

Information Asymmetry and the Pricing of Private Debt – Evidence from European Syndicated Loans

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Abstract

We analyze a sample of UK syndicated loan contracts, containing detailed firm data for both private and public borrowers for the time period 1996 through 2005 to explore the impact of information asymmetry on loan spreads. Consistent with the asset pricing literature, we find that lenders charge systematically higher spreads when the borrower lacks publicly available information. However, previous firm-lender relationships mitigate this information asymmetry and reduce the spread. Additionally, we find evidence that an increase in the loan share retained by the mandated arranger mitigates informational frictions within the lending syndicate and consequently reduces the interest spread charged to the firm. Therefore, we conclude that informational frictions between informed mandated arrangers and uninformed participant banks impose an additional syndication-specific information premium on the borrower. To the best of our knowledge, this paper is first to empirically explore whether loan spreads charged to firms are affected by the amount of publicly available firm information, prior firm-lender relationships and bank reputation. Further, the paper addresses the endogenous link between loan spreads and syndicate structure by employing actual bank loan portfolio data.

JEL-Classification: G24, G20, G32, D82

Keywords: Banks; Investment Banking; Loan Spreads; Rating Agencies; Syndicated Loans

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1. Introduction

The syndicated loan market is the biggest market of global corporate finance, exceeding the annual issuance volumes of equity and bond markets altogether (Weidner, 2000). Despite the importance of this market, its mechanics are not well understood and remain largely unexplored in the literature. Research about the relevance of syndicated loans is limited and mainly restricted to the U.S., with virtually no research facing the European market.¹ In light of major structural differences between Europe and the U.S., the private information collected in this market, its impact on information asymmetries between lenders and borrowers, and its influence on the structure and the pricing of loan syndicates in Europe are of particular relevance.

In a syndicated loan, two or more lenders jointly provide funds to a borrowing firm. Typically, the mandated arranger establishes a relationship with the borrower, negotiates the non-price terms of the loan agreement (such as loan amount, maturity, facility types) and underwrites the full loan amount within a certain price range. After setting the non-price terms and guaranteeing the loan amount, the mandated arranger syndicates a share of the loan to participating institutions and the final loan spread is determined. Further, the mandated arranger acts as the informed agent on behalf of uninformed participants, primarily performing *ex-ante* borrower investigation and due diligence and *ex-post* monitoring over the lifetime of the loan (Dennis and Mullineaux, 2000, Panyagometh and Roberts, 2002, and Lee and Mullineaux, 2004).

In this paper, we analyze how information asymmetry affects the loan spread charged to the borrower in the syndicated loan market. We employ a sample of 1,277

¹ An exception is Bosch and Steffen (2006) who explore the impact of information asymmetry on syndicate structure to UK firms. Related research also contains several international studies that examine syndicate structure across countries including Europe (Esty and Megginson, 2003, Esty, 2004, Qian and Strahan, 2005), whereas Hao, Nandy and Roberts (2006) look at pricing in different countries.

syndicated loan transactions with detailed financial data for 361 different UK-based non-financial firms and for 134 different parent banks from 1996 through 2005. As a large proportion of UK syndicated loans goes to private firms, this dataset not only adequately represents European market structures (Bosch and Steffen, 2006) but also shows great promise for exploring the pricing of private debt capital of private firms. We are the first to investigate how information asymmetry affects the cost of private debt in this largely neglected borrower segment, accounting for various explicit financial control measures of default risk.

The first part of this study investigates the effect of informational borrower transparency on loan spreads. We find evidence that loan spreads charged to borrowers systematically reflect the amount of publicly available information associated with a borrowing firm. Our empirical analysis is motivated by prior theoretical research on asset pricing, predicting that informational transparency is a priced risk factor. Barry and Brown (1984) show that the amount of information available affects the systematic risk of securities, and accordingly informational opaqueness is a non-diversifiable risk factor. Thus, investors demand a risk premium to hold securities with higher information asymmetry. Further, Easley, Hvidkjaer and O'Hara (2002), and Easley and O'Hara (2004) support the view that information asymmetry is a systematic risk factor. In a Fama and French asset pricing model the authors demonstrate that comparing otherwise identical securities (in terms of beta, size and book-to-market) the security with more asymmetric information has a larger expected excess return. Asymmetric information induces a new form of systematic risk, because uninformed investors do not know the proper portfolio weights to hold. Features like analyst coverage are shown to reduce the firm's cost of capital as the amount of information available increases,

thereby lowering the risk premium for asymmetric information. Our empirical results support this theoretical framework. We find that when borrowing firms are informational opaque, lenders charge significantly higher loan spreads. For instance, syndicated loans to firms without analyst coverage via stock exchange listings and without third party certification via rating agencies respectively, face substantially higher loan spreads (15 and 19 percent higher than median), after controlling for various known measures of default risk (like Interest Coverage and Leverage Ratio) as well as firm and loan size. We find similar results, using a variety of alternative measures of information asymmetry, including borrower industry uniqueness, firm age or cash flow ratio amongst others. Given the fact that informational opaqueness significantly increases the cost of debt capital, we address the fact that the syndicated loan market is one of repeated transactions and interactions. We find evidence that opaque borrowers who repeatedly accessed the market exhibit *ceteris paribus* lower loan spreads the smaller the time period since the last transaction with the same mandated arranger. Interestingly, we find that opaque borrowers that interact with the most reputable mandated arrangers do not exhibit *ceteris paribus* lower spreads. Thus, mandated arranger reputation does not mitigate borrower information asymmetry, whereas borrowers that repeatedly accessed the market become more reputable and known to lenders, thereby lowering informational opaqueness.

The evidence presented in the first half of this paper documents that in line with theoretical models informational opaque firms are charged systematically higher lending costs. However, it is important to recognize that information asymmetry is predicted to be priced no matter if we have a traditional bank loan or a syndicated loan. The second part of this study analyzes the effect of informational frictions within the

lending syndicate on loan spreads. As the information collection by the mandated arranger is essentially unobservable to participants, there is an information asymmetry within the lending syndicate. These agency problems between *informed* mandated arrangers and *uninformed* participants are specific to loan syndication, and thus constitute additional premiums compared to traditional bank loans. Sufi (2006) provides evidence that consistent with moral hazard in monitoring, the mandated arranger retains a larger loan share when the borrower requires more intense due diligence and monitoring. The information asymmetry between informed and uninformed lenders is assumed to increase with borrower opacity, because opaque borrowers imply a higher investigation and monitoring effort by the mandated arranger. Thus, retaining an appropriate loan share allows the mandated arranger to attract uninformed capital, signaling both good loan quality and monitoring diligence. Indeed, empirical evidence of the *Loan Pricing Corporation* supports that within the syndicate agency problems can be significant. In particular, there are cases showing that despite of a pick-up in pricing and conservative firm leverage, invited institutions refused to participate in syndicated loan deals simply because they were unfamiliar with the borrower.

The link between syndicate structure and loan spread is empirically difficult to address due to simultaneity; the final interest spread and the loan share retained by the mandated arranger are determined simultaneously in negotiations between the mandated arranger and potential participants, after the setting of the non-price terms. We use an instrumental variables approach in order to estimate the orthogonal effect of the loan share retained by the mandated arranger on loan spreads. In order to identify viable instruments, we take into account in line with Ivashina (2005) that the simultaneous relationship between the two variables is essentially determined by two considerations.

Firstly, we address that uninformed participants are mainly concerned about additional costs that could arise due to informational frictions within the syndicate, thus requiring an additional information risk premium. We predict that this information premium required by participants should decrease in the loan share retained by the mandated arranger. Secondly, as the mandated arranger typically holds a larger share of the loan than any of the participants, its main concern is loan portfolio credit risk, thus requiring an additional diversification risk premium. We predict that increasing the loan share retained by the mandated arranger increases its required diversification risk premium. Accordingly, in order to identify the required premiums, we construct instrumental variables that exogenously affect the pricing behavior of the mandated arranger, but not of uninformed participants, and vice versa. Basically, we identify the required information premium of the uninformed participants by constructing a Moody's asset quality ratio as well as a loan concentration proxy that exogenously affect the credit risk exposure of the mandated arranger's loan portfolio without affecting the information asymmetry within the lending syndicate. Our findings underscore the importance of information asymmetry as a determinant of the loan spread charged to the borrower. For instance, a 10% decrease in the loan share retained by the mandated arranger increases *ceteris paribus* the required information premium of uninformed participants by about 28 basis points (17 percent higher than median). On the other hand, we also identify the required diversification premium of the mandated arranger using instruments that proxy for previous lending relationships among syndicate members. These instruments exogenously affect within lending syndicate information asymmetries without affecting the mandated arranger's loan portfolio credit risk. We find that a 10% decrease in the

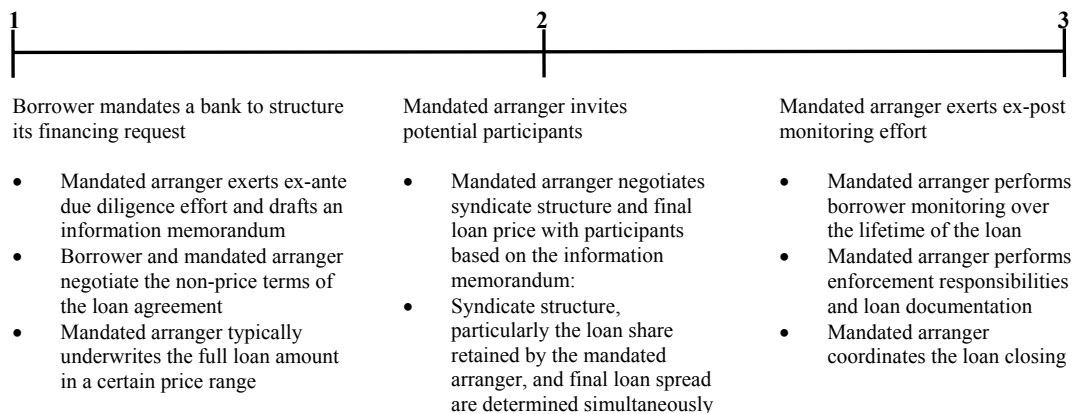
loan share retained by the mandated arranger reduces *ceteris paribus* its required diversification premium by about 21 basis points (13 percent lower than median).

This paper contributes to existing research in several new directions. Firstly, we explicitly document that the amount of publicly available information associated with a borrower affects its cost of private debt capital. Secondly, this paper investigates how informational transparency affects the loan spreads of *private* borrowing firms, especially after controlling for various financial measures of default risk. Employing detailed financial controls rules out the possibility that the impact of information asymmetry on the interest spread potentially includes the effects of both default risk as well as information asymmetry. Thirdly, we are the first to explore the repeated nature of the syndicated loan market by analyzing the effect of previous firm-lender relationships and mandated arranger reputation on loan spreads. Furthermore, we carefully address the endogenous relationship between loan spreads and syndicate structure constructing instrumental variables that measure the credit risk of the actual loan portfolio of the mandated arranger. This paper is also first to exploit a European syndicated loan market, in order to analyze the influence of information asymmetry on loan spreads. Employing detailed data for both private and public firms, we particularly recognize the *private* firm nature of the European market.

The paper is structured as follows. The next section describes the syndicated loan market as well as the contracting environment, and gives an overview over the related literature. The third section details the theoretical framework, the hypotheses, the econometric approach, and the instrumental variables. Section four presents the data and descriptive statistics. The fifth section explores how information asymmetry affects interest rate spreads, and section six concludes.

2. The Syndicated Loan Market

2.1 Background and Timeline



A syndicated loan is provided to a borrower jointly by a group of lenders. Typically, one bank is mandated by the borrower to originate and structure its financing request. After given the mandate, the mandated arranger conducts due diligence and prepares an information memorandum containing detailed information regarding the borrowing firm as well as important results of the due diligence. The mandated arranger negotiates the preliminary loan agreement with the borrower setting important non-price terms of the loan (such as loan amount, maturity, and facility types) and underwrites the full loan amount within a certain price range. In the second step, i.e. after given the mandate and setting the non-price terms, the mandated arranger approaches potential participating institutions. The information memorandum represents thereby the basis of selling loan shares to participants.² Based on this memorandum, the final loan spread and the structure of the syndicate are negotiated simultaneously. In our notation, the syndicate structure particularly corresponds to the loan share retained by the mandated arranger (but also to the loan shares syndicated to participants). Further, the mandated arranger acts as the informed agent within the lending syndicate on behalf of uninformed

² However, as highlighted in Dennis and Mullineaux (2000), disclaimers largely exculpate the mandated arranger from liability.

participants. That is, the mandated arranger performs ex-ante borrower due diligence and ex-post monitoring, on behalf of uninformed participants that rely on its information regarding the borrowing firm (Dennis and Mullineaux, 2000, Panyagometh and Roberts, 2002, and Lee and Mullineaux, 2004).

