Institutional Investment in Syndicated Loans

Abstract

A recent development in the syndicated loan market has been the arrival of institutional investors, including hedge funds and private equity funds as lenders. This paper presents the first empirical analysis of institutional loans in the literature. We show that institutional loans have loan spreads that are 9 to 13 percent higher than bank loans, *ceteris paribus*. The higher riskiness of institutional loans however, does not fully explain this additional spread. This result is robust after controlling for potential selection and endogeneity bias. Following information based theories we argue that this higher spread on institutional loans primarily serve as compensation to institutional lenders for engaging in costly information production about borrowers, since such institutional investors are new entrants to the syndicated loan market and thus less informed relative to banks. However, we also show that the loan spread differential between institutional and bank loans diminishes gradually over time, a phenomenon that is attributable to the decreasing costs of information production or reduced informational disadvantage of institutional lenders as they repeatedly participate in this market over time. Finally, we provide evidence that borrowers are willing to pay a higher spread and borrow from institutional lenders as they are the lenders of last resort for these firms.

Institutional Investment in Syndicated Loans

1 Introduction

The past decade has seen significant changes in the structure of the syndicated loan market, which has grown to about $1.7 trillion in 2006, in the United States alone. One of the most important changes during this time, has been the entry of institutional investors in the syndicated loan market. In this paper, we provide a demand side analysis and address their impact on borrowers in the loan market. Institutional investors, such as hedge funds and private equity funds, started entering the syndicated loan market shortly after the introduction of loan ratings by Moody's and S&P in 1995.[1] During the same time period, the development of the secondary loan sales market resulted in additional liquidity of syndicated loans which also attracted a growing number of institutional investors to enter this market.[2] This, in turn, further fueled the increasing liquidity of the secondary loan market.[3] We find that the volume of institutional loan origination shifted from being negligible in the early 1990s to being a considerable portion of the syndicated leveraged loan market by 2006.[4]

The theoretical literature (Parlour and Winton, 2009), has argued that loan sales lower a borrower's cost of capital due to valuable risk-sharing benefits from the sale of loans to other investors in the secondary loan market. Consistent with this positive impact on the borrower, Gande and Saunders (2009) shows that when a borrower's existing loans trade for the first time in the secondary market, it elicits a positive announcement effect on the borrower's stock price. Their evidence also suggests that this benefit appears

[1] Sufi (2009) mentions that since such ratings provided value-added information to potential non-bank syndicate participants (who typically do not have large in-house credit staff) at the time of loan origination, it facilitated the entry of institutional investors in loan origination, once considered the bastion of commercial banks.

[2] An article in the October 2005 issue of the *Business Week*, *"Hedges: The New Corporate ATMs,"* reports that hedge funds and other institutional investors were increasingly participating in the primary syndicated loan market as banks were increasingly avoiding smaller and riskier deals. Institutional investors are willing to cut deals quickly, without the red tape big banks require to meet regulator's demands. Additionally, big banks such as Bank of America has slashed its corporate loan portfolio from $110 billion in 2000 to $34 billion in 2004. Due to this trend, as of 2005, almost 50% of the market for riskier loans (also known as the leveraged loan market) was funded by institutional investors. Recent entrants to the primary syndicated loan market include hedge funds, such as, BayStar Capital, Carlson Capital, hybrid private equity funds such as Black Diamond, Eton Park, TPG-Axon fund, and buyout firms like the Carlyle Group. Prominent firms that have sourced loans from such institutional lenders include U-Haul's parent firm AMERCO, Krispy Kreme, Aloha Airlines, and Salton Inc., makers of the George Foreman grills.

[3] Cebenoyan and Strahan (2004), Gande and Saunders (2009), Drucker and Puri (2009), and Kamstra, Roberts and Shao (2009) analyze issues related to loan sales and the secondary loan market, which we discuss in detail later.

[4] As defined by LPC, the syndicated loan market comprises of the "investment grade" loan market, the "leveraged" loan market, and the "other" market. Nearly all institutional loans fall in the leveraged loan market segment. LPC classifies institutional loans as one of the key loan market segments and provides periodic analytical statistics for this segment.

to be much larger for distressed borrowers, who are *ex ante* likely to be the most financially constrained.[5] In addition, Drucker and Puri (2009) show empirically that only loans that are subject to a lower moral hazard actually trade on the secondary market. Despite the benefits that accrue to borrowers due to the existence of a liquid secondary loan market, primarily made possible by the participation of institutional investors, the growing importance of institutional loans over the last decade and the economic implications of the development of this market are not well understood.

It is also worth noting that although the syndicated loan market provides liquidity to large firms (Gatev and Strahan, 2006), the entry of institutional investors as loan originators, has not significantly affected liquidity provisions in this market. As Gatev and Strahan (2009) shows, commercial banks still dominate non-banks in lending on lines of credit and thus serve as primary liquidity providers. In contrast, institutional lenders are primarily involved in term lending which is not as liquid as revolving lines of credit. Thus, a question arises as to why borrowers may source loans from non-regulated institutional investors rather than banks. This paper aims to fill these gaps in the literature. In this paper, we analyze the net benefit to borrowers due to the entry of institutional investors in the syndicated loan market. Specifically, we analyze the impact of institutional participation on loan spreads and why borrowers choose to borrow from them. In addition, this paper is also motivated by the recent debate on the causes of the 2007-2008 financial crisis. Some recent papers attribute institutional investors' search for high-yield assets as one of the possible causes that led to the crisis.[6] Although our analyses do not directly contribute to the debate on the causes of the crisis, understanding the origins and growth of the institutional loan origination market before the crisis is particularly important, as it has important implications for the underlying reasons behind the vast failure of institutional debt investments during the crisis.

Institutional loan is formally defined by the LPC as a loan that is designed to be sold to institutional investors. Firms approach institutional lenders when they choose to issue such loans. Two questions which naturally arise about this relatively new loan type are: what is the impact of institutional loan issue on borrowers in terms of borrowing cost? and why certain firms approach institutional lenders while others rely on bank lenders? Regarding the first question, we analyze two possible implications of institutional loan origination. First, commercial banks often have an ongoing relationship with their clients (i.e., relationship banking, see, e.g., Bharath, Dahiya, Saunders, and Srinavasan, 2007) and hold private

[5] Nigro and Santos (2007) document another positive impact on borrowers and show that borrowers with liquid trading loans in the secondary market are able to source subsequent loans at a discount.

[6] See Kashyap, Rajan, and Stein (2009).

information about borrowers. In contrast, institutional investors, as new entrants to the loan market, do not have such existing relationships and are thus relatively less informed compared to commercial banks. Therefore, to compensate the less informed institutional investors to engage in costly information production, institutional loans should have higher spreads than bank loans *ceteris paribus* (the "asymmetric information hypothesis"). Further, as institutional lenders develop relationships in the loan market over time, we should observe a decline in the loan spread differential between institutional and bank loans. Second, unlike commercial banks and due to the absence of any regulation governing institutional lenders, they tend to fund riskier loans (borrowers) in pursuit of high-yield investments. Thus, loan and firm risk factors may simply justify a higher spread on institutional loans (the "selection effect hypothesis"). In summary, the former hypothesis predicts a positive correlation between loan spreads and institutional loan issues, *ceteris paribus*, while the latter predicts a zero correlation between loan spreads and institutional loan issues after the self-selection effects are properly controlled for. The focus of our empirical analysis is to assess the relative importance of these two hypotheses.

To answer the second question, we analyze the pre- and post-issue changes in the expected default probability of borrowers to analyze the underlying reasons for institutional loan issuance. Our analysis shows that institutional lenders are likely to be lenders of last resort. This is because, institutional lenders after producing information about the borrowers at the time of loan origination, are able to correctly price the ex-post deterioration in borrower quality. Moreover, borrowers that approach institutional lenders are willing to pay this higher spread than comparable bank borrowers, at loan origination. This therefore suggests that at the time of loan origination, further bank financing is unavailable for institutional loan borrowers.

Drawing on new loan issues data from Dealscan for the period 1995-2006, we document a tremendous increase in the volume of institutional loan issuance which coincides with the expansion of the leveraged loan market during this period. We find that the overwhelming majority of institutional loans are leveraged loans with the proportion increasing over the years. The unconditional analysis reveals that institutional loans are associated with a longer average term, a riskier loan purpose (such as leveraged buyout and takeover) and a larger lending syndicate, compared to bank loans. Besides, they are more likely to be secured, leveraged term loans, or second lien term loans, with stricter financial covenants, and are more frequently resold on the secondary loan market relative to bank loans. In addition, an average institutional loan borrower has a lower market to book ratio, a higher leverage ratio, and a higher default probability

than an average bank loan borrower. Overall, these results indicate that institutional loans tend to be riskier loans made out to riskier borrowers. Our further investigation into the differences in loan yield spreads between institutional and bank loans verifies that, unconditionally, institutional loans have higher average spread than bank loans. Moreover, this result holds true for the leveraged loan subsample and for the within-the-deal subsample in which bank and institutional loans are bundled in the same loan package and issued to the same firm. Thus, in this last subsample, despite sharing the same underlying fundamentals, institutional loans issued to the same borrower have a higher average spread than bank loans.

In our multivariate analysis we first show that institutional loans are associated with higher loan yield spreads of 9 to 13 percent after controlling for firm-level risk factors using firm fixed effects regressions. This relationship remains robust in the deal fixed effects regressions, and is therefore not driven by unobserved deal-specific heterogeneity. In addition, our analysis on the dynamic change of the spreads on institutional loans reveals that the difference in spreads between institutional and bank loans was larger in the earlier years when institutional loans first came into existence, but has gradually dwindled downwards over the later years. Second, to rule out the selection effect of institutional loans, we resort to a two-step treatment effects regression in which we instrument the choice of issuing institutional loans. This analysis confirms our initial results and the positive coefficient estimate on the institutional loan dummy remains robust in the full sample, as well as the leveraged, and the within-the-deal loan subsamples, indicating that potential selection effects do not drive our results. In summary, we find a positive premium in spreads for institutional loans beyond what can be justified by observed and unobserved risk factors, thus contradicting the selection effect hypothesis.

