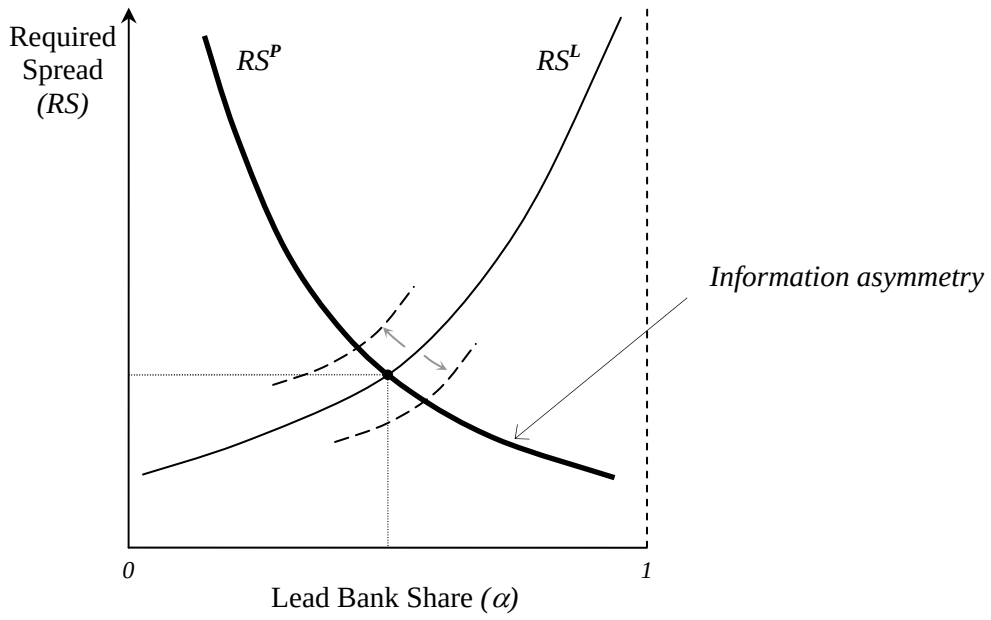

Figure 1 — Simultaneous nature of loan spread and ownership structure

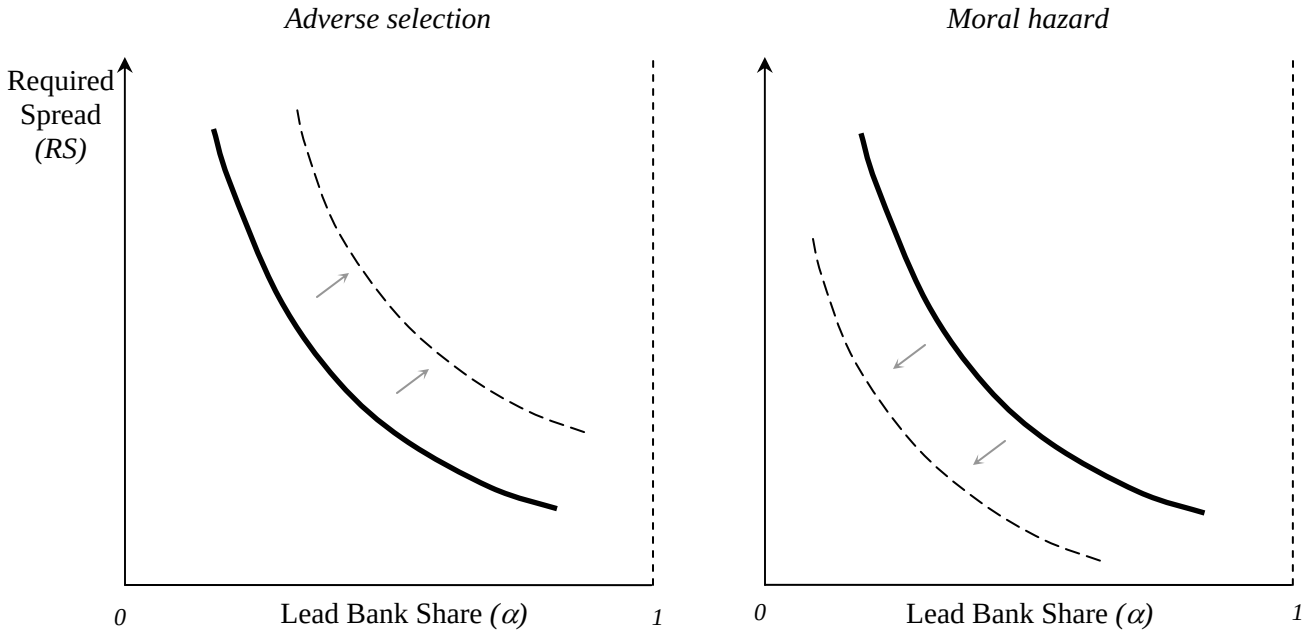

Figure 2 — Effects of moral hazard and adverse selection

DATA APPENDIX

TABLE A1
VARIABLE DESCRIPTION

Variable	Definition	Source
	A. Loan yield:	
All in Drawn Spread	All-in Spread Drawn is defined as total (fees and interests) annual spread paid over LIBOR for each dollar drawn down from the loan	Dealscan
All in Undrawn Spread	All-in Spread Undrawn is defined as total (fees and interest) annual spread over LIBOR for each dollar available under a commitment	Dealscan
	B. Syndicate structure:	
Lead Share	Share of the loan that is retained by lead arranger at the loan origination	Dealscan
Number of participants	Number of participants (excluding lead arrangers) in the original syndicate	Dealscan
	C. Instruments:	
Δ Loss volatility	Change in loss volatility of the lead bank calculated at the loan level using loan portfolio weights constructed using Dealscan and default correlation matrices from CreditPro.	Dealscan / S&P CreditPro
Lending limit	Defined as median loan issued over the past 3 years.	Dealscan
Reputation: Lead to participant	Maximum number of links between the lead bank and a member of the syndicate, scaled by the total number of deals arranged by the lead bank. This is a syndicate specific measure calculated over 3 year horizon	Dealscan
Reputation: Reciprocal	Dummy variable equal to 1 if the lead arranger had a previous relationship as a participant with at least one of the members of the syndicate.	Dealscan
	D. Borrower characteristics:	
Industry default probability	2-digit SIC industry expected loss	S&P Creditpro
Private	Dummy variable equal to 1 if the borrower is not publicly traded	Dealscan
Senior Debt Rating NIG	Dummy variable equal to 1 if the borrower's senior debt rating is BB or below using S&P where available and Moody's otherwise	Dealscan / S&P CreditPro
Not rated	Dummy variable equal to 1 if the borrower is not rated or the data is missing	Dealscan/ S&P CreditPro
Log (Sales at Close)	Logarithm of the sales at close	Dealscan