Further tasks of the mandated arranger involve coordinating the loan documentation, the loan closing and the loan repayment, and performing primarily enforcement responsibilities.³ As part of these services, the mandated arranger usually retains a larger share of the loan than any of the participants. In compensation for their services, mandated arrangers are paid upfront fees as a percentage of the size of the loan. Upfront fees are typically not disclosed to uninformed participants and directly negotiated between the borrower and the mandated arranger in a separate loan agreement (Ivashina, 2005). Syndicated loans are floating rate debt instruments which are priced with a spread above a reference rate, most frequently LIBOR. Generally, the loan spread is measured by the “All in Spread Drawn”, i.e. the annualized return shared by the members of the syndicate for their respective capital contributions.

While there are generally many lenders involved, all claims are governed by a single loan contract and the terms are identical for all lenders. Syndicated loans typically include restrictive covenants giving syndicate lenders considerable control over a borrower's action (Assender, Beatty, and Weber, 2005). Renegotiation of covenant violations usually requires a two-third majority of syndicate members. However, unanimity is needed for more drastic renegotiations of interest spread, repayment schedule, maturity or collateral. Potential renegotiations suggest that relationships are of particular importance in lending syndicates, which is also

³ In terms of an extensive description of the loan syndication process, the different roles within a syndicate and fees associated with particular duties refer to Esty (2001).

highlighted by Lee and Mullineaux (2004). Prior empirical evidence by Sufi (2006) shows that in addition to relationships among syndicate members, existing relationships between borrowers and participants are of particular importance. This is especially true when information asymmetries between borrowers and lenders are severe.

Concentration risk in a bank's loan portfolio is an important motive for the decision to engage in loan syndication.⁴ Additionally, mandated arrangers are experienced originators and underwriters of loan commitments, whereas participating banks have funding advantages.

After the syndication process, loan shares can be traded on the secondary loan market. However, it is important to note that first, the European syndicated loan market is small relative to total origination volumes and mainly trading distressed debt. Second, Ivashina (2005) points out that secondary market trading typically takes place among the smallest loan shares of participating institutions. Thus, we assume throughout this paper that mandated arrangers hold their loan shares until loan maturity. Furthermore, Felsenheimer, Gisdakis and Zaiser (2005) provide evidence that the CDS market is particularly illiquid for private debt financing. Notably, this should apply for the European syndicated loan market, as the majority of firms issuing syndicated loans are private (Bosch and Steffen, 2006).

2.2 Related Literature on Syndicated Loans

Pavel and Phillis (1987), Pennacchi (1988), Simons (1993), Gorton and Pennacchi (1995), Dennis and Mullineaux (2000) and Jones, Lang, and Nigro (2005) examine motives that influence banks to engage in loan syndications, including loan syndication

⁴ See, e.g., Simons (1993) and Dennis and Mullineaux (2000).

as a form of loan sale. Key results confirm that the mandated arranger's capital-asset ratio is positively correlated to its retained loan share suggesting that capital constraints provide an important incentive for banks to engage in loan syndications. Further, the need to achieve loan portfolio diversification in terms of sole lender credit risk exposure is shown to be a driving factor for loan sales.

Another strand of literature analyzes the determinants of syndicate structure, i.e. especially the loan share retained by the mandated arranger, but also the number of lenders as well as the proportional distribution of the loan among syndicate members. Lee and Mullineaux (2004) find evidence that information problems determine syndicate structure. In particular, for borrowers with high credit risk, smaller and more concentrated syndicates are formed. The authors argue that concentrated syndicates improve the prospects to restructure the loan in the event of financial distress. Furthermore, small syndicates minimize adverse selection problems and enhance incentives to monitor the borrower and the lead agent respectively. Sufi (2006) demonstrates that asymmetric information between lenders and borrowers affects the structure of financing arrangements in the syndicated loan market. Consistent with moral hazard in monitoring, the mandated arranger retains a larger loan share and composes a more concentrated syndicate, if borrowers have little or no reputation, because these firms require more intense due diligence and monitoring. On the other hand, borrowers with more reputation are able to obtain syndicated loans similar to public debt, where the mandated arranger retains a smaller share of the loan and forms a more diffuse syndicate. Further, Bosch and Steffen (2006) contribute to understand the drivers of European syndicated loan structures and further disentangle of what constitutes borrower transparency. Their main finding is that both credit ratings and

stock exchange listings increase borrower transparency. However, credit rating agencies are shown to perform a predominant role in reducing borrower information asymmetries.

This study complements prior research by investigating the economic effect of borrower information asymmetry on the interest spread charged to the firm. Closest to our own work are the papers by Ivashina (2005), Moerman (2005), and Bharath, Sunder and Sunder (2006). Bharath, Sunder and Sunder (2006) examine a sample of syndicated loans issued by stock exchange listed firms to analyze how accounting quality affects the loan spread and debt maturity. They measure accounting quality utilizing the magnitude of operating accruals and find evidence that firms with lower accounting quality exhibit higher cost of capital and lower loan maturities. However, as highlighted by prior literature, the authors are likely to capture the effect of credit risk on loan spreads, because the information contained in discretionary accruals has primarily been shown to measure the probability of financial distress (see, e.g., Janes, 2005). Our study differs in three important aspects. Firstly, we analyze loan spreads of both public and private firms, with a particular emphasis on private borrowers. Secondly, we employ measures of information asymmetry (such as analyst coverage and availability of third party credit rating agency certification) that are unlikely to proxy for credit risk. Thirdly, we filter out default risk, controlling for known measure of firm credit risk (such as leverage and interest coverage ratio). Moerman (2005) investigates the effect of information quality on the pricing and maturity of syndicated loans. She measures information quality using bid-ask spreads from previous syndicated loans traded on the secondary loan market to analyze its impact on new originated syndicated loans of the borrowing firm. Moerman finds that the bid-ask spread is positively related to the loan

spread and negatively related to the loan maturity. Furthermore, Moerman (2005) includes loan transaction data of both private and public firms in her sample, with detailed financial data only for stock exchange listed borrowers. Her analyses in the private firm segment completely omit borrower financial statement data such as leverage, interest coverage, and firm size (e.g. total assets, operating revenues). Therefore, her study provides only a thorough understanding of the impact of bid-ask spreads on the loan pricing of stock exchange listed firms. Furthermore, as pointed out by O'Hara (1997), Moerman's bid-ask spread not only proxies for adverse selection, but also for order processing and inventory. Thus, a bid-ask spread that includes all three main components is hard to interpret to be consistent with an information quality hypothesis. Ivashina (2005) analyzes the endogenous relationship between syndicate structure and loan spreads. She finds that informational frictions between mandated arrangers and participants affect the loan spread and accordingly, the loan share retained by the mandated arranger can help to mitigate these problems. In particular, Ivashina finds that a 10% decrease in the loan share kept by the mandated arranger increases the loan spread by about 50 basis points, thus implying a 34% change at her sample mean spread. Indeed, she notes that the economic significance of this effect appears to be very large. Ivashina suggests that her findings might be biased against an information asymmetry hypothesis, because her credit risk instruments might not adequately capture the actual loan portfolio credit risk of mandated arrangers. The reason is that Ivashina constructs credit risk proxies of mandated arrangers based on her *sample* syndicated loan data. That is, she implicitly assumes that the syndicated loans observed in her sample capture the actual loan portfolios of the respective mandated arrangers or at least an important fraction of the respective loan portfolios. In our view, it is doubtful

whether Dealscan data captures the actual loan portfolios of mandated arrangers. In particular, in our study, we construct mandated arranger credit risk proxies based on *actual* loan portfolio data and find that the impact of information asymmetry on interest spreads is of a much lower magnitude than reported by Ivashina: a 10% decrease in the loan share retained by the mandated arranger is found to increase *ceteris paribus* the required information premium of uninformed participants by about 28 basis points (17 percent higher than sample mean).

We add to prior literature on syndicated loans as follows. First, this paper is the first, to our knowledge, that focuses on how the amount of publicly available information associated with the borrowing firm affects the cost of private debt capital. Thus, this study is complementary to theoretical work on asset pricing, using measures that provide an overall evaluation of the amount of information available. As highlighted, prior empirical work primarily explores the effect of accounting quality using proxies that address primarily firm credit risk and different characteristics of the borrower's information structure respectively. Second, we thoroughly disentangle the effect of information asymmetry on loan spreads from the impact of firm credit risk, employing various controls of credit risk. In particular, we are the first to use various explicit financial controls of default risk, showing that information asymmetry is an important determinant in the largely neglected borrower segment of private firms. Third, this paper explores how previous borrower-lender relationships as well as mandated arranger reputation affect loan spreads among informational opaque firms. This analysis is new, addressing the fact that the syndicated loan market is one of repeated transactions, which might mitigate information asymmetries between borrowers and lenders, and therefore effect lower loan spreads. Fourth, we are the first

to explore the endogenous link between loan spreads and syndicate structure, using credit risk instruments based on *actual* bank loan portfolio data. This is important, as instruments constructed solely on a fraction of actual loan portfolios might bias the results in the direction of an information asymmetry hypothesis. Last but not least, we are the first to focus on the impact of information asymmetry on syndicated loan spreads in the European market, while prior research has mainly concentrated on the U.S.. Europe is structurally distinct from the U.S., as the majority of European firms issuing syndicated loans are private compared to less than 30 percent in the U.S.. Prior research primarily focused on stock exchange listed borrowers.

3. Theoretical Framework and Analytical Approach

3.1 Asymmetric Information as a Priced Source of Risk

Our analysis of how the amount of publicly available information associated with a borrowing firm affects its syndicated loan spreads is motivated by previous research on asset pricing. Barry and Brown (1984) show in the context of the Capital Asset Pricing Model (CAPM) that the amount of publicly available information affects the systematic risk of securities. In particular, the authors use the relative time period of listing in order to proxy for the quantity of firm information available. They control for systematic market risk and find that firms with less information available are perceived significantly riskier, and accordingly required higher market premiums. Indeed, the authors demonstrate that the amount of publicly available information is a non-diversifiable risk factor, and not controlling for it implies to underestimate the systematic risk of low information firms. Further, Easley, Hvidkjaer and O'Hara (2002), and Easley and O'Hara (2004) support the view that information asymmetry is a

systematic risk factor because, like market risk, it cannot be diversified away. The authors validate their argumentation in a Fama and French asset pricing model, demonstrating that the difference in expected market returns between low and high information securities that are otherwise identical (in terms of beta, size and book-to-market) is positive. Thus, investors demand a risk premium to hold stocks with higher information asymmetry. Features like analyst coverage are shown to reduce the cost of capital as the amount of information available increases.

The first hypothesis follows directly.

H1: The more informational opaque the borrower, the higher the loan spread, ceteris paribus.

The theoretical framework implies that informational opacity is a non-diversifiable risk factor, and thus lenders require compensation and charge higher loan spreads. However, given that the syndicated loan market is one of repeated transactions opaque borrowers that repeatedly accessed the market might mitigate information asymmetries, because they become more known and reputable with lenders. Thus, opaque firms that repeatedly accessed the market should exhibit *ceteris paribus* lower loan spreads.

H2: Informational opaque borrowers that repeatedly accessed the syndicated loan market exhibit ceteris paribus lower loan spreads.

Given that our theory implies that opaque borrowers are charged higher loan spreads the question arises whether borrower opacity might be offset by mandated arranger reputation, thus lowering the loan spread charged to the borrower.

H3: Informational opaque borrowers that interact with reputable mandated arrangers exhibit ceteris paribus lower loan spreads.