Third, we establish the causal relationship between the informational disadvantage of institutional lenders and the premium on institutional loan spreads, as argued in our information asymmetry hypothesis. To show this, we employ a switching regression model with endogenous switching, that accounts for the endogenous nature of borrower-lender matching. This methodology allows us to answer the following what-if type question: For an institutional loan what would the alternative spread be, had it been funded by a commercial bank? The answer to this question holds loan and borrower characteristics constant and effectively disentangles the impact of the lenders' information on loan spreads from the selection effects. The regression results confirm that institutional loans are priced differently from bank loans and that the loan spreads charged by banks are lower than those charged by institutional lenders after

accounting for the endogenous borrower-lender matching. Comparing the actual and hypothetical mean spread, we find that institutional lenders would have charged a mean spread of 85 bps higher had they funded bank loan tranches, while banks would have charged a mean spread of 38 basis point lower had they funded institutional loan tranches. These differences in spreads are consistent with the idea that banks possess informational advantages due to their relationships and therefore support the notion that the additional spreads on institutional loans primarily serves as compensation (rent) to institutional lenders for producing costly information and serving as lenders of last resort. Furthermore, our prior result that this difference in spread decreases over time is also consistent with the notion of costly information production. As institutional lenders learn over time, the cost of information production decreases. Accordingly, we attribute the decrease in the loan spread differential between the two types of loans to a decrease in the cost of information production.

However, given the higher borrowing cost, why do certain firms still choose to issue institutional loans? To answer this question, we analyze the changes in borrowers' expected default probability around loan origination. We show that institutional loan borrowers, though equally risky as matched bank loan borrowers at loan origination, experience much severe deterioration in credit quality relative to the bank borrowers after taking on the new loans. Since the post-loan deterioration in credit quality should be known ex ante to lenders who generate information about the borrowers at loan origination, this result suggests that for those borrowers that experience deteriorating performance in the future, institutional loans are the last resort for them to obtain debt financing. Though we do not directly analyze the overall efficiency of the syndicated loan market, revealed preference suggests that provision of loans by institutional lenders may be a value enhancing activity overall, as it improves the borrower's ability to survive.

Our paper contributes to several strands of the literature. First, a large body of research on institutional shareholders opens up the debate on whether institutional investors play an effective role in monitoring firms. This question has been approached by linking institutional ownership with firm value or cost of capital, directly studying the shareholder activism, or examining the impact of institutional investors on some specific corporate events such as mergers and acquisitions, seasoned equity offerings, and CEO compensation and turnovers (Morck et al.,1988, Parrino et al., 2003, Gillan and Starks, 2003, Hartzell and Starks, 2003, among others).[7] Despite the extensive coverage on the impact of institutional shareholders

[7] Allen, Bernardo and Welch (2000) argue that institutional investors have advantages in detecting and thus certifying firm quality. Shleifer and Vishny (1986) and Gorton and Schmidt (2000), are among those who document a positive relationship between ownership concentration and firm performance. Hartzell and Starks (2003) argue that institutional shareholders play

on corporate governance, very few papers have studied the role of institutional debt holders. Our paper complements this literature by showing that institutional investors, as new entrants to the loan market, act very differently than they do in the equity market. While they may arguably possess superior information about firms in which they hold equity, they appear to be informationally disadvantaged relative to banks in the syndicated loan market. However, we also show that the longer they participate in the loan market, the less this information disadvantage is.

Second, our paper also complements a relatively new area of research exploring the interaction between the primary and secondary loan markets. For example, Cebenoyan and Strahan (2004) find that banks that actively participate in the loan sales market, tend to make more risky loans and earn higher profits than other banks. Consistent with their findings, our results on institutional loans that are riskier in nature and more frequently traded imply that institutional loan lenders are most active traders on the secondary loan market. These results also reconcile the finding in Kamstra et al. (2009) that shedding lower quality loans is one of the prominent features of the loan resale activities. Additionally, Drucker and Puri (2009) find that sold loans contain a greater number of covenants and they argue that stringent financial covenants assist in resolving the agency problem associated with a loan sale. Consistent with Drucker and Puri, we find that institutional loans, loans with stricter financial covenants, are much more likely to be resold on the secondary market.

Third, our paper adds to a growing body of information-driven loan syndication literature. It has been well established that the asymmetric information problems exist in lending syndicates in which lead lenders hold superior information about borrowers while participants do not (Dennis and Mullineaux, 2000 and Sufi, 2007). It is also believed that lenders are able to produce and acquire information about borrowers both through participating in the primary loan syndication process and monitoring afterwards (Parlour and Plantin, 2008). Recent empirical work shows that the simultaneous holding of both equity and debt by institutional investors in the same firm leads to better incentive alignment between shareholders and debtholders in the firm (Jiang et. al., 2009). However, there is also evidence that shows that institutional investors, in particular hedge funds, exploit material private information obtained from participating in loan syndicates in their equity trading (Massoud et. al., 2009).[8] Our paper complements this existing

a monitoring role in alleviating agency problems, demonstrating the positive impact of institutional shareholdings on the pay-for-performance sensitivity of executive compensation.

[8] However, if exploiting private information gathered in the loan market is the sole driving force behind institutional investor participation, then in equilibrium, this should be anticipated by firms that source loans from institutions and the spread on such loans at origination should reflect this cost and thus it should not be greater than that of comparable bank loans.

research by showing that institutional investors are very likely to be uninformed about borrowers relative to banks when they enter the loan market. Further, non-bank institutions appear to be the lenders of last resort and only those borrowers who have no further options are willing to pay the premium to compensate institutional lenders for information production.

Finally, our paper is also related to two contemporary papers that examine the supply and demand for institutional funds in the loan market. Nini (2009), shows that institutional investors produced a supply shock to the loan market and as a result, the number of speculative-grade loan borrowers significantly increased during 1994-2006. He however does not analyze the relative differences in loan spreads between institutional and bank lenders. Ivashina and Sun (2009), on the other hand, argue that institutional lenders exert a demand pressure on the loan market (demand for corporate loans) and the intensive demand pressure from institutional lenders leads to a contraction of loan spreads. This result however is specific to the period between 2002 and 2007 and thus does not present the entire picture of the evolvement of the pricing of institutional loans since they came into existence in 1995. Contrary to this, our results show that a spread differential does exist between institutional and bank loans and that this differential diminished over the years and was insignificant during the latter half of the sample period (2004 to 2006) considered by them. In summary, instead of focusing on the demand or supply shock brought by institutional investors, we focus on studying the reasons behind institutional participation in loan origination and explaining why some firms choose to borrow from institutional lenders while others do not. Our paper provides an information-based explanation for the divergence in pricing between institutional and bank loans and presents evidence that is consistent with firms borrowing institutional loans as the last resort of debt financing.[9]

The rest of the paper is organized as follows. Section 2 develops testable hypotheses. Section 3 explains the sample selection process, while Section 4 describes the empirical tests and discusses the results. Section 5 concludes.

[9] In addition, this paper is also tangentially related to the growing body of literature arguing that the supply of debt financing is an important determinant of capital structure. See, Leary (2005), Faulkender and Petersen (2006), and Tang (2006) for analysis on this issue.

2 Hypotheses Development

The issue of information asymmetry between lead lenders and syndicate participants has been widely discussed in the literature. Simons (1993), Dennis and Mullineaux (2000), Panyagometh and Roberts (2005), and Sufi (2007) among others, highlight the problem of information asymmetry in the loan origination and syndication process and discuss how syndicated loans are structured to mitigate this problem. In the discussion that follows, we generalize this notion of information asymmetry between lead lenders and syndicate participants to one between commercial bank lenders and non-bank institutional lenders.[10] To gain additional insights we draw on the IPO underpricing literature, where several empirical and theoretical papers document and explain the existence of such underpricing in the presence of information asymmetry.[11] Chemmanur (1993) argues that in the presence of information asymmetry, informed participants such as firm insiders will motivate uninformed investors to produce information on the firm, and this additional information will be reflected in the secondary market price run-up of the firm's equity, thus increasing its expected value. However, since such information production is costly, firm insiders are willing to compensate uninformed investors to produce this information by underpricing the issue. In addition, Rock's (1986) adverse selection model is built upon an assumption of the existence of information asymmetry between informed and uninformed investors in the IPO market. According to Rock (1986), informed investors, taking advantage of superior information, crowd out uninformed investor participation in the better quality IPOs, leaving uninformed investors only the lower quality issues. When pro rata rationing is adopted in the primary stock distribution process, the probability of receiving lower quality issues surpasses the probability of receiving better quality issues for the uninformed investor. Realizing this "winner's curse", uninformed investors revise their valuations of new issues downward. As a result, firms must underprice their shares to prevent uninformed investors from withdrawing from the IPO market. Thus, in this set-up, underpricing is a cost imposed on the issuing firm by informed investors. Applying the same rationales to the syndicated loan market we propose the "asymmetric information hypothesis".

We argue that firms and commercial banks, who are the informed participants in the syndicated loan market, will be willing to compensate the less informed institutional investors to engage in costly informa-

[10] It is well established that commercial banks engage in relationship lending (see, e.g., Petersen and Rajan, 1994) and thus banks on average possess superior information about the borrower compared to institutional investors who are new entrants to the loan origination process.

[11] The enormous evidence on IPOs, has shown that new equity issues are on average underpriced, see, Ritter (1984) and Loughran and Ritter (2002) among others.

tion production about the firm, since such information will ultimately be reflected during loan trading in the secondary market, encouraging more institutional participation and thus leading to an overall increase in secondary market liquidity, benefitting all lenders.[12] The increase in liquidity is beneficial for commercial banks, who are able to re-balance their loan portfolio, thus freeing up additional capital to invest in new loans (Drucker and Puri, 2009). On the other hand, institutional participation also benefits borrowers, especially those otherwise non-bankable firms with high credit risks, since they can now potentially source loans that are funded by institutional lenders. In other words, the presence of institutional investors helps increase the scope of lending activity in the syndicated loan market (Nini, 2009).[13] Overall, our asymmetric information hypothesis posits that due to the existence of the information asymmetry between bank and institutional loans lenders, the initial loan yield spread on institutional loans is expected to be higher than that on commercial bank loans holding all risk factors constant. In other words, this spread premium is beyond what can be explained by the observed and unobserved risk factors associated with institutional loans. Given that institutional investors are relatively less informed compared to banks, this higher loan spread serves as additional compensation to induce information production by institutional investors and to encourage their participation in the syndicated loan market.

Our second hypothesis is the selection effect hypothesis. Anecdotal evidence suggests that institutional lenders specialize on the highly leveraged and distressed segments of the syndicated loan market.[14] "Risk-seeking" behavior exhibited by institutional investors in the loan market can be attributed to these investors' investment objectives and constraints. For example, one of the typical investment objectives of a prime fund is that the return on assets must exceed a pre-set discount rate to increase the value of the assets, leading to the high yield-seeking nature of such funds. Therefore, loans made to highly risky borrowers and for riskier projects that would generally not be considered eligible for bank funds will seek out institutional funds. Moreover, in many cases institutional loans are "second lien" loans, implying that

[12] Gande and Saunders (2009) find a positive stock price reaction to firms when their loans trade for the first time in the secondary market, which they cite as evidence on new information being generated in the secondary market.