Assets	Total assets in millions: DATA6	Compustat
Leverage	Ratio of book value of debt to total assets: [DATA181+DATA10 (or DATA56 or DATA130 depending on availability and in that order)]/DATA 6	Compustat
Market equity	Number of common shares outstanding times the closing share price	CRSP
Market value of firm	Sum of book value of debt plus market value of equity	
R&D /Sales	Ratio of research and development to sales: DATA46/DATA12	Compustat
Accruals / Assets	Difference between Operating Activities Net Cash Flow and Income Before Extra Items scaled by assets: (DATA123-DATA308)/ Data6	Compustat
Previous syndicated	Dummy variable equal to 1 if the borrower was previous issued a	Dealscan

loans	syndicated loan	
	E. Non-price loan contract characteristics:	
Facility amount	Total facility amount in million dollars	Dealscan
Maturity	Maturity of the facility in months	Dealscan
Collateral	Dummy variable equal to 1 if the loan is secured	Dealscan
Financial covenants	Dummy variable equal to 1 if the loan has financial covenants and otherwise	Dealscan
Prime base rate	Dummy variable equal to 1 if the base rate is Prime	Dealscan
Performance Pricing (increasing)/ (decreasing)	Dummy variable equal to 1 if the loan has increasing/ decreasing performance pricing specified	Dealscan
Term loan B-D	Dummy variable equal to 1 if the loan is a Term Loan B-D, it corresponds to the type of the loan that is syndicated to institutional investors	Dealscan
	F. Lender characteristics:	
Market share: Number of deals	Lead arranger's market share based on the number of the deals where the lead acts as an arranger, computed in the year previous to the year of syndication.	Dealscan
Market share: Dollar volume	Lead arranger's market share based on the total dollar volume of the deals where the lead acts as an arranger, computed in the year previous to the year of syndication.	Dealscan
Ranking	Lead arranger's ranking calculated using lead's market share based on the number of deals.	Dealscan
Bank Assets	Bank assets in billions	Compustat/ Call Reports
Capital Tier 1	Ratio of Tier 1 capital to assets	Compustat/ Call Reports