3.1.1 Measuring Asymmetric Information

We primarily employ two measures providing an overall evaluation of the amount of publicly available information associated with a borrowing firm: availability of a *stock exchange listing* and/or a *senior unsecured debt rating* by S&P or Moody's. These measures are in line with Bosch and Steffen (2006) who find that borrower transparency is significantly improved by third party certification via credit ratings and by analyst coverage via stock exchange listings. Apart from analyst coverage and publicly available filings, stock exchange listed firms in the UK are supervised by the Financial Services Authority (FSA), which is the equivalent of the SEC. It is important to note that the FSA not only requires enhanced disclosure requirements but also imposes more severe penalties for falsifying accounting information. Furthermore, members of major stock exchanges like the London Stock Exchange (LSE) have to comply with even more enhanced disclosure rules. On the other hand, firms with a senior unsecured debt rating have a qualified credit certification by an independent third party credit agency.

Based on these information measures, we refer to firms as *opaque*, if the borrower has neither a senior unsecured debt rating nor a stock exchange listing. Thus, information is most limited for opaque firms. On the other hand, *transparent* firms have both a debt rating and a stock exchange listing.

Furthermore, we use various alternative measures of information asymmetry known from the literature.⁵ In line with Faulkender and Petersen (2006), we construct borrower industry uniqueness proxies, calculated as the fraction of sample firms which operate in the same industry (according to SIC classifications) as the borrowing firm concerned. The higher this fraction, the more sample borrowers operate within the same industry.

⁵ We relay a detailed description of the variables used to Table 1.

Thus, this industry is more known by lenders, reducing borrower opaqueness. In addition, we use years since date of incorporation, because older firms are potentially better known by lenders. In line with the Principal-Agent theory of Jensen and Meckling (1976), we construct the cash flow to assets ratio. Finally, we follow Faulkender and Petersen (2006) and use whether a borrower is listed in a major index, assuming that this firm is more transparent, complying with enhanced disclosure rules and having wider analyst coverage. Similar to this intuition, we construct a proxy whether a firm has several stock exchange listings.

3.1.2 Regression Model Development

The general form of our regression models examining the link between borrower information asymmetry and syndicated loan spread (as measured by the All in Spread Drawn⁶) is:

$$\text{All in Spread Drawn} = f(\text{Information Variables}, \text{Control Variables})$$

The key right hand side variables are the proxies for the *amount of publicly available firm information* as explained above.

To rule out the possibility that the interest spread impact of borrower information asymmetry potentially includes the effects of both credit risk and informational opaqueness, we include several controls of default risk, such as leverage ratio, interest coverage ratio, as well as non-investment grade dummies. Furthermore, we control for firm size via operating revenue as well as mandated arranger reputation via total bank assets, and important contract characteristics (e.g., loan size, facility types, maturity).

⁶ The All in Spread Drawn (AISD) is the spread over LIBOR plus fees in basis points (bps). It reflects the annualized return shared by the members of the syndicate. In particular, the mandated arranger's upfront fee is not included in the AISD.

Additionally, each regression includes loan purpose dummies as well as firm industry and year dummies.

3.2 Informational Frictions within the Lending Syndicate as Priced Source of Risk

Informational frictions between mandated arrangers and participants and the resulting agency problems are an important characteristic specific to loan syndication. The mandated arranger acts as an informed agent who performs due diligence and monitoring about the borrowing firm on behalf of uninformed participant lenders. Participant lenders rely on the information and monitoring provided by the mandated arranger. As the information collected by the mandated arranger is unobservable to participants, there exist potential adverse selection and moral hazard problems. On the one hand, the lemons problem arises, because the mandated arranger might have incentives to sell only shares of bad loans to uninformed lenders, while maintaining valuable borrower-lender relationships. On the other hand, the mandated arranger's incentive to perform ex-post borrower monitoring over the lifetime of the loan decreases with the portion of the loan syndicated to participants (moral hazard problem). In particular, the mandated arranger mitigates these agency problems by retaining a large enough loan share that uninformed participants can be assured that the mandated arranger will behave diligently.

However, as outlined above, the final loan spread and the loan share retained by the mandated arranger are determined simultaneously in negotiations between the mandated arranger and potential participants after the setting of the non-price terms.

In order to estimate the orthogonal effect of the loan share retained by the mandated arranger on loan spreads, we employ a theoretical framework put forth by Ivashina

(2005). Empirical evidence indicates that there are two main considerations that drive the relationship between the loan share retained by the mandated arranger and the final loan spread: *information asymmetry* and *portfolio diversification*.

[Figure 1]

Figure 1 summarizes the theoretical framework. As uninformed participants are mainly concerned regarding the costs that could arise due to informational frictions within the syndicate, they require an additional information risk premium. We predict that this information premium required by participants should decrease in the loan share retained by the mandated arranger.

H4: The higher the loan share retained by the mandated arranger, the lower the required information premium of uninformed participants.

On the other hand, as the mandated arranger typically holds a larger share of the loan than any of the participants, its main concern is loan portfolio credit risk, thus requiring an additional diversification risk premium. We predict that increasing the loan share retained by the mandated arranger increases its required diversification risk premium.

H5: The higher the loan share retained by the mandated arranger, the higher the required diversification premium of the mandated arranger.

With these two considerations in mind, Figure 2 summarizes the simultaneous relationship between the two variables.

[Figure 2]

The loan share retained by the mandated arranger (i.e., syndicate structure) and the loan spread are determined by the intersection of the information premium and diversification premium curves. Thus, the loan spreads and syndicate structures observed in the data are sets of equilibrium points. Fitting a line to these points by OLS will estimate neither an information premium curve nor a diversification premium curve, because the points have been determined by changes in both information and diversification.

A way to circumvent this problem is to find instrumental variables that shift one curve but do not shift the other. For instance, in order to trace out the information premium curve (i.e., the required information premium of participants), we need instruments that exogenously shift the diversification curve (i.e., the required diversification premium of mandated arrangers), but do not affect the information premium curve. Now all of the equilibrium loan spread and loan share pairs lie on a stable information premium curve, and the slope of the information premium curve is easily estimated. This is exactly how two stage least squares regression (2SLS) solves the endogenous relationship between syndicate structure and loan spreads.

3.2.1 Two Stage Least Squares (2SLS) Regression Model Development

We use the IV regression method and implement our framework in the following two stage least squares (2SLS) model:

First-stage regression (reduced form) of 2SLS:

(1) *Mandated Arranger Share = f(Control Variables, Instruments Participants, Instruments Mandated Arranger)*

Second-stage regressions of 2SLS:

(2) *Information Premium Required by Participants = f(Mandated Arranger Share(fitted value), Control Variables, Instruments Participants⁷)*

(3) *Diversification Premium Required by Mandated Arranger = f(Mandated Arranger Share(fitted value), Control Variables, Instruments Mandated Arranger⁸)*

Equation (1) corresponds to the first-stage regression (reduced form) in two stage least squares. It relates the endogenous variable (Mandated Arranger Share) to the exogenous controls and the instruments. The result of this regression are the predicted values of the Mandated Arranger Share (fitted values), which are uncorrelated with the regression error term. Equations (2) and (3) model the required spreads of participants and mandated arrangers in 2SLS. Basically, 2SLS solves the simultaneous causality recursively, plugging in the predicted values of the Mandated Arranger shares from the first stage into the second stage regressions.

The key right hand side variable in our 2SLS model is the share retained by the mandated arranger. It shows the impact of syndicate structure on the required spread of participants (*information asymmetry effect*) and mandated arranger (*diversification effect*).

In particular, we control for borrower characteristics (i.e., firm size and default risk), mandated arranger reputation (i.e., total assets), and non-price contract characteristics, such as loan size, maturity, and facility types. Additionally, each regression includes loan purpose dummies as well as firm industry and year dummies.

A potential concern regarding our framework is that opaque firms might have higher loan spreads irrespective of the loan share retained by the mandated arranger,

⁷ Instruments participants highlights that the information premium of participants is being identified; identifying instruments have to be excluded from the regression equation that they identify.

⁸ See footnote 7, accordingly.

simply because of a higher syndication effort associated with these borrowers. However, the mandated arranger's upfront fee⁹, which constitutes its compensation for structuring the syndicate, is not included in the calculation of the All in Spread Drawn (AISD), which is the dependent variable in our framework. The AISD reflects the annualized return shared by the members of the syndicate (i.e., spread over LIBOR plus fees, in basis points). Thus, given the exclusion of the upfront fee, the effect of informational opaqueness on the AISD operates solely through its effect on the mandated arranger share, which is essentially the assumption of two stage least squares.

3.2.2 Instrumental Variables

We use instrumental variables to isolate that part of the mandated arranger share that is uncorrelated with the regression error term. Valid instrumental variables must satisfy *instrument relevance* and *instrument exogeneity*. Relevant instruments explain an important fraction of the variation in the mandated arranger share, whereas exogeneity ensures that this variation captured by the instrumental variable is exogenous.

Identification of the Information Premium Required by Participants

We identify the information based premium of the participants, constructing two loan portfolio diversification measures that exogenously affect the credit risk exposure of the mandated arranger's loan portfolio (i.e., the diversification curve) without affecting the information asymmetry within the lending syndicate (i.e., the pricing behavior of participants). Both measures are constructed using actual loan portfolio data of the mandated arranger at the end of the year prior to the syndication arrangement. We

⁹ The upfront fee of the mandated arranger is typically not disclosed to participant lenders.

obtain this data from Van DIJK's Bankscope database, which provides detailed financial information on over 25,000 banks around the world. Further, we construct the ratios on bank parent level.

The first measurement of mandated arranger loan portfolio credit risk corresponds to the Moody's asset quality ratio (Moody's, 2006). It is the ratio of problem loans to equity plus loan loss reserves. This asset quality ratio belongs to Moody's famous CAMEL approach to bank credit analysis. According to Moody's (2006) loan quality is considered a key component in determining the creditworthiness of banks, as loan portfolios are generally the largest component of a bank's balance sheet. Furthermore, Moody's (2006) points out that the credit risk profile of a bank can ultimately be seen in its asset quality statistics, and problem loans, although inevitably somewhat backward looking, have proven to be a good predictor of near-term loan losses. We expect mandated arranger's with higher levels of problem loans relative to the cushion of equity and reserves to require *ceteris paribus* larger diversification risk premiums. Alternatively, if we keep the loan spread constant, the mandated arranger would need to syndicate a larger loan share to participants.

In order to guarantee an adequate and overall measurement of the mandated arranger's loan portfolio credit risk, we construct a loan concentration measure as a second proxy. It is the ratio of the loan amount kept by the mandated arranger to its total loans outstanding prior to the date of loan origination.¹⁰ Simons (1993) finds empirical evidence that bank capital constraints and regulatory restrictions aimed to reduce sole lender exposure are key motives for mandated arrangers to syndicate loan shares to participants. In particular, Simons (1993) finds strong evidence that sole lender

¹⁰ We adjust the loan amount for revolver facilities by 50%, given that Araten and Jacobs (2001) find that the average borrowing firm uses only 57% of the funds available under a revolver line.

exposures are binding constraints for banks, underscoring the importance of lending limits. Furthermore, she points out that internal lending limits of banks are often up to 50 percent lower than the regulatory limit. We expect mandated arranger's with higher loan concentration ratios to require *ceteris paribus* larger diversification risk premiums. Alternatively, if we keep the diversification spread constant, the mandated arranger would need to syndicate a larger loan fraction to participants.

Our measures capture the credit risk of the actual loan portfolios of mandated arrangers. This is important, because credit risk measures constructed solely on a fraction of actual loan portfolios would bias the effect of information asymmetry on loan spreads against an information asymmetry hypothesis. However, our loan portfolio credit risk measures are in a way simplified, because we do not employ a Value at Risk (VAR) framework to measure the contribution in loan portfolio credit risk of the actual loan to be syndicated. That is, we assume that the credit risk of the outstanding loan portfolio prior to loan origination approximates for the required diversification risk premium of the mandated arranger for the actual loan share retained. In a way, we follow Jones, Lang and Nigro (2005) who use lagged bank equity capital ratios in order to avoid simultaneity problems between the loan share retained by the mandated arranger and bank capital levels.