[13] It is not surprising that institutional participation in the primary syndicated loan market started around 1995, when bank loan ratings were introduced by Moody's and Standard and Poor's. Anecdotal evidence suggests that the introduction of such loan ratings were primarily driven by the desire of institutional investors to participate in the syndicated loan market. Further, Mullineaux and Yi (2006) show that the introduction of syndicated loan ratings led to an increase in the availability of financing in the syndicated loan market.

[14] A recent article in July 2007, in Reuters, DealTalk, *Hedge Funds opt to be Lenders of last resort*, mentions that not only are hedge funds concentrating on lending to the highly leveraged sector, but in fact, funds that invest in this sector have outperformed the funds general index this year (2007), according to Credit Suisse/Tremont Hedge Fund Index. The general consensus among institutional lenders appears to be that by making loans to troubled companies, institutional lenders are betting that they have more patience than a company's creditors to wait out the storm and profit from a company's turnaround.

in the event of a bankruptcy or liquidation, institutional lenders would have a claim that is junior to that of commercial banks on the assets of the firm. Therefore there could be a borrower-lender selection effect, that is, riskier borrowers invite institutional lenders who prefer high-yield loans, while bank lenders specialize in safer loans unless institutional lenders are invited to participate in a lending syndicate and share the risks.[15] In short, the selection effect suggests that institutional loans have a higher loan yield spread than bank loans which can be justified by the observed and unobserved risk factors associated with institutional loans and borrowers.

3 Data and Sample Selection

Our sample of loans is obtained from the Dealscan database between 1995 and 2006. Our choice of 1995 follows from the recognition that institutional loans came into broad usage only from the mid-1990s along with the introduction of syndicated loan ratings. Our initial data consists of 72,568 U.S. loan facilities. We screen the data using the following criteria: 1) the all-in-drawn spread is not missing; 2) LIBOR is the base rate; 3) we exclude bankers acceptance, bridge loans, leases, loan style floating notes, standby letters of credit, step payment leases, bonds, notes, guidance lines, traded letters of credit, multi-option facilities, and other or undisclosed loans. The above screening process leaves us with a sample of 50,913 loan facilities. Next we manually match our sample with the Compustat database by company name, ticker, and deal active date (origination date) for each loan facility. Doing so effectively restricts our sample to public firms. Financial and accounting variables from Compustat are retrieved on the last fiscal year end prior to the year of loan deal origination. Our final sample includes 21,632 loan facilities (made out to 4,407 firms), out of which 2,358 (10.9%) are institutional loans.[16]

[Figure 1 and 2 here]

[15] Anecdotal evidence suggests that institutional investors such as hedge funds and private equity funds are willing to lend to borrowers and for projects that commercial banks are unwilling to do. For example, IGN Entertainment Inc., an internet publishing company in Brisbane California, sourced a $35.5 million loan from Golden Tree Asset Management a New York fund for acquisition purposes after failing to raise such a loan from commercial banks.

[16] Various conversations with analysts at Loan Pricing Corporation (LPC), Loan Syndication Trading Association (LSTA), and at Credit Suisse First Boston revealed that typically institutional loan tranches are designated as term loan B or higher, while bank loans are either various lines of credit facilities or term loan A's. Based on this, we also defined an alternative institutional loan dummy to equal 1 if the tranche had a term loan B or higher designation and 0 otherwise. The correlation in our sample between this variable and the indicator variable provided by Dealscan is very high at 92%. Our results remain qualitatively unchanged irrespective of which definition we use to identify institutional loans.

Figure 1 shows that institutional loan issuance has increased enormously in terms of both issue volume and number of issues since 1995 (as shown in Figure 1). The total face value of the institutional loan issuance reached $650 billion in 2006 from a mere $47 billion in 1995, a compound annual growth rate of 27%. In our sample, overwhelming majority of institutional loans (86.1%) are leveraged loans.[17] The rapid growth of institutional loan issues coincide with the rise of the leveraged loan market. Figure 2 shows that the leveraged loan market consists of both bank and institutional loans. However, the proportion of institutional loans within this market grew steadily between 1997 to 2006. The two trends (increase in leveraged loans and institutional loans) actually reinforce each other: the growth of the leveraged loan market stimulates institutional investors to participate in the loan market; and their increasing demand for institutional loans allows borrowers to issue more and riskier loans than previously possible. This self-fueling growth may have been partially responsible for the eventual vast failure of institutional debt investments during the 2007 - 2008 financial crisis (see, Kashyap, Rajan, and Stein, 2009).

[Insert Table 1 Here]

Table 1 reports the univariate comparisons between institutional and bank loans. We classify the variables into two categories: loan characteristics and borrower characteristics. The summary statistics for the variables in each category are reported in panels A and B respectively. The last two columns of the table present the results of the Wilcoxon rank sum test and the student t-test for the difference between institutional and bank loans. Panel A indicates that, on average, institutional loans have longer maturity and a greater proportion (72.3%) of institutional loans are secured loans. Institutional loans also tend to have larger syndicates and tend to fund risky endeavors (such as leverage buyout, takeover, or recapitalization) rather than normal business operational needs (such as repayment of debt or general corporate purposes). A higher percentage (86.1%) of institutional loans are leveraged loans, while less than half (42.7%) of bank loans fall into this category. Furthermore, a larger proportion of institutional loans are second lien loans compared to bank loans. In contrast to these results, almost none of the institutional loans (0.3%) are investment grade loans, while about a third of bank loans (27.1%) fall into the investment grade category. In addition, financial covenants are more likely to present in institutional loans rather than in bank loans.[18] However, a pricing grid (i.e. performance pricing terms) are less likely to be present in the

[17] LPC defines leveraged loans as loans that meet the following two criteria: (1) borrower of such loan has low credit rating (below BBB); (2) the initial loan yield spread of such loan is at least 150 basis points above LIBOR.

[18] In unreported tests, we find that institutional loans seem to have stricter financial covenants than bank loans for certain categories (six of the eleven), though the pattern is not pronounced. For example, the maximum debt to net worth ratio, the

former than in the later. Moreover, institutional loans are generally larger in size and constitutes a bigger fraction of the entire loan deal amount (i.e. larger facility ratio) compared to bank loans. We also find that a greater proportion of institutional loans (25%) are resold on the secondary loan market compared to bank loans (4.5%).

Panel B shows the differences in various borrower characteristics. Compared to the average bank loan borrower, the average institutional loan borrower is of similar size, has lower market to book ratio, higher leverage ratio, lower credit rating (none of the institutional loan borrowers have either AAA or AA rating) and higher expected default probability. However, compared to bank loans, institutional loans are less likely to be lent to a firm without credit rating. Moreover, institutional loan borrowers have lower average Amihud illiquidity ratio implying that the stocks of these borrowers tend to be more liquid. Overall, we find that institutional loans are associated very different loan and borrower characteristics. First, the contract design of institutional loans apparently caters for the institutional investors' preferences including high yield, liquidity and stronger collateral. Secondly, institutional loans are lent to lower quality firms with higher expected default probability. Finally, we find that institutional loan borrowers have less active revolving credit facilities available to them in the year prior to the loan issue year (as indicated by variable "lnumrev") and that a greater number of leveraged buyout transactions happened in the 2-digit SIC industry of the institutional loan borrowers' relative to the industry of the bank loan borrowers', in the year prior to the loan issue year (as indicated by variable "pctlbo_lag1"). We propose to use these two variables as instruments in the regressions addressing the potential selection and endogeneity problems. We argue that both these variables are correlated with the choice of institutional loan issue but are uncorrelated with the loan spread. The detailed discussion about these two variables is provided in Section 2.3. Finally, Panel C presents the correlation matrix of all these variables along with our primary variable of interest, all-in-drawn spread.

maximum leverage ratio, minimum cash interest, minimum EBITDA, minimum fix charge coverage, and minimum interest coverage all appear to be more restrictive for institutional loans compared to bank loans. Drucker and Puri (2009) argue that loans with more restrictive financial covenants are more likely to be resold on the secondary market. Our results seem consistent with their arguments since we find that a higher percentage of institutional loans are indeed resold in the secondary market.

4 Pricing of the Institutional Loans vs. Bank Loans

4.1 Univariate Analysis

The initial univariate comparison of the average loan yield spreads of institutional and of bank loans reveal that the two types of loans have very different spreads. Table 2 Panel A shows that the average initial loan yield spread (307 basis points) of institutional loans is almost double that (167 basis points) of bank loans in our full sample from 1995 to 2006. The year-by-year comparison indicates that the average loan yield spreads varies over the years for both institutional and bank loans. However, the general pattern that the mean and median spread is higher for institutional loans relative to bank loans holds in each year.

[Insert Table 2 Here]

As discussed earlier, majority of institutional loans (86.1 %) are leveraged loans. Leveraged loans are considered riskier loans which consist of both institutional and bank loans. Therefore, in Panel B of Table 2, we compare the differences in loan yield spreads of institutional and bank loans within the leveraged loan subsample only. Not surprisingly, leveraged loans have higher mean (median) initial loan yield spread than general loans for both loan types in all the years. However, the pattern of higher loan spreads for institutional loans still holds true. In particular, the mean and median initial loan spreads (315/300 basis points) of institutional leveraged loans are all statistically significantly higher than the corresponding spreads (300/250 basis points) of leveraged bank loans. Finally, to accommodate the fact that institutional loans typically appear in a multi-tranche loan deal lent to the same borrower in which there are both institutional and bank loan tranches (i.e. within-the-deal loans), we repeat our tests for the within-the-deal subsample in Panel C of Table 2. We find that the mean (median) loan spread (304 (288) basis points) for institutional loans is much higher than that (275 (275) basis points) of bank loans lent to the same borrowers and within the same loan package. The year-by-year comparison results are generally consistent with the above panels with an exception in the year 2004 and 2005.

[Insert Figure 3 Here]

Finally, figure 3 graphically presents the year-by-year comparison between the average loan spread of institutional and bank loans for our full sample. These results are consistent with the prediction of both the "information asymmetry hypothesis" and the "selection effect hypothesis", both of which predict that the

average spread of institutional loans would be higher than that of bank loans, albeit for different reasons. In the following sections, we try to disentangle these two hypothesis.

4.2 Multivariate Analysis – Initial Loan Yield Spread Regressions

To address our two hypotheses, we first investigate the effect of sourcing an institutional loan on the initial loan yield spread using a fixed effects regression framework. Similar to the univariate analyses, our multivariate analyses are also conducted on the full sample, the leveraged loan subsample, and the within-the-deal subsample with the log of loan yield spread as the dependent variable. The key variable of interest is the dummy variable, "instloan", which takes the value of one if the loan is an institutional loan or zero if it is a bank loan.