TABLE A2
DESCRIPTIVE STATISTICS

This table presents descriptive statistics for the sample containing completed dollar denominated loans originated between 1993 and 2004 to U.S. companies excluding regulated and financial industries identified with 2-digit SIC 40 through 45 and 60 through 64. Borrower's and lender's characteristics are computed as of the earliest date previous to the origination of the loan. For definition of other dependent variables please see Appendix 1.

	Observations= 5,017	
	Mean	Std.Dev.
All in Drawn Spread (b.p.)	148.61	106.76
Lead share (%)	27.17	17.17
Number of Participants	8.51	7.98
Default probability (%)	2.16	2.41
Non-investment grade	0.23	0.42
Not rated	0.49	0.50
Public	0.75	0.44
Log (Sales at close)	6.35	1.67
Log (Facility amount)	4.81	1.28
Maturity (Months)	39.44	21.97
Number of facilities	1.35	0.68
Collateral	0.43	0.50
Financial Covenants	0.12	0.32
Prime base rate	0.03	0.16
Performance pricing	0.66	0.47
Ranking	12.49	16.98
Reputation: Lead to participant	12.51	8.02
Reputation: Reciprocal	0.97	0.18
Credit risk: Δ Loss volatility	0.00	0.22
Credit risk: Lending limit	37.04	28.79

TABLE 1
DIRECT COSTS OF SOLE LENDER AND SYNDICATED LOANS

This table compares direct costs of sole lender and syndicated commercial loans. The sample contains completed dollar denominated loans originated between 1988 and 2004 to U.S. Spreads and fees are expressed in basis points per annum. *All in Drawn Spread* describes the amount the borrower pays for each dollar drawn down. *All in Undrawn Spread* measures the amount the borrower pays for each dollar available under commitment. The following are the components of the spreads:

All in Drawn Spread = Upfront fee + Annual fee + Utilization Fee + Spread over LIBOR

All in Undrawn Spread = Upfront fee + Annual fee + Commitment Fee

Panels A through C disaggregate sample by credit quality using S&P's senior debt rating. High yield or non investment grade loans correspond to a borrower rated 'BB' or lower.

	Sole lender loans		**Syndicated loans**			
	Mean	Std.Err.	Mean	Std.Err.	Diff.	t-stat
	Panel A: Investment grade					
Deal Amount ($ MM)	64.3	14.5	804.3	19.6	740.1	30.4
Maturity (Months)	29.7	6.0	39.1	0.5	9.5	1.6
All in Drawn Spread	77.8	16.6	62.4	1.1	-15.4	-0.9
All in Undrawn Spread	15.5	1.7	13.3	0.2	-2.2	-1.3
Upfront Fee	35.0	20.8	25.2	1.8	-9.8	-0.5
Annual Fee	11.7	1.4	16.2	0.5	4.5	3.2
Commitment Fee	21.3	3.5	32.1	0.5	10.8	3.0
Utilization Fee	12.5	0.0	13.1	0.4	0.6	1.3
	Panel B: High yield					
Deal Amount ($ MM)	31.9	3.7	306.8	6.2	274.9	38.3
Maturity (Months)	34.8	2.0	54.7	0.4	19.9	10.0
All in Drawn Spread	282.4	10.1	245.1	1.9	-37.2	-3.6
All in Undrawn Spread	46.4	2.7	44.9	0.4	-1.5	-0.6
Upfront Fee	85.0	8.1	66.2	2.1	-18.8	-2.2
Annual Fee	30.9	5.0	20.6	0.8	-10.3	-2.0
Commitment Fee	39.9	1.9	38.9	0.3	-1.0	-0.5
Utilization Fee	15.2	2.0	18.2	2.3	3.0	1.0
	Panel C: Not rated					
Deal Amount ($ MM)	11.2	0.3	130.4	1.8	119.2	64.9
Maturity (Months)	33.6	0.4	45.3	0.3	11.7	21.5
All in Drawn Spread	295.1	2.2	218.7	1.2	-76.4	-30.7
All in Undrawn Spread	38.1	0.7	34.6	0.3	-3.5	-4.7
Upfront Fee	70.8	1.9	56.8	1.6	-13.9	-5.6
Annual Fee	28.8	1.8	17.6	0.4	-11.2	-6.3
Utilization Fee	16.3	1.9	16.4	1.3	0.1	0.0
Commitment Fee	36.9	0.6	37.0	0.3	0.1	0.2