Identification of the Diversification Premium of Mandated Arrangers

On the other hand, in order to identify the diversification premium required by mandated arrangers, we construct instruments that exogenously affect the level of within syndicate information asymmetries (i.e., the pricing behavior of participants) without having any direct effect on the mandated arranger loan portfolio credit risk.

In particular, we draw on evidence provided by Sufi (2006) who finds that when information asymmetries between borrowing firms and lenders are high (and thus within the syndicate agency problems are potentially severe), mandated arrangers primarily choose participants that know the firm from prior lending relationships. Further, prior relationships between syndicate members are found to mitigate informational problems within the syndicates. Thus, our first two measures proxy for previous relationships. More precisely, we construct two dummy variables showing 1, if the borrower had a prior lending relationship with at least one of the current syndicate participants or if the mandated arranger co-operated with some of the current participants in a previous syndicate. The third measure proxies for the informational opaqueness of the borrowing firm, measured by the fraction of sample borrowers with the same first two digit SIC code industry classification as the borrower concerned. Borrowers that have comparable firms operate in industries that are more known by lenders, thus decreasing potential agency problems within the lending syndicate. Overall, we predict that the lower the within syndicate information asymmetries as measured by our proxies, the lower *ceteris paribus* the information spread required by participants. Alternatively, keeping the information spread constant, the mandated arranger would be able to syndicate a large loan share to participants.

4. Data & Descriptive Statistics

4.1 Data

We create the universe of our sample by merging loan transaction data using Reuters/Loan Pricing Corporation (LPC) Dealscan database with borrowing firm financial statement data from UK's Companies House and with mandated arranger bank

financials from Van DIJK's Bankscope database. Dealscan is the primary database used to evaluate syndicated loans, containing detailed information on worldwide syndicated loan originations, i.e. contract terms, lender identities and roles within the syndicate, as well as borrower identity (i.e. name, region, country, and SIC industry classification).¹¹ However, apart from U.S. firms, Dealscan virtually provides no borrower financials. According to our analysis UK firms issuing syndicated loans have largely private legal status, pointing out a major structural difference compared to the U.S. In the U.S. more than 70% of all borrowers issuing syndicated loans are public, enabling researchers to use S&P's Compustat database to get an even richer set of financials regarding stock exchange listed U.S. firms (respective studies suppress an in-depth analysis of private and not stock exchange listed U.S. issuers). To gather a rich set of financial variables regarding both private and public sample borrowers, we match our loan data with data from UK's Companies House. Companies House is the national institution responsible for storing all company information provided under the UK's Companies Act. Information provided includes all companies' filings, industry affiliation, legal form as well as date of incorporation. We manually match the Dealscan sample borrowers with Companies House and require a matching on all of the following three criteria: name, industry affiliation given by SIC codes and region.¹² We use the financial data of the year prior to the loan transaction. Connecting our Dealscan sample with Companies House data allows borrower classification according to legal form, i.e. private vs. public. Furthermore, we employ Dun & Bradstreet's Hoovers database to obtain

¹¹ Carey, Post and Sharpe (1998) provide detailed information about LPC Dealscan database.

¹²We carefully account for changes in legal status, changes in name as well as merger and acquisition activities among our sample borrowers. Employed databases include Thomson Financial SDC Platinum, Mergermarket and Bloomberg Corporate action calendar.

information whether a public firm is stock exchange listed and on which stock exchanges it is listed.

Moreover, we also enrich our data with respect to detailed mandated arranger bank financials by merging our Dealscan loan data with bank financial statement data from Van DIJK's Bankscope database. Bankscope provides information on over 25,000 banks around the world including detailed accounts and ratings. We assign all sample banks to their respective parent institutions. Matching criteria are lender parent name and country. Further, we use the financial data of the year prior to the loan transaction.

For UK-based borrowers, Dealscan contains information on 5,063 syndicated loans issued between 1996 and 2005 involving 1,481 different firms.¹³ We drop loans that are "not fully confirmed" (112), loans to borrowers of regulated and financial industries (617), as well as loans with structural inconsistencies (10). Furthermore, for all observations included, we require the joint availability of borrowing-firm financials as well as mandated arranger-bank financials.

The matching process results in a final sample with detailed financial data for 1,277 syndicated loan transactions representing 361 different UK-based non-financial firms and 134 different mandated arranger parent banks from 1996 through 2005.

¹³ The basic unit of observation in Dealscan is a facility ("loan"). If firms enter into multiple facilities at the same time, different facilities are syndicated into one deal. As syndicate structure and size as well as contract terms (e.g., maturity, loan amount, spread) and facility types (e.g., term loan or revolver line) differ across facilities in one deal, we perform a facility level analysis. However, all basic results are robust to an analysis that only considers the largest and earliest facility.

4.2 Descriptive Statistics

Table 2 lists the top lead and participant banks for our sample of syndicated loan transactions from 1996 through 2005.

[Table 2]

Panel A presents the top 10 lead banks by market share, whereas Panel B the top 10 participants by total number of deals. According to this analysis, the U.K. syndicated loan market is much less concentrated compared to the U.S.: in the U.K., the biggest two lead banks have an aggregated market share of about 10%, whereas in the U.S. of about 47% (see, e.g., Sufi, 2006).

Table 3 provides cell means and standard errors, grouped by measures of information asymmetry. Descriptive statistics of borrower and mandated arranger characteristics are calculated at the firm/bank level, i.e. we compute averages across all loan facilities by a given firm/bank, whereas syndicated loan characteristics are calculated at the individual facility level. Table 1 provides a description of variables.

[Table 3]

We group borrowing firms according to availability of third party certification, i.e. senior unsecured debt ratings (by S&P and/or Moody's) and stock exchange listings (S.E.L.). Column 2 and 3 reveal that about 8% of sample firms have debt ratings and about 27% are stock exchange listed, respectively. *Opaque* in column 1 corresponds to firms with neither debt ratings nor stock exchange listings, whereas *transparent* in column 4 refers to borrowers with both a debt rating and a stock exchange listing. 54%

of sample loan facilities go to opaque and only 10% to transparent firms respectively. In line with our expectations, firm size (Total Assets, Operating Revenue, and EBITDA) of opaque borrowers is much smaller compared to rated, stock exchange listed and transparent firms. Additionally, opaque firms have higher leverage and interest coverage ratios compared to transparent firms. The interest coverage ratio of opaque borrowers is 24.72, whereas transparent firms have an average ratio of 2.63. In line with this observation, loan purpose highlights that 46% of opaque borrowers issue syndicated loans because of corporate control (LBO/MBO activities), whereas for transparent firms most issuances are due to capital structure purposes (44%). Grouping borrower industry sectors according to first digit SIC-Code reveals that manufacturing (2,3), transportation et al. (4) and services (7,8) are most represented.

Analyzing syndicated loan characteristics, we find that loans to transparent firms are on average larger, have shorter maturities and lower spreads. Opaque firms show an average loan size of USD 180 million and an average maturity almost twice as long as of transparent firms. Furthermore, opaque firms borrow at a spread of 205 bps, whereas transparent firms have to pay 108 bps above LIBOR on average.

Analyzing mandated arranger loan shares across our four information classes, we find the same pattern highlighted by prior literature (e.g., Sufi, 2006, Bosch and Steffen, 2006): the less transparent the borrower in terms of publicly available information, the higher the loan share retained by the mandated arranger.

Interestingly, mandated arrangers of opaque firms appear on average smaller in terms of bank asset size and riskier in terms of loan concentration and asset quality ratios.

[Table 4]

Table 4 splits our sample firms in the smallest (Panel A) and largest half (Panel B) according to firm size, i.e. operating revenues, in order to analyze whether the trends shown in table 2 are true among sub-samples based on firm size. This analysis shows that first, the more opaque the borrower, the higher the loan share retained by the mandated arranger. Second, the more opaque the borrower, the higher the loan spread charged (All in Spread Drawn). Thus, we conclude that firm size does not appear to drive the trends, which we also confirm in the multivariate analysis, controlling for firm size in every regression equation.

[Table 5]

Table 5 classifies loan transactions according to major loan facility types, i.e. term loan, institutional term loan, revolver, and 364 day facilities (see, e.g., Yago and McCarthy, 2004). A term loan (term loan A) is a bank loan for a specified amount with a specified repayment schedule and a fixed maturity. They differ from revolvers having longer maturities and being fully funded at origination, whereas revolvers give the borrower the option to draw down the funds of a revolving credit line. On the other hand, institutional term loans (term loan B, C, D, E ...) typically have longer maturities compared to term loans (term loan A). Furthermore, we distinguish 364 day facilities.

In line with our expectations, syndicate structure, i.e. the loan share retained by the mandated arranger, and loan spread, i.e. the All in Spread Drawn, generally show the same pattern across our four information classes.

5. Multivariate Analysis

5.1 Model Estimation

5.1.1 Asymmetric Information as a Priced Source of Risk

Table 6 presents the effect of publicly available borrower information on loan spreads. Panel A explores the full sample, whereas Panel B analyzes the public sub-sample.

[Table 6]

The top nine rows show that informational opaque borrowers face substantially higher interest spreads consistent with the theoretical asset pricing framework outlined above. Columns (1) and (2) (Panel A) present our main proxies of borrower transparency, and confirm that firms with debt ratings, stock exchange listings or both (transparent case), exhibit significantly lower loan spreads, because the amount of publicly available information associated with these firms is substantially higher, thereby lowering the information uncertainty risk of lenders. In particular, in regression (1) we omit transparent firms, in order to analyze the relative effect of senior unsecured debt ratings vs. stock exchange listings. We find that the availability of a debt rating decreases *ceteris paribus* the loan spread charged to the borrower by about 31 basis points (19 percent lower than sample median loan spread). On the other hand, analyst coverage via a stock exchange listing decreases *ceteris paribus* the interest spread by about 25 basis points (15 percent lower than median).

Columns (3) to (6) (Panel A) present alternative proxies of information asymmetry associated with a borrowing firm. The common finding is that informational

transparency significantly reduces the cost of capital, thus supporting our main proxies. Columns (1) and (2) of Panel B show alternative measures of information asymmetry in the public sub-sample. Given the fact that a borrowing firm's equity is trading in a major index, it is more transparent, lowering interest spreads. However, the observed relationship is only significant at the 10% level.

We control for firm size and borrower credit risk as well as for non-price contract terms. In particular, we find that high interest coverage ratios significantly lower loan spreads. Furthermore, loans rated BB or below show substantially higher interest spreads due to higher default risk. Mandated arranger reputation, as measured by total bank asset size, is found to decrease the loan spread charged to the borrowing firm, *ceteris paribus*.

The central result of table 6 is that we empirically confirm prior theoretical research on asset pricing. Borrower information asymmetry is a priced risk factor, i.e. loan spreads charged to the firm systematically reflect the amount of publicly available information associated with the borrower.

[Table 7]

Table 7 analyzes the effect of mandated arranger reputation (Panel A) and prior borrower-lead bank lending relationships (Panel B) on loan spreads. In line with the information asymmetry hypothesis (Table 6), opaque borrowers are charged significantly higher loan spreads (first row).

Column (2) of Panel A shows that the interest rate spread charged is significantly lower if reputable mandated arrangers structure the syndicate, which corresponds to the

finding that larger banks lower loan spreads, *ceteris paribus*. Column (3) of Panel A examines the interaction of informational opacity with mandated arranger reputation. The coefficient on the interaction term is negative implying lower loan spreads when reputable mandated arrangers syndicate the loans for opaque borrowers. However, the point estimate is not statistically distinct from 0 at a meaningful confidence level. Thus, we conclude that mandated arranger reputation does not lower the loan spread charged to opaque firms, because bank reputation is not able to offset borrower information asymmetries.

Column (1) of Panel B shows that the loan spread is substantially reduced when the borrower had a previous syndicated loan with at least one of the lead banks in the current syndicate.¹⁴ Column (2) examines the interaction of opacity and prior borrower-lead bank lending relationships, and finds a point estimate not statistically distinct from 0 at a meaningful level of confidence. Given that borrowers that repeatedly accessed the syndicated loan market show *ceteris paribus* lower loan spreads, column (3) explores the loan price effect of the time period since the last transaction between the borrower concerned and the same mandated arranger in the actual deal. Thus, we base regressions (3) and (4) in Panel B only on the sub-sample of borrowing firms that had a prior lending relationship with the mandated arranger of the current deal. Intuitively, we find that the longer the time period since the last transaction between the two parties, the higher the loan spread charged, *ceteris paribus*. However, column (4) points out that this effect is somewhat lower for opaque firms. Thus, we find evidence that opaque borrowers that repeatedly accessed the market exhibit lower loan spreads the smaller the time period since the last transaction with the same mandated arranger.