[Insert Table 3 Here]

Table 3 presents the initial loan spread regression results, controlling for potential determinants of spread along with year and firm fixed effects. In these regressions, we control for an array of determinants that have been shown to affect loan spreads in the prior literature. These control variables include both loan and borrower characteristics such as loan maturity, secured status, firm size, market-to-book ratio, leverage ratio, cash to asset ratio, and borrower's expected default frequency among others. In addition, we also include loan purpose dummies and borrower's credit rating dummies in all the specifications. It is worth noting that the OLS regressions with firm fixed effects we employ in Table 3 allow us to control for observable firm-specific heterogeneity. Moreover. following Petersen (2009), robust standard errors are clustered at the deal level. As can be seen from Table 3 the coefficient on the institutional loan dummy, "instloan" is positive and significant in the full sample as well as the two subsample regressions. The estimated coefficients on the institutional loan dummy range from 0.086 to 0.119 implying that on average institutional loans are priced around 9 to 13 percentage higher than bank loans, *ceteris paribus*. The relationship between initial loan spread and the other loan/borrower characteristics is intuitive and consistent with the literature regarding loan yield spread determinations (Stulz and Johnson, 1985 and Dennis, Nandy, and Sharp, 2000). Secured loans are priced higher because they are often lent to riskier borrowers. Leveraged and second lien loans are associated with higher spreads, but that does not fully explain the higher spread on institutional loans. Large loans, loans with pricing grid, loans taking a greater portion of the entire loan deal amount, loans with a larger lending syndicate, as well as loans that have

not been resold on the secondary loan market are associated with lower spreads. In terms of borrower characteristics, while large firms tend to pay less to borrow, firms with higher leverage ratio and/or with higher default probability (measured by expected default frequency) need to pay more. Thus, overall it appears that borrower and loan specific risk characteristics do not completely explain the higher spread on institutional loans, since even after accounting for such factors and the other unobserved firm specific factors (using fixed effects), the institutional loan dummy is positive and significant at the 1% level.

[Insert Table 4 Here]

Although we add a number of control variables in the firm fixed effects models, we may still miss some unobservable risk factors that vary across different loan deals. Because an institutional loan tranche is usually part of the a loan deal combining both bank and institutional loan tranches lent to the same borrower, introducing deal fixed effects allows us to control for all the deal-level unobservable heterogeneity (such as financial covenants) that may affect loan spreads. Table 4 reports the loan spread regression results using deal fixed effects. As before, the robust standard errors are clustered at the deal level. In these regressions, we only keep the control variables (in Table 3) that vary across loan deals. Therefore, in this setting, the estimated coefficient on the institutional loan dummy reflects the differences in the pricing between institutional and bank loan facilities after controlling for all the deal specific risk factors. While the significance of coefficients on many control variables is simply absorbed by the fixed effects, the coefficient on the institutional loan dummy, "instloan", still remains positive and significant. The estimated coefficients on "instloan" has a similar value as before, ranging from 0.073 to 0.084, or a difference of 8 to 9 percent between institutional and bank tranches.[19]

In Panel B of Table 4, we introduce a number of interaction variables formed by multiplying "instloan" and year dummy variables, to capture the dynamic effect of "instloan" over the years in our sample. As before, the regressions are run on three separate samples: the full sample, the leveraged loan subsample, and the within-the-deal subsample, respectively. From this set of regressions, we can easily observe how the differences in spread between institutional and bank loan evolve over time. It appears that the discrepancy

[19] In unreported deal fixed-effects regressions we also control for the ammortization schedule of the loans, since industry reports suggest that institutional loans have slower ammortization schedules. We are able to obtain detailed information on the ammortization schedules for about 42% of our within-the-deal subsample of loans. Specifically we obtain information on the payment start date, the number of ammortization schedules, the number of periods in each schedule, and the payment amount for each period. Our results remain largely unaffected after controlling for ammortization in our regressions. The coefficient on "instloan" continues to be significant at 1% and suggests that institutional loans are about 11% more expensive than bank loans.

between the two types of loans is largest in the earlier years and gradually becomes smaller in the later years. For example, the coefficient on the interaction term of "instloan" and 1997 year dummy is 0.143 (which is equivalent to 15 percent) for the within-the-deal loan subsample. Such discrepancy becomes smaller but still remains positive and significant at least at the 10% level except for the year 2005. There could be two potential mechanisms that lead to the gradually diminishing difference in the spreads between bank and institutional loans. The first could be that institutional investors learn from their repeated interactions with firms. As a result, the longer they are involved in loan origination, the more they become informed and bank-like, thus incurring less information production costs. The second could be the increased demand for institutional loans causing the initial spread of such loans to be eventually lower. Ivashina and Sun (2009) argue that the demand pressure from the institutional investors causes a general contraction of the loan spreads from 2001 to 2007. However, during the same time, institutional investors, as a new group of lenders, also provide a significant increase in the supply of credit (Nini, 2008). Thus, ultimately how spreads adjust would be related to the magnitude of demand and supply changes in institutional loans. Although there is no direct evidence to show that the equilibrium spread on institutional loans decreased over time as a result of these shifts, we do not exclude these possibilities as potential explanations for the difference in spreads going down over our sample period.

In summary, results in Table 3 and 4 suggest that institutional loans are associated with higher loan spreads than bank loans holding all else constant. Because institutional loans are particularly designed for institutional investors, who are relatively less informed than bank lenders, the higher loan yield spreads serve as compensation to encourage institutional participation in the loan market. However, this interpretation is subject to the usual challenge of controlling for potential selection bias. If the choice of issuing institutional loans is endogenously determined, in other words, if only lower quality firms choose to issue institutional loans, then the higher loan spreads associated with institutional loans can simply be a reflection of such selection effect. Although the firm and deal fixed effects models as well as the subsample analyses help us to control for observables that may affect selection, especially those caused by time-invariant firm and deal-specific characteristics, the time-varying unobserved heterogeneity needs to be properly accounted for. Thus, we resort to treatment effect regression models as well as switching regression with endogenous switching models to address such concerns in the next section.

4.2.1 Endogenous Choice of Institutional Loan Issues: Treatment Effect Regressions

To account for the selection effect, the loan yield spreads and the choice of institutional loan issue can be modeled as follows:

$$spread_i = X_i\beta + \delta instloan + \varepsilon_i,$$

$$instloan_i^* = X_i\gamma_1 + Z_i\gamma_2 + \omega_i, \tag{1}$$

$$instloan = 1, \text{ if } instloan_i^* > 0; instloan = 0, \text{otherwise.}$$

In equations (1), $spread_i$ is the spread over LIBOR of the *i-th* loan. X_i is a vector of covariates that include loan and borrower characteristics. The coefficient of interest is δ, in front of the indicator variable *instloan*. Variable $instloan^*$ indicates the latent propensity of institutional loan. It is a function of the X_i variable, and an additional set of covariates Z_i that affect the choice of institutional loan, but does not affect spreads directly other than through the selection of institutional loans. The indicator variable *instloan* is allowed to be endogenous in the sense that corr $(\varepsilon, \omega) \neq 0$. A positive (negative) association implies that institutional loans are riskier (safer) based on unobservable heterogeneity. Thus, an estimate for δ are upward (downward) biased if the endogeneity is not properly accounted for.

Our choice of instrumental variables Z_i is derived following the recent work by Gatev and Strahan (2009), who show that revolving lines of credit are primarily provided by banks and not by non-bank institutions. Thus, the larger the number of lines of credit that a firm has access to through banks, the less likely they are to pay a higher spread to access funds from institutional lenders. In addition, if a firm belongs to an industry with high-volume of leveraged buyout transactions in the year prior to the loan, then it is more likely to issue institutional loans. This is because, the relative ratio of LBOs to other M&As within an industry in the prior year may signal that firms in that industry may be more susceptible to undertaking an LBO and thus may approach institutional investors to fund such activities, given that institutional lenders are more likely to provide loans for such corporate restructuring. Specifically, we use *numrev* (defined as the natural logarithm of number of outstanding revolving credits available to the

borrower in the year prior to issuing a new loan) and *pctlbo* (defined as the percentage of leveraged buyouts out of all corporate control transactions within the borrowers 2-digit SIC industry in the year prior to a new loan issue) as our instruments. In an unreported loan spread regression, we confirm that these two variables do not directly determine the loan yield spreads. However, they may indirectly affect the loan spreads through the choice of institutional loan.

[Insert Table 5 Here]

We estimate equations (1) using a two-step treatment effects regression framework. Table 5 Panel A presents results of the first-step probit model of the choice of institutional loans, while Panel B lists the second-step loan yield spreads model results. From Panel A, we find that firms of smaller size, lower cash to asset ratio are more likely to issue institutional loans. In terms of loan characteristics, loans with longer maturity, secured loans, larger loans, leveraged loans, and loans with smaller lending syndicate are likely to be institutional loans. In addition, our primary instrument *numrev* is negative and significant at the 1% level in all three regressions suggesting that the larger the number of credit lines the lower the probability of the borrowing from institutions. Our second instrument *pctlbo* is also statistically significant at 5% for the full sample.

Results in Panel B column (1) show that the loan spread of institutional loans is about 50 basis points (computed from the estimated coefficient on *instloan* 0.259) higher than that of bank loans for an average loan in our sample. The magnitude of this coefficient on *instloan* is much larger than that reported in Table 4 Panel A column (1) without controlling for the time-varying selection effect. It is also worth noting that the endogeneity test rejects the null hypothesis that corr $(\varepsilon, \omega) = 0$ at 1% level for the full sample only, but not for the leveraged loan and the within-the-deal loan subsamples, implying that endogeneity bias only exists in the regression over the full sample. Therefore the coefficients of *instloan* reported in Table 4 for the two subsamples are still considered unbiased and consistent estimates. In general, the results in Table 5 reinforce our asymmetric information hypothesis by showing that firms incur higher costs of borrowing if they approach institutional lenders, after properly controlling for selection effects.

4.2.2 Endogenous Choice of Institutional Loan Issues: Switching Regressions with Endogenous Switching

Our asymmetric information hypothesis posits that institutional investors are relatively less informed than banks about borrowers financial conditions, since banks may have prior relationships with borrowers. We argue that the higher spreads associated with institutional loans serve as compensation to encourage costly information production. In this section, we resort to switching regressions with endogenous switching model and try to provide evidence for the above two statements by showing how private information held by banks affects loan pricing. Therefore to correctly identify the impact of institutional participation on loan spreads, we are interested in the following "what-if" type of questions: For a firm funded by an institutional lender, what would the alternative loan spread be *had it been funded* by a commercial bank. Similarly, for a firm that received a loan from a commercial bank, what would the alternative loan spread be *had it received* the loan from an institutional investor. The answers to these questions hold lenders' selection effect constant and separate out the impact of the lender's private information on loan spreads.