TABLE 2
VALIDITY OF THE INSTRUMENTS: CHANGE IN LOSS VOLATILITY

This table presents descriptive statistics for the change in loss volatility used as an instrument to identify the spread required by the participant banks. Change in loss volatility is calculated at the loan level and measures the contribution of the particular loan to the loss volatility of the lead bank loan portfolio. Loss volatility is constructed using 2-digit SIC default covariance matrices from CreditPro database and bank specific 2-digit SIC portfolio weights computed using Dealscan. First row corresponds to the measure used in the regression analysis. Other rows are presented for comparison. Last column reports correlation between change in loss volatility of the lead bank and the comparison group.

	Loss Volatility (%)		**Change in Loss Volatility (%)**				
	Mean	Def. Prob.	5th %	Median	95th %	Mean	Corr.
1. ***Lead bank***	**5.6** ***	**0.33**	**-0.027**	**0.002**	**0.047**	**0.001**	**--**
2. Largest participant (Tier2)	12.9 ***	1.69	-0.183	0.005	0.154	-0.014	0.02
3. Random participant (Tier2)	25.7 ***	7.12	-0.052	0.004	0.130	0.023 **	0.01
4. Random competitor (Loan size)	6.2 ***	0.39	-0.007	0.003	0.037	0.007 ***	0.04 ***
5. Random competitor (Loan and client size)	7.2 ***	0.52	-0.012	0.006	0.110	0.019 ***	0.08 ***

*** Indicates *p* value of 1%
** Indicates *p* value of 5%
* Indicates *p* value of 10%

TABLE 3
VALIDITY OF THE INSTRUMENTS: CORRELATIONS

This table presents correlations between the instruments used to identify asymmetric information and diversification effects, as well as, size of the lead bank. *Δ Loss volatility* is calculated at the loan level and measures the contribution of the particular loan to the loss volatility of the lead bank loan portfolio. It is constructed using 2-digit SIC default covariance matrices from CreditPro database and lead bank specific 2-digit SIC loan portfolio weights computed using Dealscan. *Lending limit* is defined as median loan issued over the past 3 years. *Reputation: Lead to participant* measures relationship bounds within the syndicate. It looks at the sample of the deals underwritten by the same lead lender that include at least one of the same participants over the past 3 years and counts the maximum share of the deals allocated to the same participant. *Reputation: Reciprocal* is a dummy variable equal to 1 if there are cases in the past where lead bank acts as a participant in a syndicate lead by one of the participants. *Market share* is computed as of the year previous to the year of the loan syndication.

		1		***2***		***3***		***4***	
1	*Credit risk: Δ Loss volatility*	--							
2	*Credit risk: Lending limit*	0.03	*						
3	*Reputation: Lead to participant*	-0.08	***	0.17	***				
4	*Reputation: Reciprocal*	-0.02		0.04	***	0.09	***		
5	*Lead bank market share: Number of deals*	-0.01		0.06	***	0.07	***	0.07	***
6	*Lead bank market share: Dollar volume*	-0.01		0.13	***	0.37	***	0.05	***