¹⁴ Lead banks support the mandated arranger in his management function and take on some administrative tasks in the loan syndicate.

5.1.2 Informational Frictions within the Lending Syndicate as Priced Source of Risk

[Table 8]

Table 8 explores the pricing of informational frictions within the lending syndicate, i.e. the effect of the loan share retained by the mandated arranger (syndicate structure) on the loan spread charged to the borrower. As outlined in section 3.2, we address the endogenous relationship between the two variables, using a two stage least squares framework. Panel A presents the first-stage regression relating the endogenous variable (mandated arranger share) to the exogenous controls and the instruments. Panel B presents the second-stage regressions, estimating the required information premium of participants and the required diversification premium of mandated arrangers, using the predicted values for the mandated arranger share from Panel A.

Analyzing the estimation of the first-stage regression reveals that all of our instruments are highly significant at the 1% level, thus explaining a large fraction of the variation in the mandated arranger share. Furthermore, all instruments have the predicted signs. The higher the loan concentration and the asset quality ratios, the higher the credit risk exposure of the mandated arranger's loan portfolio, and consequently the lower the loan share retained by the mandated arranger, *ceteris paribus*. On the other hand, prior lending relationships and industries that are more known by participant lenders decrease the level of information asymmetry within the syndicate, and thus increase the fraction of the loan syndicated to uninformed participants. Furthermore, the

F-test of joint significance reveals that identifying instruments are jointly significant.¹⁵ This confirms that we have strong instruments that produce valid results.

Column (1) of Panel B presents the coefficient estimates of the required information premium of participants due to informational frictions within the lending syndicate (*information asymmetry effect*). The negative coefficient on the loan share retained by the mandated arranger underscores the importance of informational frictions between participants and mandated arrangers in the syndicated loan market, and the substantial economic effect on the loan spread charged to the borrower. In particular, we find that a 10% decrease in the loan share retained by the mandated arranger increases *ceteris paribus* the required information premium of uninformed participants by about 28 basis points (17 percent higher than median).

In line with our expectations, we find that lower within the syndicate information asymmetries as measured by prior lending relationships and borrower industry uniqueness (*instruments mandated arranger*) decrease the required information premium of participants, *ceteris paribus*. Furthermore, the more reputable the mandated arranger in terms of bank asset size, the lower the required information premium of participants. Intuitively, financial covenants that give lenders considerable control over a borrower's ex-post action decrease the required information spread of participants as the information risk is reduced.

Column (2) of Panel B presents the coefficient estimates of the required diversification premium of mandated arrangers due to loan portfolio credit risk diversification concerns (*diversification effect*). In line with our expectations, the

¹⁵ The F-statistic tests the hypothesis that the coefficients on the instruments are all zero in the first-stage regression, thus, providing a measure of the information content contained in the instruments. The information content in the instruments is high, as the p-value for the F-statistic of joint significance is very small.

coefficient on the mandated arranger share is positive, underscoring the importance of credit risk exposure considerations. We find that a 10% increase in the loan share retained by the mandated arranger increases *ceteris paribus* its required diversification premium by about 21 basis points (13 percent higher than median).

Further, we find that higher asset quality and loan concentration ratios increase the required diversification risk premium of the mandated arranger, *ceteris paribus*. Interestingly, the coefficient estimate on mandated arranger bank size (“mandated arranger reputation”) is not statistically distinct from 0 at a meaningful confidence level. Obviously, bank size is primarily a proxy for mandated arranger reputation that mitigates within the syndicate information asymmetries, and thus lowers the required information premium of uninformed participants (column 1, Panel B). The intuition is that the larger the mandated arranger, the higher its reputation at risk. More reputable banks will carefully investigate and monitor the borrower, because these banks want to carry on transactions in the future. The same intuition applies for firm size (i.e., operating revenues) and financial covenants, comparing columns 1 and 2 of Panel B. The larger the borrowing firm, the more transparent and potentially known it is. Thus, the required information premium of participants is decreased. However, neither borrower firm size nor covenants have an effect on the required diversification premium of the *informed* mandated arranger.

Finally, Panel B presents two further measures to assess the quality of our instruments. First, we employ an Anderson canonical correlations LR statistic to test the relevance of the excluded instruments in the second stage regressions. We reject the null hypothesis implying that our model is identified and that the instruments are relevant. Second, we employ a Sargan J statistic to test for no correlation of the instruments with

the error term. The null hypothesis is that the excluded instruments are not correlated with the error term. The fact that we do not reject the null implies that we employ valid instruments.

5.2 Robustness Tests

In line with the empirical syndication process outlined in section 2.1, we implicitly assume in our multivariate analysis that all non-price loan contract terms are exogenous variables determined outside the model. However, a potential concern is that the mandated arranger negotiates some non-price terms with the borrower, anticipating the final setting of loan structure and loan spread. In order to address this potential simultaneous causality bias between loan spread and non-price terms, we completely exclude collateral, seniority, financial covenants and performance pricing from the regression models.¹⁶ However, using this “exclusion approach”, we get coefficient estimates that are qualitative similar to the results reported in this study. The robustness tests are available upon request.

6. Conclusion

In this paper, we empirically confirm theoretical research on asset pricing that limited information associated with a borrowing firm is a priced risk factor which is systematically reflected in loan spreads. Employing measures that provide an overall evaluation of the amount of borrower information available, we find that informational transparency affects the cost of private debt capital. In particular, borrower transparency is significantly improved by credit ratings and stock exchange listings, thereby lowering

¹⁶ The other non-price terms (loan amount, maturity, and facility types) are likely to be determined by the financing request of the borrowing firm.

interest spreads substantially (15 and 19 percent lower than median, respectively). Furthermore, we rule out the possibility that the impact of information asymmetry on loan spreads is driven by insufficient controls for default risk. Addressing the fact that the syndicated loan market is one of repeated transactions, we find that opaque borrowers that repeatedly accessed the market exhibit *ceteris paribus* lower loan spreads; however, bank reputation is not able to offset informational opaqueness of borrowing firms, and thus does not decrease loan spreads.

Further, we address the effect of informational frictions within the lending syndicate on loan spreads charged to the borrower. We address this issue, recognizing the simultaneous relationship between syndicate structure (i.e., the loan share retained by the mandated arranger) and loan spreads. We find that information asymmetries between mandated arrangers and participants have an important economic impact on the loan spread charged to the borrowing firm because of additional information premiums required by participants and additional diversification premiums required by mandated arrangers. In particular, we find that a 10% decrease in the loan share retained by the mandated arranger increases *ceteris paribus* the required information premium of participants by about 28 basis points (17 percent higher than median). On the other hand, a 10% decrease in the loan share retained by the mandated arranger reduces *ceteris paribus* its required diversification premium by about 21 basis points (13 percent lower than median).

Overall, this paper contributes to our understanding of the impact of information asymmetries on loan spreads in the syndicated loan market.

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Figure 1
The Relationship between Loan Spread and Mandated Arranger Share – Two Opposing Effects

Participants: Information Asymmetry Effect

Mandated Arranger: Diversification Effect

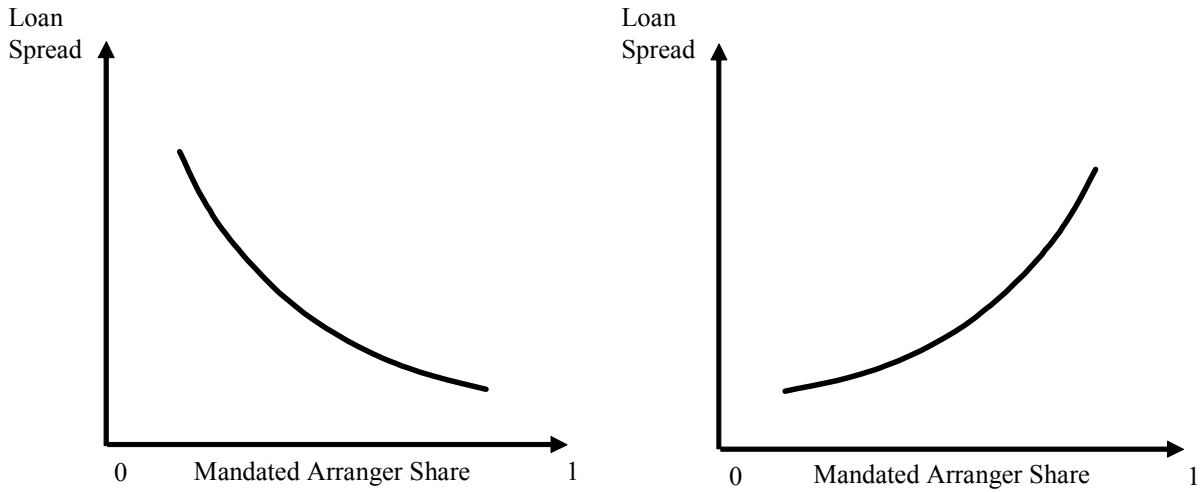


Figure 2
The Simultaneous Relationship between Loan Spread and Mandated Arranger Share