A switching regression model with endogenous switching consists of a binary outcome equation that reflects the selection or matching between the lenders and the borrower, and two regression equations on the variable of interest, in this case the *log of all-in-drawn spread*. Formally, we have:

$$I_i^* = Z_i^{'}\gamma + \varepsilon_i, \tag{2}$$

$$y_{1i} = x_i^{'}\beta_1 + u_{1i}, \text{ and} \tag{3}$$

$$y_{2i} = x_i^{'}\beta_2 + u_{2i}. \tag{4}$$

Equation (2) is the latent lender-borrower matching equation. To reflect binary outcomes, I^* is discretized as follows:

$$I_i = 1 \text{ iff } I_i^* > 0, \text{ and } I_i = 0 \text{ iff } I_i^* \leq 0. \tag{5}$$

In other words, I_i equals one if and only if a firm receives the loan from an institutional investor. In this setup, the lender-borrower matching is modeled in reduced form. The dependent variable I_i indicates the outcome of whether a firm receives a loan from an institutional investor, which results from decisions of both the firm and the institutional investor and the selection criteria adopted by the institutional investor. Accordingly, in the empirical specification, the vector Z_i contains variables that might matter for either party. Firm-level characteristics that could affect the selection include firm size, market to book ratio, cash to asset ratio, firm's default probability, illiquidity ratio; loan characteristics include maturity, secured status, not rated loan indicator, loan size, size of the lending syndicate, among others. In addition, we also include the two instrumental variables discussed before, *numrev* and *pctlbo*. As discussed in the last section, these instruments provide us with a certain degree of exogenous variation in terms of borrowers' demand for institutional loans, which affects the matching equation but does not directly affect the loan spreads charged by lenders.

[Insert Table 6 Here]

We estimate this first stage equation using a probit model where the dependent variable is a dummy variable, identifying whether a loan is funded by institutional lenders. Consistent with the results reported in Table 5 Panel A, the results presented in Table 6 column (1) show that institutional lenders are more likely to lend to smaller firms with little cash and non-investment credit ratings. They are also more likely to fund leveraged, secured loans with longer maturity. These results again support the notion that institutional lenders tend to lend to riskier firms seeking loans with riskier features. As expected, the two instruments are all significant at least at 10% level, suggesting that borrowers' demand for institutional funds is an important determinant of their choice of institutional loan issue.

Equation (3) analyzes the impact on loan spreads for institutional loans, while equation (4) analyzes the impact on loan spreads for the same borrowers had they received the loans from commercial banks. Similarly from these two equations, one can also compute the hypothetical loan spread for the borrowers that received loans from banks, had they received the loans from the institutional investors, using equation (3). Certainly, for each loan, we only observe either y_{1i} or y_{2i}, depending on the outcome of I_i, so that the following observation rules hold:

$$y_i = y_{1i} \text{ iff } I_i = 1, \text{ and } y_i = y_{2i} \text{ iff } I_i = 0. \tag{6}$$

This model appears in Dunbar (1995) in his study on the use of warrants as underwriter compensation and in Fang (2005) in her study on investment bank reputation and the price and quality of bond underwriting services provided by them. The model is a generalization of the Heckman style two-stage model where instead of the two second stage equations, for the institutional investors and the commercial banks, there is one second-stage equation, which in effect restricts the beta coefficients in equations (3) and (4) to be the same across institutional and bank loans. Relaxing the equality of the beta coefficients makes this model more general.

To estimate the model, a key observation is that since either equation (3) or (4) is realized depending on the outcome of I^* (but never both), the observed loan spread is a conditional variable. Taking expectations of equation (3), we obtain:

$$\begin{aligned} E[y_{1i}] &= E[y_i \mid I_i = 1] \\ &= E[y_i \mid I_i^* > 0] \\ &= E[X_i^{'}\beta_1 + u_{1i} \mid Z_i^{'}\gamma + \varepsilon_i > 0] \\ &= X_i^{'}\beta_1 + E[u_{1i} \mid \varepsilon_i > -Z_i^{'}\gamma] \end{aligned} \tag{7}$$

Because u_1 and ε are correlated, the last conditional expectation term in (7) does not have a zero mean, and OLS on equation (3) will generate inconsistent estimates. If, however, equation (3) is augmented with the Inverse Mills ratio from the first stage probit estimation, added to the regression as a right-hand-side variable, we can then use OLS to find consistent estimates. This procedure is discussed in detail in Heckman (1979) and Maddala (1983). Equation (2) is first estimated by a probit regression, yielding consistent estimates of γ. With this, the inverse Mills-ratio terms can be computed for equations (3) and (4). Both equations are then augmented with the inverse Mills ratios as additional regressors. These terms adjust for the conditional mean of u, and allow the equations to be consistently estimated by OLS. However, since we are also interested in comparing the coefficient estimates across the two regressions, we estimate the regressions within a seemingly unrelated regression (SUR) framework which yields consistent standard errors.

The second stage results presented in Table 6 column 2, show that the inverse Mill's ratio is negative and only significant for bank loans. This suggests that the unobserved borrower/loan characteristics and

private information that increase the likelihood of choosing commercial banks contribute to decreases in the loan spread. The significance of the inverse Mill's ratio also confirm that the loan spread charged by banks is lower than that charged by institutional lenders taking into account the unobservable factors. Comparing the institutional loan model and bank loan model, we find that although many of the variables have the same sign in both equations, there are dissimilarities between the pricing practices of two type of lenders. In particular, Table 6 column (3) shows that institutional loan spreads are less sensitive to secured status and whether or not the loan is a leveraged loan. In addition, firm size is only priced for bank loans but not for institutional loan, while syndication size affects loan spreads negatively only for institutional loans but not bank loans.

4.2.3 The Impact of Private Information on Loan Spreads

To infer the impact of private information and prior relationships on loan spreads, we compute the following difference:

$$\underbrace{y_{1i}}_{\text{actual}} - \underbrace{E[y_{2i} \mid I_i^* > 0]}_{\text{hypothetical}} \tag{8}$$

The first term in (8) is the actual loan spread of an institutional loan, while the second is the hypothetical loan spread that would be charged for the same loan facility to the same borrower, had it been issued by a commercial bank. Similarly, one can also compute the difference between the actual spread on a bank loan and the corresponding hypothetical spread to the same borrower, had the loan been issued by an institutional investor. If the difference is negative, then the impact on loan spreads due to the private information or relationship of the commercial bank lender is explicitly quantified, as the actual loan spread charged by the uninformed institutional lender is higher.

[Insert Table 7 Here]

Consistent with the insights obtained from the inverse Mills-ratios, the results presented in Panel A of Table 7 establish that institutional investors charge a higher spread compared to banks, for the same loan to the same borrower. The mean actual spread charged by institutional lenders is 278 basis points, higher than the hypothetical average of 240 basis points that would have been charged by commercial banks

for the same loans; the difference being statistically significant at the 1% level.[20] Similarly, institutional lenders would have charged a much higher spread compared to the actual spread charged by commercial banks. The mean actual spread charged by commercial banks is 129 basis points which is significantly lower than the hypothetical average of 214 basis points that would have been charged had institutional investors funded the same loans. It is not surprising that both bank lenders and institutional lenders would charge higher spreads on institutional loans than bank loans simply because of the added level of riskiness associated with the former. However, for both type of loans, banks could offer a significantly lower spread than institutional investors, reflecting banks' informational advantage arising from their prior banking relationship with borrowers. Moreover, these results also establish that institutional lenders are in fact uninformed investors because they are new entrants to the syndicated loan market and therefore they need extra compensation for costly information production. In other words, the differences between the actual and hypothetical loan spread single out the selection effects and capture the net impact of private information on loan spreads, holding loan and borrower constant. For example, the differences in the means reported in column (5) indicate that banks would have offered a spread of 37 bps lower had they funded the institutional loans and that institutional investors would have charged a spread of 85 bps higher had they funded bank loans. These differences in spreads are purely caused by information asymmetry between banks and institutional investors.

In Panel B and C of Table 7, we examine the actual versus hypothetical loan spreads on the leveraged loan subsample and the within-the-deal subsample respectively. The results on institutional loan sample remain qualitatively unchanged across all the three panels because majority of the institutional loans stay in all the three samples. In contrast, the average actual and hypothetical spreads on bank loans increase significantly from full sample to the two subsamples. This is because only loans made out to riskier borrowers are included in the two subsamples and a large number of bank loans made out to safer firms are excluded from the two subsamples. In general, the evidence of the impact of private information on loan spreads is present in the two subsamples in the same way as in the full sample. In addition, we find that the hypothetical loan yield spread on leveraged bank loans is 302 bps. This number is even larger than the actual yield institutional investors charge for the leveraged institutional loans (286 bps), indicating that the information disadvantage of the institutional investors is intensified when funding the riskier loans/borrowers. The results presented in Panel C is particularly interesting because both bank

[20] Note that the reported t-statistics are based on bootstrapped standard errors.

and institutional loans in this subsample belong to the same loan deal packages made out to the same borrowers. We find that institutional loans are still priced higher than bank loans even when they share the same underlying fundamentals. Similar to the results in Panel A and B, bank lenders could help lower the loan spread if they also fund the institutional loan tranches of the same loan package. In contrast, institutional lenders would ask for a higher spread (even higher than what they actually receive from funding institutional loans) if they also fund the bank loan tranches of the same loan package. Therefore, Panel C provides strong evidence of the presence of the information asymmetry between bank and institutional loan lenders.

4.3 Analysis of Post-Issue Borrower Credit Quality

In this section, we explore why certain firms choose to issue institutional loans given the higher cost and examine whether institutional investors are lenders of last resort, i.e., they provide financing to firms that have no other options left. We assume that any future (post-loan) deterioration in expected default probability will be known to lenders generating information about the borrowers (as private information) at the time of loan origination.[21] Thus, we conjecture that only certain firms (who expect this future deterioration) will use institutional loans as a last resort of debt financing when other sources are exhausted. Since banks will not provide additional funds to these high-risk firms by themselves, such firms have to pay the higher spreads to compensate the institutional investors to participate, otherwise they may end up without being able to raise any financing. Though we do not directly analyze the overall efficiency of the syndicated loan market, revealed preference suggests that provision of loans by institutional lenders may be a value enhancing activity as it may improve the borrower's ability to survive.

To verify our above conjecture, we examine the changes in borrowers' credit quality both before and after a loan issue. We first conduct this analysis based on our full sample ignoring the potential selection bias. We then address the selection bias problem using propensity score matching as well as treatment effects models. Specifically, we match institutional borrowers to bank borrowers with similar expected default probabilities in the year prior to loan origination, based on a propensity score matching algorithm. If indeed institutional lenders are the lenders of last resort, we would then observe that the post-loan deterioration in default

[21] Even though we state this as an assumption, it is easy to show that this is indeed the case. In unreported tests, we find that the spread on revolver loans charged to borrowers that also have an institutional tranche in the same deal, is significantly greater than the spread on revolvers to similar firms that do not have an institutional tranche in the same deal. This shows that lenders indeed generate information and thus possess private information regarding the potential future performance of borrowers that is priced in at the time of loan origination.

probability for institutional loan borrowers will be worse than that for bank borrowers.