*** Indicates *p* value of 1%
** Indicates *p* value of 5%
* Indicates *p* value of 10%

TABLE 4
VALIDITY OF THE INSTRUMENTS: FIRST STAGE REGRESSIONS

This table presents results of the first-stage regression, the dependent variable is shares retained by lead arranger. The sample contains completed dollar denominated loans originated between 1993 and 2004 to U.S. companies excluding regulated and financial industries identified with 2-digit SIC 40 through 45 and 60 through 64. Model (1) corresponds to the full sample and Model (2) re-examines the result for the sub-sample of the loans extended to the companies in the industries where lead bank doesn't have monitoring expertise. Bank is said to have monitoring expertise if its loan portfolio in a particular industry defined at the 2-digit SIC level exceeds median level of 3%. Each observation in the regression corresponds to a different deal. Borrower's and lender's characteristics are computed as of the earliest date previous to the origination of the loan. For definition of other dependent variables please see Appendix 1. Industry effects are jointly insignificant and not included in the analysis. Each regression included year, bank and deal purpose fixed effects jointly significant at 1% level.

		(1)			***(2)***		
		Coeff.	t-stat		Coeff.	t-stat	
Borrower characteristics:							
Industry default probability (%)		0.25	3.0	***	0.12	1.1	
Non-investment grade		0.28	0.5		1.05	1.2	
Not rated		3.25	6.0	***	2.77	3.3	***
Public		0.00	0.0		0.17	0.3	
Log (Sales at close)		-0.45	-3.0	***	-0.60	-2.4	*
Contract characteristics:							
Log (Facility amount)		-6.72	-31.2	***	-6.77	-19.8	***
Maturity (Months)		-0.03	-3.5	***	-0.03	-2.3	**
Number of facilities		-5.69	-18.8	***	-6.13	-13.3	***
Collateral		0.60	1.4		0.45	0.7	
Financial Covenants		-0.16	-0.3		-0.16	-0.2	
Prime base rate		0.86	0.8		-0.22	-0.1	
Performance pricing		-2.13	-5.1	***	-1.97	-3.2	***
Lead bank characteristics:							
Ranking		0.10	3.8	***	0.12	3.4	***
Instruments (Participants):							
Credit risk: Δ Loss volatility (%)	z_1	-2.61	-3.2	***	-4.75	-3.5	***
Credit risk: Lending limit ($MM)	z_2	0.02	2.6	***	0.01	1.3	
Instruments (Lead):							
Reputation: Lead to participant (%)	z_3	-0.50	-14.9	***	-0.53	-11.0	***
Reputation: Reciprocal	z_4	-5.14	-5.2	***	-4.22	-3.1	***
F-test: ($z_1 = z_2 = z_3 = z_4 = 0$)		67.8			34.96		
F-test: ($z_1 = z_2 = 0$)		8.3			6.74		
F-test: ($z_3 = z_4 = 0$)		130.7			67.36		
Observations		5,017			2,397		
Adjusted R^2		0.52			0.51		

TABLE 5
DETERMINANTS OF LOAN SPREADS: PARTICIPANT BANKS

This table reports results of the second stage regression corresponding to the spread required by the participant banks. Participants behavior is identified using *Credit Risk* and *Lending Limit* measurements that exogenously shifts the spread demanded by the lead bank. The dependent variable is *All in Drawn Spread* including fixed fee and variable spread the borrower pays for each dollar drawn down under loan commitment. The first set of results reports coefficients estimated by OLS. Models (1) and (2) report point estimates for the second stage regression using predicted values for share retained by lead arranger from Table 4. Model (1) corresponds to the full sample and Model (2) re-examines the result for the sub-sample of the loans extended to the companies in the industries where lead bank doesn't have monitoring expertise. Bank is said to have monitoring expertise if its loan portfolio in a particular industry defined at the 2-digit SIC level exceeds median level of 3%. The sample contains completed dollar denominated loans originated between 1993 and 2004 to U.S. companies excluding regulated and financial industries identified with 2-digit SIC 40 through 45 and 60 through 64. Each observation in the regression corresponds to a different deal. Borrower's and lender's characteristics are computed as of the earliest date previous to the origination of the loan. For definition of other dependent variables please see Appendix 1. Each regression included year, bank and deal purpose fixed effects jointly significant at 1% level. Industry effects are jointly insignificant and not included in the analysis. The t-statistics are constructed using Murphy-Topel adjusted standard errors.