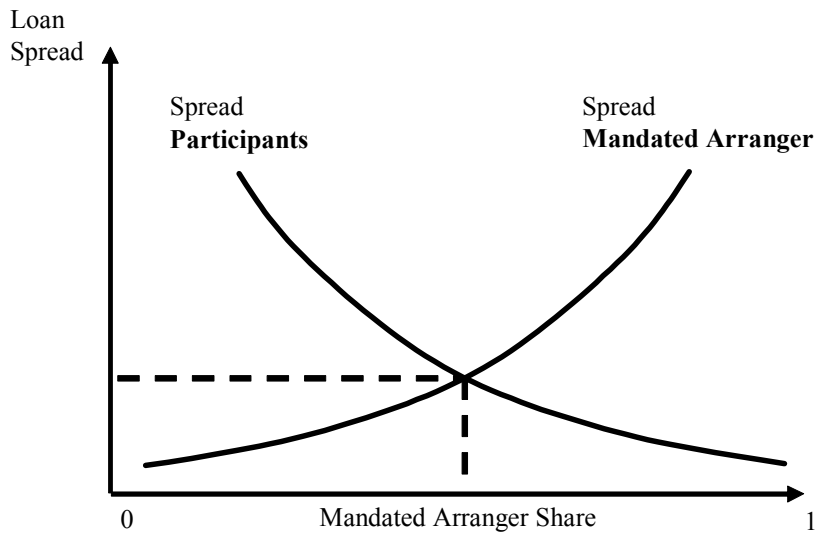


Table 1
Description of Variables

Variable	Descriptions
<i>1. Borrower Characteristics</i>	
Rated	Dummy variable equal to 1 if the borrower has a senior unsecured debt rating by S&P and/or Moody's.
Stock Exchange Listed (S.E.L.)	Dummy variable equal to 1 if the borrower's equity is listed on a stock exchange.
Opaque	Dummy variable equal to 1 if the borrower's equity is not listed on a stock exchange and if the borrower has no senior unsecured debt rating.
Transparent (Transp.)	Dummy variable equal to 1 if the borrower's equity is listed on a stock exchange and if the borrower has a senior unsecured debt rating.
Borrower Industry Uniqueness Fraction (first 2 digits of SIC-Code)	Natural logarithm of one plus the fraction of firms which operate in the same industry. => <i>Calculation:</i> 1) Count the number of firms where the first two digits of the SIC-Code are identical to those of the borrower concerned. 2) Exclude the borrower concerned. 3) Divide this number by the total number of borrowers in the sample.
Borrower Industry Uniqueness Fraction (first 3 digits of SIC-Code)	Natural logarithm of one plus the fraction of firms which operate in the same industry. => <i>Calculation:</i> 1) Count the number of firms where the first three digits of the SIC-Code are identical to those of the borrower concerned. 2) Exclude the borrower concerned. 3) Divide this number by the total number of borrowers in the sample.
Borrower Firm Age	Natural logarithm of one plus the number of years since the company has been incorporated at the end of the year prior to the syndication arrangement.
Cash Flow to Assets	Ratio of Cash Flows to Total Assets at the end of the year prior to the syndication arrangement. => <i>Calculation:</i> Cash Flow / Total Assets
Stock Exchange Listing in Major Index	Dummy variable equal to 1 if the borrower's equity is trading in a major index.
Several Stock Exchange Listings	Dummy variable equal to 1 if the borrower's equity is trading on more than 1 stock exchange.
Total Assets (in \$m)	Borrower's total assets at the end of the year prior to the syndication arrangement.
Ln(Operating Revenue)	Natural logarithm of the borrower's operating revenue / turnover at the end of the year prior to the syndication arrangement.
EBITDA (in \$m)	Borrower's earnings before interest, tax, depreciation and amortization at the end of the year prior to the syndication arrangement.
Tangibles to Assets	Ratio of Tangible Assets to Total Assets at the end of the year prior to the syndication arrangement. => <i>Calculation:</i> Tangible Assets / Total Assets
Intangibles to Assets	Ratio of Intangible Assets to Total Assets at the end of the year prior to the syndication arrangement. => <i>Calculation:</i> Intangible Assets / Total Assets
Leverage Ratio	Solvency stock measure that indicates whether the borrower is able to meet its obligations in the distant future. We use financial data at the end of the year prior to the syndication arrangement. => <i>Calculation:</i> Total Debt / Total Assets
High Leverage Ratio	Dummy variable equal to 1 if the borrower's leverage ratio is greater than 0.80.
Interest Coverage Ratio	Solvency flow measure. Measures how many times interest expenses are covered by earnings / cash flows; we use EBITDA as the closest cash flow proxy from the income statement. We use financial data at the end of the year prior to the syndication arrangement. => <i>Calculation:</i> EBITDA / Interest Expense
High Interest Coverage Ratio	Dummy variable equal to 1 if the borrower's interest coverage ratio is above the median of the sample.
ROCE (in %)	Return on common equity. It measures returns on the borrower's common shareholders. We use financial data at the end of the year prior to the syndication arrangement. => <i>Calculation:</i> (Net Income - Preferred Dividends) / Average Common Equity
Non-investment Grade	Dummy variable equal to 1 if the borrower's senior unsecured debt rating is BB or below using S&P where available and Moody's otherwise.
<i>2. Mandated Arranger / Lender Characteristics</i>	
Ln(Total Assets)	Natural logarithm of the mandated arranger's total assets at the end of the year prior to the syndication arrangement.
Equity to Total Assets (in %)	Capital adequacy measure. It measures the shareholders' equity against the total bank assets. We use financial data at the end of the year prior to the syndication arrangement. => <i>Calculation:</i> Shareholders' Equity / Total Assets
Top 10 Mandated Arranger Indicator	Dummy variable equal to 1 if the mandated arranger's market share in the year of the syndication arrangement belongs to the top 10 of sample mandated arrangers. Market share is constructed using origination volumes during the syndication year.
Opaque*Top 10	Interaction term equal to 1 if the borrower is opaque and if the mandated arranger is a top 10 sample mandated arranger according to market share.

Table 1
Description of Variables (continued)

Variable	Descriptions
<i>2. Mandated Arranger / Lender Characteristics (continued)</i>	
Prior Borrower/Lead Bank Relationship Indicator	Dummy variable equal to 1 if the borrower had a prior lending relationship with at least one of the lead banks in the current syndicate. Lead banks take on administrative tasks in the syndicate.
Opaque*Borrower/Lead Bank Relationship	Interaction term equal to 1 if the borrower is opaque and if the borrower had a prior lending relationship with at least one of the lead banks in the current syndicate.
Time Period since Last Transaction	Time period since last transaction between the borrower and the current mandated arranger in days.
Opaque*Last Contact	Interaction term equal to days since last transaction, if the borrower is opaque.
<i>3. Syndicated Loan Characteristics</i>	
All in Spread Drawn (in bps), AISD (in bps)	Spread over LIBOR plus fees in basis points (bps). Reflects the annualized return shared by members of the syndicate. The mandated arranger's upfront fee is not included in the AISD.
Mandated Arranger Share (%)	Loan share retained by the mandated arranger.
Ln(Facility Amount)	Natural logarithm of the facility amount (in US-Dollar).
Ln(Facility Amount to Total Assets)	Natural logarithm of one plus the ratio of the facility amount to the borrower's total assets at the end of the year prior to the syndication arrangement.
Ln(Maturity, in days)	Natural logarithm of the maturity in days.
High Maturity	Dummy variable equal to 1 if loan maturity is greater than 180 months.
Number of Facilities	Counts the number of facilities if the loan deal has more than one facility.
Term Loan Indicator	Dummy variable equal to 1 if the facility is a term loan.
Institutional Term Loan Indicator	Dummy variable equal to 1 if the facility is an institutional term loan (i.e. term loan B, C or D).
Revolver	Dummy variable equal to 1 if the facility is a revolver.
Revolver (greater than 1 year)	Dummy variable equal to 1 if the facility is a revolver with a duration of more than 1 year.
364 Day Facility	Dummy variable equal to 1 if the facility is a 364 day loan.
Collateral	Dummy variable equal to 1 if the loan is secured.
Performance Pricing	Dummy variable equal to 1 if the LIBOR-Spread is contingent on ex-post performance of the borrower.
Financial Covenants	Dummy variable equal to 1 if the loan has financial covenants.
Purpose: General Corporate	Dummy variable equal to 1 if the loan issuance purpose is "General Corporate".
Purpose: Corporate Control	Dummy variable equal to 1 if the loan issuance purpose is "Corporate Control".
Purpose: Capital Structure	Dummy variable equal to 1 if the loan issuance purpose is "Capital Structure".
Purpose: Project Finance	Dummy variable equal to 1 if the loan issuance purpose is "Project Finance".
Purpose: Other	Dummy variable equal to 1 if the loan issuance purpose is "Other".
<i>4. Instrumental Variables / Instruments</i>	
Loan Concentration: Facility Amount to Total Loans (z1)	Natural logarithm of one plus the ratio of the loan amount kept by the mandated arranger to its total loans outstanding at the end of the year prior to the syndication arrangement. => <i>Calculation:</i> Facility Amount Retained by Mandated Arranger / Total Loans
Asset Quality: Problem Loans to Equity plus Loan Loss Res. (z2)	Ratio of the problem loans (which include non-accrual loans and accruing loans that are past due 90 days or more) to shareholders' equity plus loan loss reserves. We use financial data of the mandated arranger at the end of the year prior to the syndication arrangement. => <i>Calculation:</i> Problem Loans / (Shareholders' Equity plus Loan Loss Reserves)
Repeated Transactions: Participants to Borrower (z3)	Dummy variable equal to 1 if the borrower had a prior lending relationship with at least one of the current participants
Repeated Transactions: Mandated Arranger to Participants (z4)	Dummy variable equal to 1 if the mandated arranger had previous lending relationship bonds with at least one of the current participants.
Borrower Opaqueness: Industry Uniqueness Fraction (z5)	Natural logarithm of one plus the fraction of firms which operate in the same industry. => <i>Calculation:</i> 1) Count the number of firms where the first two digits of the SIC-Code are identical to those of the borrower concerned. 2) Exclude the borrower concerned. 3) Divide this number by the total number of borrowers in the sample.

Table 2

Top Lead Banks and Participant Banks

Panel A presents the top 10 lead banks (by market share) and Panel B presents the top 10 participants (by total number of deals), for the sample of syndicated loan transactions from 1996 through 2005. We define lead banks as lenders with a management task in the syndicate; these “managing” lenders might also provide funds. Lead banks receive more prestigious league table titles as the importance of the management task increases (e.g., mandated arranger is more impressive than arranger). We define participant banks as lenders that solely provide capital; these lenders do not perform management tasks in the syndicate. Participant lenders receive more prestigious league table titles as the proportional share of capital provided increases (e.g., senior manager compared to manager). Market share figures for lead banks are computed giving each lead bank full credit for the total commitment amount of the transaction (i.e., “volume by full credit approach”).

Panel A: Top Lead Banks, by Market Share

Panel B: Top Participant Banks, by Number of Deals

	Market Share		# Deals
BZW [Barclays de Zoete Wedd]	4.86%	Royal Bank of Scotland Plc	264
Royal Bank of Scotland Plc	4.74%	Allied Irish Banks Plc [AIB]	185
Barclays Bank Plc	4.10%	Bank of Scotland	177
Lloyds TSB Bank Plc	3.24%	Commerzbank AG	165
ABN AMRO Bank NV	2.81%	Barclays Bank Plc	162
BNP Paribas SA	2.79%	Bayerische Landesbank GZ [BayernLB]	162
Chemical Bank	2.63%	Lloyds TSB Bank Plc	160
HSBC Banking Group	2.53%	ABN AMRO Bank NV	152
Deutsche Bank AG	2.47%	WestLB AG	152
Citigroup	2.41%	Danske Bank A/S	145

Table 3**Cell Means, by Measures of Information Asymmetry**

This table presents cell means and standard errors (SE), grouped by measures of information asymmetry, for the sample of 1,277 syndicated loan transactions with detailed financial data for 361 different UK-based firms and 134 parent banks from 1996 through 2005. Descriptive statistics of borrower and mandated arranger characteristics are calculated at the firm/bank level, and descriptive statistics for syndicated loan characteristics are calculated at the facility level. S.E.L. denotes "stock exchange listed".

Full Sample Analysis	Opaque (54.38%)		Rated (8.24%)		S.E.L. (27.06%)		Transparent (10.32%)	
	mean	SE	mean	SE	mean	SE	mean	SE
Borrower Characteristics								
Total Assets (in \$m)	1033	236	4606	1812	5447	2380	15223	4903
Operating Revenue (in \$m)	663	113	2875	932	6239	3341	7818	1200
EBITDA (in \$m)	67	8	517	228	590	250	1260	239
Borrower Firm Age	20.40	1.47	19.27	3.94	34.06	2.52	35.21	5.23
Leverage Ratio	0.46	0.02	0.47	0.05	0.26	0.01	0.39	0.03
Interest Coverage	24.72	6.97	21.57	11.27	8.97	1.72	2.63	0.46
Intangibles to Assets	0.09	0.01	0.12	0.03	0.14	0.01	0.20	0.03
ROCE (in %)	21.32	3.16	19.65	5.22	15.64	1.50	12.01	2.23
Industry Composition (SIC)								
Mining, construction, agriculture (0,1)	0.07		0.06		0.17		0.02	
Manufacturing (2,3)	0.25		0.31		0.27		0.42	
Transp., comm., gas & electricity (4)	0.23		0.44		0.13		0.20	
Trade (5)	0.13		0.13		0.20		0.22	
Industry Group "Real Estate" (6)	0.08		0.00		0.05		0.04	
Services (7,8)	0.22		0.06		0.18		0.11	
Utilities (9)	0.02		0.00		0.00		0.00	
Syndicated Loan Characteristics								
Facility Size (in \$m)	180	11	686	140	404	25	1352	149
Maturity (in days)	2515	52	2067	118	1530	37	1385	57
All in Spread Drawn (in bps)	205	5	193	14	111	6	108	10
Senior	0.91	0.01	0.94	0.02	0.99	0.00	1.00	0.00
Collateral	0.05	0.01	0.19	0.03	0.05	0.01	0.08	0.02
Financial Covenants	0.13	0.01	0.39	0.04	0.12	0.01	0.31	0.03
Performance Pricing	0.08	0.01	0.26	0.04	0.12	0.01	0.29	0.03
Mandated Arranger Share (in %)	33.04	1.75	22.61	4.77	19.73	1.86	10.65	2.15
Loan Purpose								
General Corporate Purpose	0.16		0.20		0.23		0.20	
Corporate Control	0.46		0.33		0.39		0.31	
Capital Structure	0.28		0.39		0.30		0.44	
Project Finance	0.07		0.07		0.01		0.02	
Other	0.04		0.02		0.06		0.03	
Mandated Arranger Characteristics								
Total Assets (in \$bn)	453	31	579	53	505	35	588	45
Equity to Total Assets (in %)	5.00	0.22	5.42	0.40	4.84	0.23	5.14	0.31
Loan Concentration (in %)	0.80	0.32	0.46	0.08	0.36	0.06	0.85	0.12
Asset Quality (in %)	25.61	2.41	19.61	3.36	25.01	2.42	23.98	3.48

Table 4**Cell Means, by Measures of Information Asymmetry, Among Small and Large Sample Firms**

This table presents cell means and standard errors (SE), grouped by measures of information asymmetry, for the sample of 1,277 syndicated loan transactions with detailed financial data for 361 different UK-based firms and 134 parent banks from 1996 through 2005. We split the sample in small 1/2 and large 1/2 firms, by operating revenue. Descriptive statistics of borrower and mandated arranger characteristics are calculated at the firm/bank level, and descriptive statistics for syndicated loan characteristics are calculated at the facility level. S.E.L. denotes “stock exchange listed”.