[Insert Table 8 Here]

Table 8 Panel A reports the average expected probability of default (measured by KMV expected default frequency (*edf*)) for institutional loan issuers and bank loan issuers before and after the loan issue year t, based on the full sample. We report the *edf* for loan issuers for eleven years over the [t-5, t+5] window. Column (4) presents the difference in *edf* between the two types of loan issuers, while the before and after differences in *edf* within each of issuer group are reported in the last two rows of Panel A. Two interesting empirical regularities emerge. First, institutional loan issuers have a significantly higher average *edf* in all the years except for the year t+5, confirming that institutional loan issuers are riskier than bank loan issuers both before and after the loan issue year. Second, in general the expected default probability for borrowers deteriorate after the loan issue year. The differences between the year t and t-3 are insignificant for both institutional and bank loan borrowers, indicating that there is no pre-issue credit deterioration for both types of borrowers. But comparisons between the year t+3 and t within the group yield significant results for both types of borrowers. The magnitude of credit deterioration for institutional borrowers (9.2% increase in *edf*) from year t to t+3 is larger than that (5.4%) of bank borrowers. In panel B of Table 8, we further verify the univariate analysis results in Panel A using dynamic fixed effects differences-in-differences regression specifications. Specifically, the regression models are set up as follows: let $y_{i,t+j}$, j∈(–5, 5), be the *edf* of the borrower of the loan i at j years before/after the loan issue year; let d_{t+j}, j∈(–5, 5) be the indicator variable for a firm-year where j years before/after the firm borrows an institutional loan; let t_j, j∈(–5, 5) be the indicator variable for the relative year from t-5 to t+5 to control for time trend in the following regression:

$$y_{i,t+j} = \sum_{j=-5}^{5} \beta_j d_{t+j} + \gamma t_j + \alpha + \varepsilon_{i,t+j}, \tag{9}$$

where industry fixed effects (at the four-digit SIC code level) are controlled for in the industry fixed effects model (column (1) of Panel B) and both industry and year fixed effects are controlled for in the industry and year fixed effects model (column (2) of Panel B); β_j represents the difference in the default probability for firms issuing institutional loans and those issuing bank loans at j years after (negative values mean "before") a loan issue. In additional to the β_j coefficients from (9), we also examine the difference-

in-differences, $\beta_{t+j} - \beta_t$, i.e., the before minus after difference in the differences between institutional and bank borrowers. Such differences could be tested using the estimates and the variance-covariance matrices from (9). Similar to the univariate results reported in Panel A, results in Panel B show that in most of years around the loan issue year t, institutional loan issuers have higher *edf* than bank loan issuers. Difference-in-differences ($\beta_t - \beta_{t-3}$, $\beta_{t+3} - \beta_t$) results confirm that while the changes in credit quality of the two types of loan issuers are not significantly different from each other before the loan issue, a borrower's credit worthiness deteriorates by a significantly greater extent after an institutional loan issue.

[Insert Table 9 Here]

Though the above results conform to our expectations, one can still argue that potential selection effects drive our results. Thus, using two different methodologies, we analyze the post-issue *edf* of the institutional borrowers after controlling for the potential selection bias. The results are presented in Table 9. First, we apply the propensity score matching algorithm to find the nearest neighbor matching bank borrower for each institutional loan borrower. The instrumental variables used in the probit model are the same set of variables as in loan yield spread model reported in Table 3. In panel A, we report the average *edf* of the treatment group (institutional borrowers) in column (3) and that of the control group (bank borrowers) in column (4) in the loan issue year t, one year after loan issue (t+1), and two years after loan issue (t+2). The results show that in the loan issue year, there is no difference between the institutional loan issuers and bank loan issuers in terms of the average default probability. However, the average *edf* for firms in the treatment group substantially increases after the loan issue year, but that for the control group does not significantly change in the years after loan issuance. As a result, the difference in *edf* between institutional and bank borrowers becomes statistically significant in years t+1 and t+2. In other words, institutional loan issuers experience severe deterioration in credit quality relative to the matched bank borrowers in the years after a loan issue.

To address concerns regarding "unobservables" driving the potential selection effect, we employ a second methodology and estimate treatment effects models. In the first step of the two-step treatment effects model we run the same probit model as in Table 5 Panel A using *numrev* and *pctlbo* as instruments for institutional loans; and in the second step, we regress the *edf* of the borrower in year t+1 (or at year t+2) on the institutional loan dummy and the other covariates. Results from the regressions on *edf* at t+1 and *edf* at t+2 are reported in Panel B column (1) and (2) respectively. We find that market-to-book

ratio, lagged *edf* at year t (loan issue year), borrowers' illiquidity ratio, and investment grade loan dummy help to explain the *edf* one year or two years after the loan issue. In addition the regression specification controls for year and industry dummies. Most importantly, we continue to find that the coefficient on "*instloan*" (the predicted institutional loan identifier from the first stage), is positive and significant at the 1% level in both columns, reconfirming that the post-issue credit worthiness of institutional borrowers deteriorate to a greater extend than that of bank borrowers after taking into account the selection effects. These results therefore suggest that firms that issue institutional loans, given the higher cost, do so because institutional investors are the lenders of last resort for them.

5 Conclusion

A recent development in the syndicated loan market has been the arrival of institutional investors, including hedge funds and private equity funds as lenders. This paper presents the first empirical analysis of institutional loans in the literature. We show that institutional loans have loan spreads that are 9 to 13 percent higher than bank loans, ceteris paribus. The higher riskiness of institutional loans however, does not fully explain this additional spread. This result is robust after controlling for potential selection and endogeneity bias. Following information based theories we argue that this higher spread on institutional loans primarily serve as compensation to institutional lenders for engaging in costly information production about borrowers, since such institutional investors are new entrants to the syndicated loan market and thus less informed relative to banks. However, we also show that the loan spread differential between institutional and bank loans diminishes gradually over time, a phenomenon that is attributable to the decreasing costs of information production or reduced informational disadvantage of institutional lenders as they repeatedly participate in this market over time.

Given the higher cost associated with institutional loan issues, we ask the question why certain firms still choose to issue institutional loans. Our investigation into the pre- and post-issue changes in credit quality of borrowers reveals that : first, institutional borrowers have significantly higher probability of default than bank borrowers both before and after the loan issue; second, similar to that of bank borrowers, the probability of default of institutional borrowers do not deteriorate significantly prior to the loan issue. However, subsequent to the loan issue, the probability of default for institutional borrowers deteriorates much more severely relative to that of matched bank borrowers. We conclude that institutional

investors are the lenders of last resort for certain firms which expect to deteriorate in the future and thus are willing to pay a higher spread, since they are not likely to get debt financing solely from banks.

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Figure 1: The Size of the Institutional Loan Market

Value and Number of Institutional Loans: 1995 – 2006

This figure presents the overall size of the institutional loan market over the period 1995 to 2006. We plot the number of loans on the left axis and the value of the loans in billion dollars on the right axis. The blue line denotes the number of institutional loans while the red line denotes the value of these loans over our sample period, between 1995 and 2006.

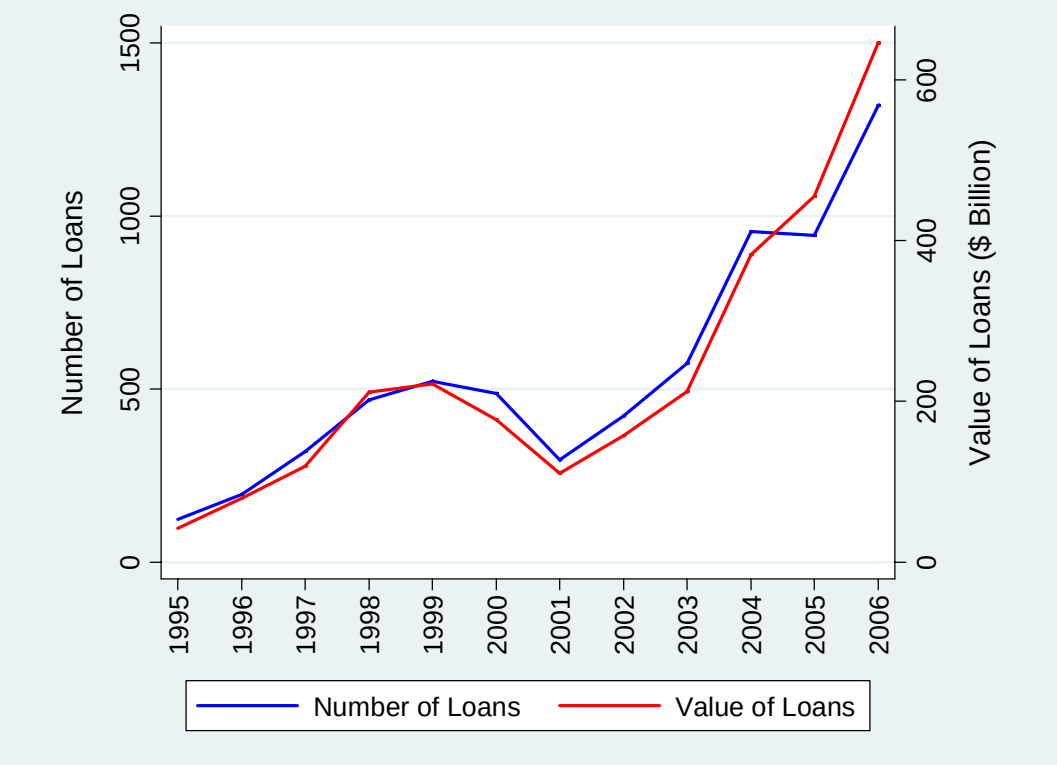


Figure 2: The Leveraged Loan Market

Bank vs. Institutional Loans: 1997 – 2006

This figure presents the relative value of bank and institutional loans in the leveraged loan market over the period 1997 to 2006 depicting the steady rise in the value of institutional loans relative to bank loans. We plot the value of the loans in billion dollars on the left axis. The blue bars denote the value of bank loans while the red bars denote the value of institutional loans between 1997 and 2006 in the leveraged loan market.