	OLS			***2SLS***					
				(1)			***(2)***		
	Coeff.	t-stat		Coeff.	t-stat		Coeff.	t-stat	
Syndicate structure:									
Lead share (%)	0.20	2.5	**	-4.75	-2.6	***	-4.19	-2.1	**
Borrower characteristics:									
Industry default probability (%)	1.40	3.0	***	2.67	3.4	***	1.29	1.5	
Non-investment grade	73.00	21.9	***	74.46	16.8	***	85.49	12.1	***
Not rated	35.48	11.4	***	51.55	7.1	***	50.14	6.0	***
Public	-10.29	-4.4	***	-10.22	-3.3	***	-13.11	-2.8	***
Log (Sales at close)	-7.26	-8.4	***	-9.52	-6.7	***	-8.47	-3.8	***
Contract characteristics:									
Log (Facility amount)	-13.36	-9.9	***	-46.59	-3.7	***	-46.37	-3.3	***
Maturity (Months)	-0.03	-0.6		-0.18	-2.1	**	-0.16	-1.3	
Number of facilities	6.53	3.6	***	-21.55	-2.0	**	-23.48	-1.8	*
Collateral	56.41	23.4	***	59.52	17.6	***	61.63	12.8	***
Financial Covenants	12.41	3.9	***	11.57	2.7	***	11.04	1.8	*
Prime base rate	177.71	26.9	***	182.14	20.5	***	196.74	15.5	***
Performance pricing	-22.95	-9.6	***	-33.58	-6.6	***	-42.02	-6.9	***
Lead bank characteristics:									
Ranking	0.40	2.6	***	0.90	3.3	***	0.63	1.9	*
Shifters:									
Reputation: Lead to participant (%)	-0.77	-3.9	***	-3.22	-3.4	***	-2.57	-2.4	**
Reputation: Reciprocal	3.92	0.7		-21.24	-1.8	***	-13.29	-1.0	
Observations	5,017			5,017			2,397		
Adjusted R^2	0.59			0.45			0.49		

*** Indicates *p* value of 1%
** Indicates *p* value of 5%
* Indicates *p* value of 10%

TABLE 6
DETERMINANTS OF LOAN SPREADS: LEAD BANK

This table reports results of the second stage regression corresponding to the spread required by the lead bank Spread demanded by the lead bank is identified using syndicate specific *Reputation* measurements that exogenously shifts the spread demanded by the participant banks. These results correspond to the second equation of the structural model. The dependent variable is *All in Drawn Spread* including fixed fee and variable spread the borrower pays for each dollar drawn down under loan commitment. Models (1) and (2) report point estimates for the second stage regression using predicted values for share retained by lead arranger from Table 4. Model (1) corresponds to the full sample and Model (2) re-examines the result for the sub-sample of the loans extended to the companies in the industries where lead bank doesn't have monitoring expertise. Bank is said to have monitoring expertise if its loan portfolio in a particular industry defined at the 2-digit SIC level exceeds median level of 3%. The sample contains completed dollar denominated loans originated between 1993 and 2004 to U.S. companies excluding regulated and financial industries identified with 2-digit SIC 40 through 45 and 60 through 64. Each observation in the regression corresponds to a different deal. Borrower's and lender's characteristics are computed as of the earliest date previous to the origination of the loan. For definition of other dependent variables please see Appendix 1. Each regression included year, bank and deal purpose fixed effects jointly significant at 1% level. Industry effects are jointly insignificant and not included in the analysis. The t-statistics are constructed using Murphy-Topel adjusted standard errors.

	(1)			***(2)***		
	Coeff.	t-stat		Coeff.	t-stat	
Syndicate structure:						
Lead share (%)	1.40	3.9	***	0.76	1.8	*
Borrower characteristics:						
Industry default probability (%)	1.10	2.3	**	0.59	0.9	
Non-investment grade	72.63	21.4	***	79.64	14.8	***
Not rated	31.54	9.3	***	36.14	6.9	***
Public	-10.20	-4.3	***	-13.44	-3.6	***
Log (Sales at close)	-6.80	-7.5	***	-5.56	-3.6	***
Contract characteristics:						
Log (Facility amount)	-5.37	-1.8	*	-12.43	-2.8	***
Maturity (Months)	0.01	0.1		0.00	0.0	
Number of facilities	13.19	4.6	***	7.13	1.6	
Collateral	55.94	22.6	***	59.60	15.9	***
Financial Covenants	12.54	3.8	***	11.81	2.4	**
Prime base rate	176.58	26.2	***	198.49	19.6	***
Performance pricing	-20.37	-7.8	***	-32.21	-8.2	***
Lead bank characteristics:						
Ranking	0.27	1.7	*	0.03	0.1	
Shifters:						
Credit risk: Δ Loss volatility (%)	11.85	2.5	**	15.15	1.9	*
Credit risk: Lending limit ($MM)	-0.20	-3.8	***	-0.27	-4.0	***
Observations	5,017			2,379		
Adjusted R^2	0.59			0.61		