Panel A:	Opaque (75.08%)		Rated (5.45%)		S.E.L. (17.35%)		Transparent (2.11%)	
Small Sample	mean	SE	mean	SE	mean	SE	mean	SE
Borrower Characteristics								
Total Assets (in \$m)	345	44	702	299	575	132	1956	932
Operating Revenues (in \$m)	137	9	225	38	232	18	376	57
Leverage Ratio	0.51	0.02	0.43	0.10	0.29	0.02	0.34	0.10
Interest Coverage	31.20	9.94	41.49	33.09	6.77	1.01	0.95	2.19
ROCE (in %)	24.67	4.18	35.72	13.08	16.55	3.58	-0.95	8.56
Syndicated Loan Characteristics								
Facility Size (in \$m)	111	7	402	63	163	16	281	33
Maturity (in days)	2921	70	2648	347	1745	75	1602	175
All in Spread Drawn (in bps)	227	7	183	23	124	8	211	47
Senior	0.91	0.01	0.96	0.03	0.97	0.01	1.00	0.00
Collateral	0.04	0.01	0.22	0.06	0.04	0.02	0.00	0.00
Financial Covenants	0.14	0.01	0.39	0.07	0.13	0.03	0.05	0.05
Performance Pricing	0.06	0.01	0.25	0.06	0.10	0.02	0.00	0.00
Mandated Arranger Share (in %)	34.87	2.23	32.71	17.53	25.85	4.13	14.78	3.98
Mand. Arr. Characteristics								
Total Assets (in \$bn)	455	36	621	81	419	40	446	99
Loan Concentration (in %)	0.74	0.41	0.56	0.14	0.18	0.03	0.50	0.21
Asset Quality (in %)	24.22	2.41	16.30	4.65	23.35	2.98	30.55	8.88
<hr/>								
Panel B:	Opaque (36.11%)		Rated (10.70%)		S.E.L. (35.62%)		Transparent (17.57%)	
Large Sample	mean	SE	mean	SE	mean	SE	mean	SE
Borrower Characteristics								
Total Assets (in \$m)	2554	714	6408	2583	7839	3452	16306	5277
Operating Revenues (in \$m)	1964	346	4257	1337	9020	4854	8438	1260
Leverage Ratio	0.37	0.03	0.49	0.06	0.26	0.02	0.40	0.03
Interest Coverage	10.13	3.26	12.80	7.46	10.01	2.42	2.77	0.46
ROCE (in %)	14.22	3.91	10.81	2.36	15.02	0.99	13.22	2.25
Syndicated Loan Characteristics								
Facility Size (in \$m)	307	28	813	200	507	33	1466	163
Maturity (in days)	2274	69	1744	77	1453	41	1366	60
All in Spread Drawn (in bps)	189	9	179	18	107	8	98	9
Senior	0.91	0.01	0.94	0.02	0.99	0.00	1.00	0.00
Collateral	0.06	0.01	0.17	0.04	0.05	0.01	0.09	0.02
Financial Covenants	0.12	0.02	0.39	0.05	0.12	0.02	0.34	0.04
Performance Pricing	0.11	0.02	0.26	0.04	0.13	0.02	0.32	0.04
Mandated Arranger Share (in %)	31.41	2.65	21.21	4.93	17.86	2.05	10.65	2.15
Mand. Arr. Characteristics								
Total Assets (in \$bn)	497	39	612	61	535	37	612	46
Loan Concentration (in %)	0.51	0.13	0.40	0.07	0.41	0.07	0.90	0.13
Asset Quality (in %)	28.67	3.12	17.96	3.76	24.93	2.59	22.54	3.48

Table 5
Cell Means, by Measures of Information Asymmetry, According to Loan Facility Type

This table presents cell means and standard errors (SE), grouped by measures of information asymmetry. We classify loan transactions according to their major facility types i.e. term loan, institutional term loan, revolver, and 364 day. Borrower and mandated arranger characteristics are calculated at firm/bank level, and syndicated loan characteristics are calculated at the facility level. S.E.L. denotes “stock exchange listed”; AISD denotes “All in Spread Drawn”.

	Panel A: Term Loan								Panel B: Institutional Term Loan							
	Opaque (68.65%)		Rated (7.77%)		S.E.L. (17.75%)		Transp. (5.83%)		Opaque (80.57%)		Rated (9.00%)		S.E.L. (6.64%)		Transp. (3.79%)	
	mean	SE	mean	SE	mean	SE	mean	SE	mean	SE	mean	SE	mean	SE	mean	SE
Borrower Characteristics																
Total Assets (in \$m)	543	64	2235	592	9630	5513	15953	12057	379	59	1563	374	1108	291	2333	1111
Interest Coverage	31.90	10.52	24.97	20.52	13.96	4.04	1.34	1.14	74.14	26.20	41.59	35.21	2.88	1.43	1.55	1.62
ROCE (in %)	23.33	4.44	22.39	12.51	17.34	3.11	14.85	6.68	23.63	4.63	33.82	20.85	13.68	2.77	5.53	7.36
Syndicated Loan Characteristics																
Facility Size (in \$m)	154	10	506	120	384	74	840	219	86	12	259	46	118	21	285	82
Maturity (in days)	2921	75	2171	93	1763	70	1628	104	2909	41	2479	138	1993	217	2010	106
AISD (in bps)	256	6	212	21	133	13	190	24	260	11	315	28	205	22	229	36
Collateral	0.05	0.01	0.34	0.06	0.08	0.02	0.12	0.05	0.02	0.01	0.47	0.12	0.21	0.11	0.25	0.16
Financial Covenants	0.14	0.02	0.50	0.07	0.15	0.03	0.33	0.07	0.15	0.03	0.53	0.12	0.43	0.14	0.13	0.13
Performance Pricing	0.07	0.01	0.19	0.05	0.13	0.03	0.27	0.07	0.01	0.01	0.11	0.07	0.20	0.13	0.14	0.14
Mandated Arranger Share (in %)	32.77	2.41	32.98	11.92	27.70	4.59	12.77	4.05	34.43	5.92	68.37	31.63	31.60	10.77	13.67	0.00
Mand. Arr. Characteristics																
Total Assets (in \$bn)	465	38	672	81	488	44	649	65	607	75	858	77	780	70	746	76
	Panel C: Revolver Facility								Panel D: 364 Days Facility							
	Opaque (43.34%)		Rated (6.78%)		S.E.L. (36.43%)		Transp. (13.44%)		Opaque (23.08%)		Rated (11.19%)		S.E.L. (40.56%)		Transp. (25.17%)	
	mean	SE	mean	SE	mean	SE	mean	SE	mean	SE	mean	SE	mean	SE	mean	SE
Borrower Characteristics																
Total Assets (in \$m)	960	174	3403	858	2260	309	14067	5887	6389	3133	11861	7835	6906	3097	33773	13525
Interest Coverage	34.07	10.22	24.53	12.61	7.59	1.89	2.68	0.49	4.33	1.15	25.78	22.83	7.29	2.02	2.38	0.76
ROCE (in %)	24.73	4.28	17.47	5.47	14.99	1.78	11.67	2.44	17.10	5.86	16.64	5.36	14.57	1.35	9.64	3.51
Syndicated Loan Characteristics																
Facility Size (in \$m)	215	26	547	81	414	22	1160	127	430	93	2642	1213	401	72	2671	640
Maturity (in days)	1945	59	1972	64	1692	34	1742	59	360	0	360	0	360	0	360	0
AISD (in bps)	159	6	126	14	107	9	93	12	106	19	88	25	81	9	51	5
Collateral	0.05	0.01	0.13	0.05	0.04	0.01	0.09	0.03	0.06	0.04	0.13	0.09	0.05	0.03	0.03	0.03
Financial Covenants	0.12	0.02	0.33	0.06	0.12	0.02	0.30	0.04	0.12	0.06	0.25	0.11	0.16	0.05	0.33	0.08
Performance Pricing	0.10	0.02	0.30	0.06	0.12	0.02	0.30	0.05	0.15	0.06	0.56	0.13	0.13	0.05	0.33	0.08
Mandated Arranger Share (in %)	31.17	2.90	21.89	6.36	15.42	1.79	10.51	3.17	17.09	3.51	7.68	1.29	12.50	1.56	6.66	2.27
Mand. Arr. Characteristics																
Total Assets (in \$bn)	484	37	591	66	512	36	606	51	672	79	578	75	594	51	722	51

Table 6
The Effect of Borrower Information Asymmetry on Loan Spreads

Panel A presents coefficient estimates from full sample regressions relating the interest rate spread on drawn funds to borrower information asymmetry. The sample employed in Panel B includes only public firms. The dependent variable in both Panels A and B is the All in Spread Drawn; numbers in parentheses are p-values. The sample contains loan facilities originated between 1996 and 2005 to UK-based non-financial firms. Borrower's and mandated arranger's financial characteristics are computed as of the year prior to the loan transaction. Table 1 provides a detailed description of all variables used in the multivariate analysis. In addition to variables reported, each regression includes time, firm industry and loan purpose controls. We omit transparent firms in Panel A, regression (1).