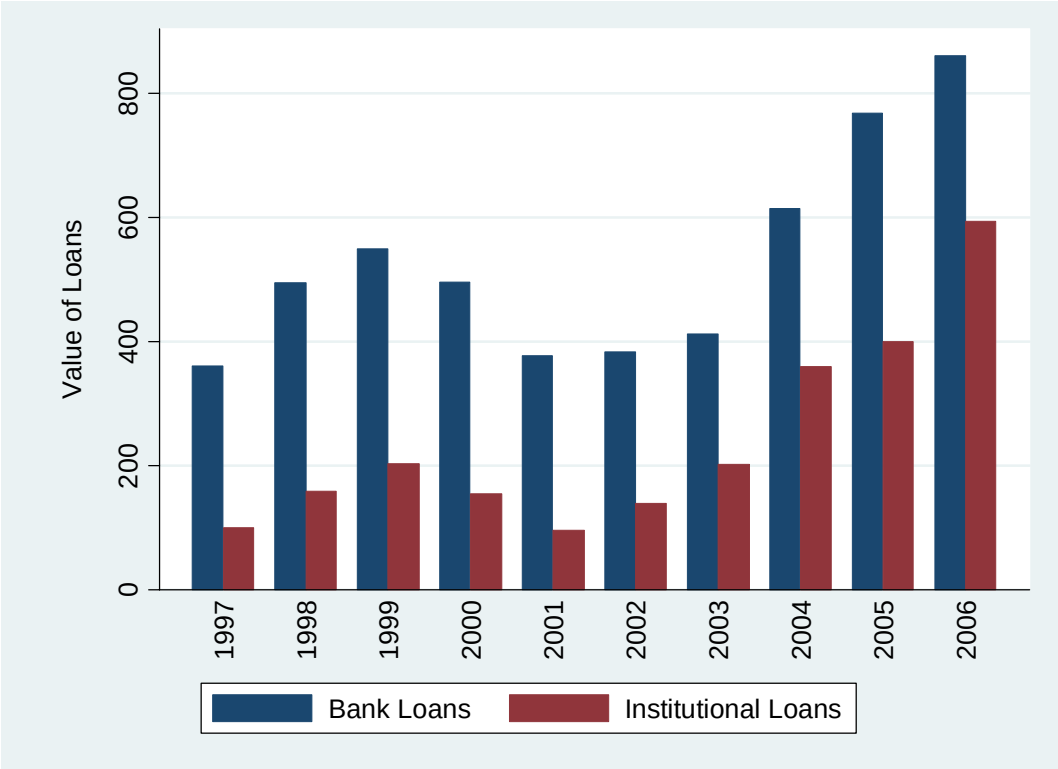
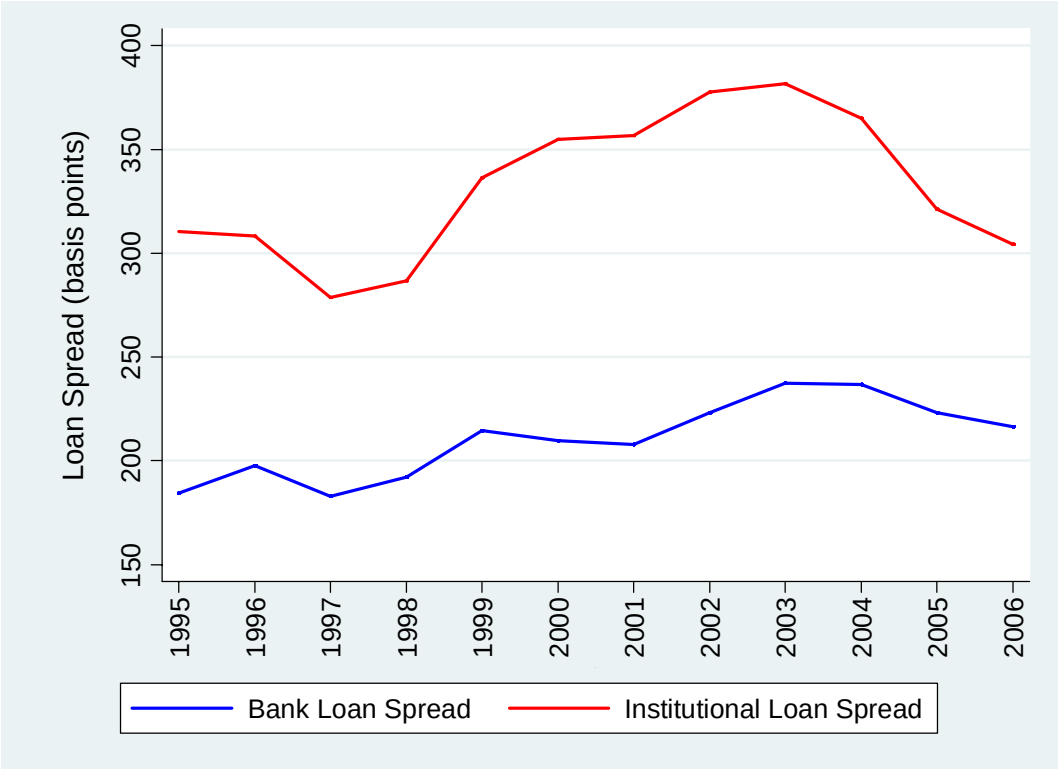


Figure 3: Average Spread on Institutional and Bank Loans
1995 – 2006

This figure presents the average loan spreads for bank and institutional loans over the period 1995 to 2006. We plot the loan spread in basis points on the left axis. The blue line denotes the average spread on bank loans while the red line denotes the average spread on institutional loans over our sample period, between 1995 and 2006.



Appendix A: Variable Definitions

	Definition
Variables of Interest	
log all-in-drawn spread	Natural logarithm of all-in-drawn spreads. All-in-drawn spread is the percentage coupon spread over LIBOR plus the annual fee and the upfront fee paid by borrowers for each dollar drawn down.
instloan	An indicator variable taking the value of one for institutional loans and zero for bank loans.
Loan Characteristics	
maturity	Natural logarithm of loan maturity in number of days.
secured	A indicator variable taking the value of one for secured loans or zero otherwise.
number of lender	Natural logarithm of number of lenders in a loan syndicate.
repay	An indicator variable taking the value of one if the primary purpose of borrowing a loan is debt repayment, or zero otherwise.
takeover	An indicator variable taking the value of one if the primary purpose of borrowing a loan is takeover, or zero otherwise.
corp. purpose	An indicator variable taking the value of one if the primary purpose of borrowing a loan is general corporate purpose, or zero otherwise.
lbo	An indicator variable taking the value of one if the primary purpose of borrowing a loan is leverage buyout, or zero otherwise.
recapitalization	An indicator variable taking the value of one if the primary purpose of borrowing a loan is recapitalization, or zero otherwise.
other purpose	An indicator variable taking the value of one if the primary purpose of borrowing a loan is other than debt repayment, takeover, general corporate purpose, leverage buyout, and recapitalization, or zero otherwise.
leveraged loan	An indicator variable if a loan is calssified by the Loan pricing Corporation as a leveraged loan, or zero otherwise.
investment grade loan	An indicator variable if a loan is calssified by the Loan pricing Corporation as an investment grade loan, or zero otherwise.
second lien loan	An indicator variable if a loan is a second lien loan, or zero otherwise.
financial covenant	An indicator variable if a loan contract includes at least one financial covenant, or zero otherwise.
pricing grid	An indicator variable if a loan contract has a performance-based pricing scheme.
loan size	Natural logarithm of loan facility amount in 2006 dollars.
facility ratio	A ratio calclulated as loan facility amount divided by the loan deal amount.
resold	An indicator variable taking the value of one if a loan was resold on the secondary market, or zero otherwise.

Borrower Characteristics

size	Natural logarithm of borrower's total assets.
market to book	Borrower’s total assets minus book value of equity plus market value of equity over total assets.
leverage	Borrower's total debt over total assets.
relationship	Natural logarithm of loan deal amount over the sum of the borrower's total debt and loan deal amount.
not rated	An indicator variable taking the value of one if the S&P long term senior debt rating of a borrower is not available, or zero otherwise.
aaa	An indicator variable taking the value of one if the S&P long term senior debt rating of a borrower is AAA, or zero otherwise.
aa	An indicator variable taking the value of one if the S&P long term senior debt rating of a borrower is AA, or zero otherwise.
a	An indicator variable taking the value of one if the S&P long term senior debt rating of a borrower is A, or zero otherwise.
bbb	An indicator variable taking the value of one if the S&P long term senior debt rating of a borrower is BBB, or zero otherwise.
bb	An indicator variable taking the value of one if the S&P long term senior debt rating of a borrower is BB, or zero otherwise.
b	An indicator variable taking the value of one if the S&P long term senior debt rating of a borrower is B, or zero otherwise.
ccc	An indicator variable taking the value of one if the S&P long term senior debt rating of a borrower is CCC, or zero otherwise.
cc	An indicator variable taking the value of one if the S&P long term senior debt rating of a borrower is CC, or zero otherwise.
d	An indicator variable taking the value of one if the S&P long term senior debt rating of a borrower is D, or zero otherwise.
illiquidity	The Amihud illiquidity is defined as the yearly average of 1,000 times the square root of |Return|/(Dollar Trading Volume), using daily data.
edf	The expected default frequency that is calcluated based on KMV model.
lnumrev	Natural logarithm of number of active revolving credits avialble to a borrower before a new loan issue.
pctlbo_lag1	Leveraged buyout transactions as a percentage of all takover transactions in a loan borrower's industry (2-digit SIC) in the year prior to a new loan issue.

Table 1. Univariate Analysis

This table reports summary statistics for the main variables and shows the differences in various characteristics between institutional loans and bank loans. Definitions of the variables are provided in the appendix. The total number of observations is 21,632 loans issued by Compustat firms from 1995 to 2006, including 2,358 institutional loans. Number of observations for firm characteristic variables varies depending on the avilability of information in Compustat. Variables are classified as loan characteristics (reported in Panel A) or borrower characteristics (reported in Panel B). Panel C presents the correlation matrix of all the variables.