*** Indicates *p* value of 1%
** Indicates p value of 5%
* Indicates p value of 10%

TABLE 7
ROBUSTNESS CHECK: ALTERNATIVE MEASURES OF PUBLIC INFORMATION

This table uses accounting proxies of uncertainty to measure the agency problem. Original sample of completed syndicated loans issued between 1993 and 2004 was matched to COMPUSTAT. Each observation in the regression corresponds to a different deal. In both panels the dependent variable is *All in Drawn Spread* defined as fixed fee and variable spread that the borrower pays for each dollar drawn down under the loan commitment. Except for the *Borrower Characteristics* the specification is similar to the ones presented in Table 5 and Table 6. Panel A is comparable to the results in Table 5 and Panel B is comparable to Table 6. Borrower characteristics are computed as of the earliest date previous to the origination of the loan. Accounting variables are defined in the Appendix 1. The t-statistics are constructed using Murphy-Topel adjusted standard errors.

	(1)			***(2)***			***(3)***		
	Coeff.	t-stat		Coeff.	t-stat		Coeff.	t-stat	
	Panel A: Participants								
Syndicate structure:									
Lead Share (%)	-4.61	-1.9	*	-4.31	-1.8	*	-4.85	-1.4	
Borrower characteristics:									
Non-investment grade	71.30	15.1	***	71.03	15.4	***	65.70	8.6	***
Senior debt not rated	48.57	4.9	***	46.46	5.0	***	45.85	3.2	***
Accruals/Assets				0.41	2.7	***			
R&D/Sales Not rated*							0.65	1.8	*
R&D/Sales							-1.18	-2.4	**
Leverage	0.47	6.9	***	0.42	6.3	***	0.61	6.7	***
Log(Assets)	-13.20	-3.0	***	-12.75	-2.8	***	-11.05	-1.9	*
Adjusted R^2	0.46			0.48			0.45		
	Panel B: Lead								
Syndicate structure:									
Lead Share (%)	1.93	4.3	***	1.99	4.4	***	1.95	2.9	***
Borrower characteristics:									
Non-investment grade	71.87	19.8	***	71.84	19.7	***	70.63	14.1	***
Senior debt not rated	30.73	8.1	***	30.14	7.9	***	29.18	5.6	***
Accruals/Assets				0.50	4.4	***			
R&D/Sales							0.39	0.8	
R&D/Sales Not rated*							-1.19	-3.2	***
Leverage	0.57	13.8	***	0.51	11.6	***	0.68	11.6	***
Log(Assets)	-5.00	-3.4	***	-4.14	-2.7	***	-4.02	-1.9	*
Adjusted R^2	0.60						0.60		
Number of observations	3,916			3,904			2,009		

*** Indicates *p* value of 1%
** Indicates *p* value of 5%
* Indicates *p* value of 10%

TABLE 8
ROBUSTNESS CHECK: ALTERNATIVE DEFINITIONS OF LOSS VOLATILITY

This table evaluates the robustness of the relationship between spread and lead bank share reported in Tables 5 and 6 to alternative definitions of credit risk. Original measure was calculated using lagged cross-industry matrices of default correlations. Default correl Revolver lines were scales by 50% and maturity was assumed First raw restates the results reported in Tables 5 and 6. First three columns report point estimate, t-stat and significance level of the coefficient on the *Lead Share* corresponding to the regression of the required spread demanded by participant banks reported in Table 5. Second set of results corresponds to the regression of the required spread demanded by lead bank reported in Table 6. I report F-stat of the joint significance of the four instruments used in the reduced form of the *Lead Share*. The last column contains correlation between original definition of the credit risk and the modified measure.