Variables	Panel A: Full Sample Regressions						Panel B: Public Sample	
	<i>All in Spread Drawn</i>						<i>All in Spread Drawn</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)
Borrower Information Asymmetry:								
Rated	-30.856*** (0.005)							
Stock Exchange Listed (S.E.L.)	-24.798*** (0.009)							
Transparent		-26.819** (0.046)						
Borrower Industry Uniqueness Fraction (first 2 digits of SIC-Code)			-21.538*** (0.003)					
Borrower Industry Uniqueness Fraction (first 3 digits of SIC-Code)				-26.526*** (0.001)				
Borrower Firm Age (years since incorporation)					-4.347** (0.049)			
Cash Flow to Assets						24.685* (0.096)		
Stock Exchange Listing in Major Index							-16.600* (0.081)	
Several Stock Exchange Listings								-7.157 (0.526)
Borrower Characteristics:								
Ln(Operating Revenue)	-5.058** (0.049)	-5.413** (0.048)	-6.211** (0.017)	-5.475** (0.037)	-6.451** (0.014)	-6.993*** (0.009)	-10.527** (0.036)	-8.921** (0.050)
High Leverage Ratio	15.460 (0.134)	11.604 (0.336)	12.365 (0.304)	11.544 (0.337)	7.062 (0.572)	14.188 (0.274)	12.938 (0.571)	4.512 (0.842)
High Interest Coverage Ratio	-14.364** (0.049)	-15.080** (0.050)	-15.902** (0.042)	-18.138** (0.022)	-13.677* (0.091)	-17.378** (0.047)	-10.296 (0.345)	-13.197 (0.215)
Non-investment Grade	89.872*** (0.001)	90.351*** (0.000)	85.109*** (0.000)	82.214*** (0.000)	84.855*** (0.000)	82.892*** (0.000)	62.971*** (0.001)	89.359*** (0.000)
Contract Characteristics:								
Ln(Facility Amount to Total Assets)	10.935*** (0.005)	8.945** (0.020)	9.369** (0.014)	9.185** (0.016)	9.575** (0.013)	9.386** (0.025)	8.965* (0.098)	9.328* (0.097)
Number of Facilities	8.909*** (0.009)	9.413*** (0.000)	10.995*** (0.000)	11.529*** (0.000)	9.690*** (0.000)	10.186*** (0.000)	12.608*** (0.004)	10.493** (0.014)
Ln(Maturity, in days)	-0.196 (0.984)	-0.660 (0.939)	-1.554 (0.856)	1.130 (0.895)	-1.110 (0.897)	-0.372 (0.966)	3.185 (0.782)	-7.916 (0.481)
High Maturity	-21.239 (0.459)	-20.512 (0.519)	-11.833 (0.711)	-12.401 (0.697)	-26.249 (0.410)	-16.401 (0.630)	-4.105 (0.952)	9.102 (0.895)
Term Loan Indicator	-33.865** (0.041)	-33.330** (0.033)	-33.258** (0.033)	-34.665** (0.026)	-34.094** (0.029)	-33.003** (0.038)	-29.970* (0.098)	-29.358* (0.099)
Institutional Term Loan Indicator	61.476*** (0.000)	61.177*** (0.000)	60.619*** (0.000)	59.428*** (0.000)	61.795*** (0.000)	60.147*** (0.000)	17.385 (0.577)	15.104 (0.670)
Revolver	-32.042** (0.048)	-36.112** (0.019)	-36.272** (0.018)	-38.047** (0.013)	-37.072** (0.016)	-36.869** (0.019)	-37.866* (0.099)	-23.271 (0.356)
364 Day Facility	-49.977** (0.029)	-49.226** (0.022)	-48.218** (0.025)	-46.687** (0.030)	-52.096** (0.016)	-50.333** (0.022)	-43.940* (0.090)	-42.896* (0.097)
Collateral	43.454*** (0.009)	47.628*** (0.001)	49.978*** (0.001)	49.590*** (0.001)	50.394*** (0.001)	58.344*** (0.000)	112.195*** (0.000)	132.692*** (0.000)
Senior Facility	-158.112*** (0.000)	-157.098*** (0.000)	-155.893*** (0.000)	-153.972*** (0.000)	-157.248*** (0.000)	-155.206*** (0.000)	-175.293*** (0.010)	-158.429*** (0.005)
Performance Pricing	-28.528*** (0.009)	-28.490*** (0.005)	-27.099*** (0.009)	-26.084** (0.010)	-31.724*** (0.002)	-29.235*** (0.006)	-28.864** (0.048)	-29.872** (0.015)
Financial Covenants	7.564 (0.495)	6.467 (0.504)	6.417 (0.505)	5.404 (0.574)	6.493 (0.501)	2.478 (0.802)	5.698 (0.667)	9.010 (0.492)
Mandated Arranger Characteristics:								
Ln(Total Assets)	-18.013*** (0.004)	-19.956*** (0.002)	-21.311*** (0.001)	-21.527*** (0.001)	-20.675*** (0.001)	-22.080*** (0.001)	-25.435** (0.025)	-26.073** (0.014)
Observations	1145	1277	1277	1277	1277	1277	345	345
Adjusted R-squared	0.379	0.391	0.395	0.396	0.394	0.391	0.336	0.325

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7**The Effect of Mandated Arranger Reputation and Prior Borrower-Lead Bank Lending Relationships on Loan Spreads**

Panel A presents coefficient estimates from regressions relating interest rate spreads on drawn funds to borrower information asymmetry and mandated arranger reputation. Panel B relates interest rate spreads on drawn funds to borrower information asymmetry and prior borrower-lead bank lending relationships. An "opaque" borrower is a firm with neither a stock exchange listing nor a senior unsecured debt rating. The dependent variable in both Panels A and B is the All in Drawn Spread; numbers in parentheses are p-values. The sample contains loan facilities originated between 1996 and 2005 to UK-based non-financial firms. Borrower's and mandated arranger's financial characteristics are computed as of the year prior to the loan transaction. Table 1 provides a detailed description of all the variables used in the multivariate analysis. In addition to variables reported, each regression includes time, firm industry and loan purpose controls. Regressions (3) and (4) of Panel B are based on the sub-sample of firms that had a prior lending relationship with the mandated arranger of the current deal.

Variables	Panel A: Mandated Arranger Reputation			Panel B: Prior Borrower-Lead Bank Lending Relationship			
	<i>All in Spread Drawn</i>			<i>All in Spread Drawn</i>			
	(1)	(2)	(3)	(1)	(2)	(3)	(4)
Borrower Information Asymmetry:							
Opaque	37.629*** (0.002)	39.307*** (0.001)	50.848*** (0.001)	34.664*** (0.004)	37.310* (0.099)	34.769*** (0.003)	41.254*** (0.001)
Mandated Arranger Reputation:							
Top 10 Mandated Arranger Indicator (Market Share)		-14.086** (0.047)	6.694 (0.731)				
Opaque*Top 10			-22.851 (0.274)				
Borrower/Lead Bank Relationship:							
Prior Borrower/Lead Bank Relationship Indicator				-17.856** (0.040)	-45.773** (0.019)		
Opaque*Borrower/Lead Bank Relationship					34.391 (0.109)		
Time Period since Last Transaction (Borrower/Mandated Arranger (in days))						0.030*** (0.003)	0.095*** (0.005)
Opaque*Last Contact							-0.071** (0.044)
Borrower Characteristics:							
Ln(Operating Revenue)	-5.204** (0.047)	-5.018** (0.050)	-4.854* (0.065)	-4.207* (0.098)	-4.374* (0.082)	-5.941** (0.019)	-5.701** (0.025)
High Interest Coverage Ratio	-19.336** (0.011)	-20.385*** (0.007)	-20.207*** (0.008)	-20.231*** (0.008)	-20.895*** (0.006)	-16.395** (0.031)	-16.322** (0.032)
Non-investment Grade	102.509*** (0.000)	100.818*** (0.000)	102.676*** (0.000)	103.110*** (0.000)	101.755*** (0.000)	104.695*** (0.000)	103.301*** (0.000)
Contract Characteristics:							
Ln(Facility Amount to Total Assets)	3.585 (0.297)	3.667 (0.286)	3.724 (0.278)	4.031 (0.241)	4.058 (0.238)	3.105 (0.365)	3.131 (0.361)
Term Loan Indicator	-23.842* (0.098)	-24.422* (0.100)	-24.766* (0.096)	-23.930* (0.099)	-23.575 (0.108)	-23.434 (0.113)	-22.587 (0.117)
Institutional Term Loan Indicator	69.594*** (0.000)	69.898*** (0.000)	70.027*** (0.000)	68.244*** (0.000)	68.562*** (0.000)	68.094*** (0.000)	68.670*** (0.000)
Revolver	-31.911** (0.029)	-32.950** (0.024)	-33.400** (0.022)	-30.713** (0.035)	-30.349** (0.037)	-33.108** (0.023)	-32.819** (0.024)
364 Day Facility	-50.621*** (0.007)	-51.463*** (0.006)	-51.210*** (0.006)	-49.299*** (0.008)	-49.569*** (0.008)	-49.626*** (0.008)	-48.487*** (0.009)
Collateral	44.596*** (0.002)	42.732*** (0.003)	42.134*** (0.004)	42.741*** (0.003)	41.813*** (0.004)	44.553*** (0.002)	41.923*** (0.004)
Senior Facility	-167.220*** (0.000)	-167.297*** (0.000)	-167.257*** (0.000)	-165.858*** (0.000)	-166.326*** (0.000)	-167.236*** (0.000)	-167.786*** (0.000)
Performance Pricing	-30.374*** (0.002)	-29.548*** (0.003)	-29.164*** (0.004)	-28.555*** (0.004)	-28.093*** (0.005)	-30.151*** (0.003)	-29.945*** (0.003)
Observations	1277	1277	1277	1277	1277	167	167
Adjusted R-squared	0.360	0.361	0.361	0.362	0.363	0.365	0.366

* significant at 10%; ** significant at 5%; *** significant at 1%; p values in parentheses

Table 8**The Pricing of Informational Frictions within the Lending Syndicate - the Effect of Syndicate Structure on Loan Spreads**

This table presents a two stage least squares (2SLS) regression in order to address the endogenous link between loan spread and syndicate structure. Panel A presents the first-stage regression relating the Mandated Arranger Share (endogenous variable) to the exogenous controls and the instruments. Panel B presents coefficient estimates from the second-stage regressions using predicted values for the Mandated Arranger Share from Panel A. The dependent variable is the All in Spread Drawn (AISD) which includes the spread over LIBOR plus fees (in bps, annualized). We identify the information premium of uninformed participants (**information asymmetry effect**) using Loan Concentration and Asset Quality measurements that exogenously affect the credit risk exposure of the mandated arranger's loan portfolio without affecting within the lending syndicate information asymmetry. We identify the diversification premium of the mandated arranger (**diversification effect**) using Repeated Transactions as well as Borrower Opaqueness measurements that exogenously affect within the lending syndicate information asymmetry without affecting the mandated arranger's loan portfolio credit risk. Numbers in parentheses are p-values. Borrower's and mandated arranger's financial characteristics are computed as of the year prior to the loan transaction. Table 1 provides a detailed description of all variables used in the multivariate analysis. The sample contains loan facilities originated between 1996 and 2005 to UK-based non-financial firms. Each regression includes time, firm industry and loan purpose controls (not reported).

Variables	Panel A: First Stage Regression		Panel B: Second Stage Regression	
	Mandated Arranger Share	Spread Participants	Spread Participants	Spread Mandated Arranger
	<i>Instrument Validity</i>	<i>Information Asymmetry Effect</i>	<i>Information Asymmetry Effect</i>	<i>Diversification Effect</i>
Syndicate Structure:				
Mandated Arranger Share (%)		-2.798*** (0.009)		2.148** (0.015)
Borrower Characteristics:				
Ln(Operating Revenue)	-2.159** (0.021)	-13.124*** (0.010)		-4.801 (0.390)
Tangibles to Assets	7.156* (0.077)	-36.601** (0.047)		-62.114*** (0.001)
High Leverage Ratio	-3.411 (0.409)	54.435*** (0.005)		70.001*** (0.001)
Non-investment Grade	8.512* (0.096)	136.689*** (0.000)		100.497*** (0.000)
Contract Characteristics:				
Ln(Facility Amount)	10.380** (0.031)	-11.869** (0.031)		-49.145** (0.048)
Number of Facilities	2.498*** (0.008)	13.841*** (0.004)		3.389 (0.419)
Ln(Maturity, in days)	-5.811*** (0.010)	-41.798*** (0.000)		-16.030 (0.191)
Term Loan Indicator	3.899 (0.306)	68.834*** (0.000)		60.001*** (0.009)
Revolver (greater than 1 year)	2.879 (0.399)	52.899*** (0.001)		40.819** (0.021)
Collateral	-0.421 (0.879)	39.001*** (0.010)		42.901*** (0.010)
Senior Facility	-6.429 (0.301)	-145.008*** (0.000)		-120.909*** (0.000)
Financial Covenants	-0.683 (0.819)	-23.815** (0.048)		-17.108 (0.166)
Mandated Arranger Characteristics:				
Ln(Total Assets)	-19.678*** (0.000)	-61.847*** (0.000)		17.801 (0.551)
Instruments (Participants):				
Loan Concentration: Facility Amount to Total Loans (z1)	-13.929*** (0.001)			56.806** (0.021)
Asset Quality: Problem Loans to Equity plus Loan Loss Res. (z2)	-29.270*** (0.000)			141.009*** (0.009)
Instruments (Mandated Arranger):				
Repeated Transactions: Participants to Borrower (z3)	-6.317*** (0.010)	-28.074** (0.050)		
Repeated Transactions: Mandated Arranger to Participants (z4)	-18.528*** (0.006)	-91.081** (0.019)		
Borrower Opaqueness: Industry Uniqueness Fraction (z5)	-2.293*** (0.000)	-9.988*** (0.009)		
F-test: (z1 = z2 = z3 = z4 = z5 = 0), Prob > F				
	0.000			
F-test: (z1 = z2 = 0), Prob > F				
	0.000			
F-test: (z3 = z4 = z5 = 0), Prob > F				
	0.000			
Identification/IV relevance test:				
Anderson canon. corr. LR statistic		20.879		29.473
p-value		0.000		0.000
Overidentification test:				
Sargan J statistic		0.149		0.092
p-value		0.7943		0.9583
Observations	299	299		299
Adjusted R-squared	0.596	0.531		0.447

* significant at 10%; ** significant at 5%; *** significant at 1%