		Corr.	Participant banks (Table 5)			Lead bank (Table 6)			Instruments
			Coeff.	t-stat		Coeff.	t-stat		F-stat
1.	***Original measure (Tables 5&6)***	**--**	**-4.75**	**-2.6**	***	**1.40**	**3.9**	***	**67.8**
2.	*Loan share: median share by loan size*	0.98	-4.13	-2.5	**	1.41	3.9	***	68.1
3.	*Default matrix: 1 year default horizon*	0.79	-5.69	-2.8	***	1.79	4.8	***	66.5
4.	*Default matrix: not lagged, 3 year horizon*	0.73	-3.47	-2.4	**	1.67	4.3	***	63.1
5.	*Default matrix: not lagged, 1 year horizon*	0.71	-3.73	-2.8	***	1.60	4.3	***	64.3
6.	*Loans drawn: 100 % revolver loans*	0.95	-3.95	-2.6	***	1.58	4.6	***	68.0
7.	*Loans drawn: until maturity*	0.97	-4.76	-2.9	***	1.69	4.6	***	67.7
8.	*Recovery rates: assets tangibility*	0.96	-5.12	-2.6	***	1.39	3.9	***	67.7
9.	*Recovery rates: collateral*	0.96	-4.20	-2.5	**	1.38	3.8	***	68.3
10.	*Recovery rates: loan size/sales*	0.95	-3.78	-2.4	**	1.37	3.8	***	68.7
11.	*Recovery rates: credit rating*	0.96	-5.34	-2.7	***	1.35	3.7	***	67.8

*** Indicates *p* value of 1%
** Indicates p value of 5%
* Indicates p value of 10%

TABLE 9
PREVIOUS LENDING RELATIONSHIP

This table examines the importance of the previous lending relationship between the borrower and the lead lender. Results are comparable to the Model (1) in the Tables 5 and 6. The sample contains completed dollar denominated loans originated between 1993 and 2004 to U.S. companies excluding regulated and financial industries identified with 2-digit SIC 40 through 45 and 60 through 64. The focus of the table is *Previous relationship* and the interaction term with *Not Rated*. For definition of other dependent variables please see Appendix 1. Each regression included year, bank and deal purpose fixed effects jointly significant at 1% level. Industry effects are jointly insignificant and not included in the analysis. The t-statistics are constructed using Murphy-Topel adjusted standard errors.

	Participants			Lead		
	Coeff.	t-stat		Coeff.	t-stat	
Syndicate structure:						
Lead share (%)	-4.65	-2.6	***	1.41	3.8	***
Borrower characteristics:						
Previous relationship	-8.88	-1.87	*	-0.23	-0.1	
*Previous relationship*NR*	5.03	0.92		1.59	0.4	
Not rated	47.69	6.6	***	30.58	7.3	***
Default probability (%)	2.64	3.4	***	1.10	2.3	**
Non-investment grade	74.16	16.9	***	72.56	21.3	***
Public	-9.56	-3.1	***	-10.27	-4.3	***
Log (Sales at close)	-9.45	-6.7	***	-6.81	-7.5	***
Contract characteristics:						
Log (Facility amount)	-45.73	-3.7	***	-5.31	-1.8	*
Maturity (Months)	-0.19	-2.1	**	0.01	0.1	
Number of facilities	-20.87	-2.0	**	13.23	4.5	***
Collateral	59.55	17.7	***	55.91	22.6	***
Financial Covenants	11.81	2.8	***	12.50	3.8	***
Prime base rate	182.04	20.6	***	176.55	26.1	***
Performance pricing	-33.30	-6.7	***	-20.39	-7.8	***
Lead bank characteristics:						
Ranking	0.89	3.3	***	0.27	1.7	*
Instruments (Lead):						
Reputation: Lead to participant (%)	-3.14	-3.4	***			
Reputation: Reciprocal	-20.57	-1.7	*			
Instruments (Participants):						
Credit risk: Δ Loss volatility (%)				11.94	2.5	**
Credit risk: Lending limit ($MM)				-0.20	-3.8	

*** Indicates *p* value of 1%
** Indicates p value of 5%
* Indicates p value of 10%