Panel A: Loan Characteristics

	Institutional Loans			Bank Loans			Test Statistics	
Variable	**Mean**	**Std. Dev.**	**Median**	**Mean**	**Std. Dev.**	**Median**	**Wilcoxon**	**t Statistics**
facility amount ($ Mil)	277	492	150	321	746	114	6.99***	-2.8***
maturity	2166.63	648.51	2192.00	1288.48	700.27	1170.00	51.33***	56.67***
secured	0.723	0.448	1.000	0.450	0.497	0.000	25.14***	25.49***
number of lender	9.183	14.619	5.000	8.010	8.478	5.000	2.68***	5.75***
repay	0.138	0.345	0.000	0.202	0.401	0.000	-7.41***	-7.43***
takeover	0.246	0.431	0.000	0.147	0.354	0.000	12.55***	12.59***
corp. purpose	0.361	0.480	0.000	0.440	0.496	0.000	-7.32***	-7.3***
lbo	0.145	0.353	0.000	0.032	0.177	0.000	25.16***	25.52***
recapitalization	0.044	0.205	0.000	0.017	0.130	0.000	8.74***	8.75***
other purpose	0.065	0.247	0.000	0.162	0.368	0.000	-12.36***	-12.41***
leveraged loan	0.861	0.347	1.000	0.427	0.495	0.000	39.84***	41.36***
investment grade loan	0.003	0.058	0.000	0.271	0.444	0.000	-28.62***	-29.18***
second lien loan	0.028	0.164	0.000	0.006	0.079	0.000	10.62***	10.64***
financial covenant	0.637	0.481	1.000	0.614	0.487	1.000	2.13***	2.1**
pricing grid	0.279	0.449	0.000	0.501	0.500	1.000	-20.34***	-20.54***
loan size	19.620	1.135	19.599	19.006	1.459	19.036	6.99***	19.75***
facility ratio	0.499	0.288	0.450	0.723	0.327	1.000	-33.02***	-31.81***
resold	0.250	0.433	0.000	0.045	0.208	0.000	37.34***	38.58***

Panel B: Borrower Characteristics

	Institutional Loans			Bank Loans			Mean Dif. Test	
Variable	**Mean**	**Std. Dev.**	**Median**	**Mean**	**Std. Dev.**	**Median**	**Wilcoxon**	**t Statistics**
size	6.677	1.413	6.581	6.697	1.946	6.563	0.75	-0.39
market to book	1.587	0.810	1.364	1.727	1.005	1.395	-3.34***	-4.67***
leverage	0.310	0.192	0.294	0.226	0.179	0.194	15.17***	15.61***
relationship	0.279	0.448	0.000	0.314	0.464	0.000	-4.57***	-3.54***
not rated	0.577	0.494	1.000	0.625	0.484	1.000	-4.52***	-4.52***
aaa	0.000	0.000	0.000	0.004	0.065	0.000	-3.19***	-3.19***
aa	0.000	0.000	0.000	0.019	0.138	0.000	-6.82***	-6.83***
a	0.008	0.092	0.000	0.088	0.284	0.000	-13.53***	-13.59***
bbb	0.031	0.172	0.000	0.116	0.321	0.000	-12.71***	-12.77***
bb	0.194	0.395	0.000	0.080	0.271	0.000	18.04***	18.11***
b	0.166	0.372	0.000	0.059	0.235	0.000	19.2***	19.35***
ccc	0.015	0.121	0.000	0.005	0.070	0.000	5.88***	5.88***
cc	0.002	0.041	0.000	0.001	0.025	0.000	1.81*	1.81*
d	0.007	0.085	0.000	0.002	0.046	0.000	4.59***	4.59***
illiquidity	0.615	0.884	0.305	0.706	0.953	0.351	-2.28**	-3.1***
edf	0.086	0.211	0.000	0.059	0.178	0.000	10.49***	4.7***
lnumrev	0.700	0.326	0.693	0.825	0.277	0.693	-20.25***	-16.81***
pctlbo_lag1	0.031	0.032	0.022	0.028	0.030	0.019	3.9***	5.7***

Panel C: Correlation Matrix

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	log all-in-drawn spread	1.00																		
2	instloan	0.32	1.00																	
3	maturity	0.24	0.25	1.00																
4	secured	0.61	0.19	0.25	1.00															
5	number of lender	-0.33	0.02	0.07	-0.22	1.00														
6	repay	0.07	-0.03	0.14	0.14	-0.10	1.00													
7	takeover	0.13	0.09	0.16	0.16	0.03	-0.23	1.00												
8	corp. purpose	0.02	-0.03	-0.03	-0.09	-0.05	-0.48	-0.39	1.00											
9	lbo	0.17	0.14	0.15	0.08	-0.02	-0.08	-0.07	-0.13	1.00										
10	recapitalization	0.06	0.04	0.06	0.05	0.00	-0.04	-0.03	-0.07	-0.01	1.00									
11	other purpose	-0.33	-0.09	-0.35	-0.25	0.16	-0.22	-0.18	-0.37	-0.06	-0.03	1.00								
12	leveraged loan	0.73	0.26	0.19	0.52	-0.25	0.01	0.10	0.05	0.13	0.02	-0.24	1.00							
13	investment grade loan	-0.68	-0.18	-0.27	-0.51	0.30	-0.23	-0.15	0.09	-0.09	-0.05	0.34	-0.54	1.00						
14	second lien loan	0.16	0.09	0.04	0.04	-0.02	-0.02	-0.01	0.02	0.04	0.03	-0.02	0.08	-0.04	1.00					
15	financial covenant	0.24	0.04	0.17	0.39	0.03	0.15	0.11	-0.03	-0.05	0.01	-0.23	0.19	-0.21	0.00	1.00				
16	pricing grid	0.00	-0.13	0.23	0.16	0.20	0.11	0.12	-0.07	-0.03	0.03	-0.15	0.01	-0.06	-0.06	0.57	1.00			
17	loan size	-0.49	0.03	0.00	-0.36	0.70	-0.12	0.00	-0.05	-0.02	-0.02	0.23	-0.35	0.42	0.00	-0.17	0.06	1.00		
18	facility ratio	-0.28	-0.23	-0.21	-0.23	-0.06	0.01	-0.22	0.18	-0.16	-0.04	0.05	-0.21	0.20	-0.02	-0.11	-0.02	0.23	1.00	
19	resold	0.19	0.25	0.16	0.16	0.14	0.00	0.09	-0.07	0.12	0.03	-0.05	0.18	-0.12	0.03	0.09	0.03	0.10	-0.19	1.00
20	size	-0.52	0.00	-0.18	-0.46	0.59	-0.19	-0.14	0.04	-0.05	-0.03	0.34	-0.39	0.52	0.00	-0.30	-0.10	0.79	0.08	0.06
21	market to book	-0.21	-0.04	-0.03	-0.08	0.03	-0.04	0.05	-0.04	-0.03	-0.01	0.07	-0.12	0.14	-0.02	0.00	0.01	0.04	0.01	-0.01
22	leverage	0.32	0.13	0.03	0.15	0.03	0.07	-0.07	0.00	0.03	0.03	-0.03	0.20	-0.20	0.04	-0.01	-0.06	0.02	-0.11	0.12
23	relationship	-0.18	-0.02	-0.09	-0.18	0.22	-0.08	-0.09	0.05	-0.06	-0.02	0.14	-0.12	0.25	-0.01	-0.09	-0.02	0.25	0.11	-0.02
24	not rated	0.31	-0.08	0.08	0.27	-0.46	0.14	0.08	-0.02	0.03	0.00	-0.23	0.23	-0.32	-0.02	0.18	0.05	-0.57	-0.02	-0.10
25	aaa	-0.12	-0.02	-0.05	-0.07	0.03	-0.03	-0.03	-0.02	-0.01	-0.01	0.09	-0.06	0.10	0.00	-0.10	-0.07	0.09	0.00	-0.02
26	aa	-0.25	-0.05	-0.11	-0.14	0.10	-0.05	-0.03	-0.04	-0.02	-0.01	0.17	-0.14	0.20	-0.01	-0.18	-0.12	0.19	0.00	-0.02
27	a	-0.44	-0.09	-0.19	-0.30	0.22	-0.11	-0.07	-0.06	-0.05	-0.03	0.30	-0.29	0.43	-0.02	-0.20	-0.08	0.34	0.06	-0.05
28	bbb	-0.24	-0.08	-0.12	-0.28	0.26	-0.09	-0.04	0.04	-0.03	-0.03	0.10	-0.29	0.28	-0.02	-0.02	0.06	0.28	0.10	-0.02
29	bb	0.16	0.19	0.17	0.13	0.16	0.02	0.01	0.05	0.02	0.01	-0.10	0.16	-0.23	0.00	0.05	0.03	0.14	-0.07	0.16
30	b	0.24	0.15	0.11	0.15	-0.02	0.01	0.01	0.01	0.03	0.06	-0.07	0.20	-0.16	0.10	0.01	-0.02	-0.02	-0.08	0.10
31	ccc	0.08	0.05	0.02	0.05	-0.01	-0.01	-0.02	0.02	-0.01	0.09	0.00	0.05	-0.04	0.04	0.00	-0.04	0.01	-0.03	0.04
32	cc	0.04	0.02	0.00	0.02	-0.01	-0.01	-0.01	0.00	0.00	0.00	0.03	0.02	-0.01	0.12	0.00	-0.01	0.01	-0.02	0.00
33	d	0.02	0.02	-0.01	0.00	-0.01	-0.01	-0.01	0.00	0.00	0.00	0.01	0.02	-0.01	0.00	-0.01	-0.01	0.00	0.00	0.00
34	illiquidity	0.33	-0.03	0.04	0.27	-0.41	0.13	0.03	-0.04	0.01	0.02	-0.14	0.25	-0.30	-0.02	0.14	-0.01	-0.54	-0.08	-0.06
35	edf	0.32	0.04	-0.07	0.18	-0.10	0.06	-0.05	0.00	-0.02	0.00	-0.01	0.24	-0.17	0.05	0.03	-0.09	-0.12	-0.06	0.08
36	lnumrev	-0.19	-0.11	-0.14	-0.13	0.17	-0.02	0.03	-0.08	0.00	-0.02	0.11	-0.17	0.14	-0.04	-0.04	0.04	0.14	-0.26	-0.02
37	pctlbo_lag1	0.04	0.01	-0.02	0.05	-0.09	0.00	0.01	0.01	0.02	0.00	-0.02	0.06	-0.04	-0.01	0.05	0.01	-0.12	-0.01	-0.01

	Variable	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
20	size	1																	
21	market to book	-0.04	1.00																
22	leverage	0.08	-0.48	1.00															
23	relationship	0.27	0.02	0.01	1.00														
24	not rated	-0.68	0.04	-0.19	-0.21	1.00													
25	aaa	0.13	0.15	-0.07	0.05	-0.07	1.00												
26	aa	0.24	0.12	-0.08	0.04	-0.16	-0.01	1.00											
27	a	0.41	0.07	-0.09	0.12	-0.36	-0.03	-0.06	1.00										
28	bbb	0.36	-0.09	0.04	0.13	-0.43	-0.03	-0.07	-0.15	1.00									
29	bb	0.11	-0.08	0.18	0.03	-0.38	-0.03	-0.06	-0.14	-0.16	1.00								
30	b	-0.02	-0.04	0.25	0.00	-0.27	-0.02	-0.04	-0.10	-0.11	-0.10	1.00							
31	ccc	0.02	-0.03	0.10	-0.01	-0.06	0.00	-0.01	-0.02	-0.03	-0.02	-0.02	1.00						
32	cc	0.01	-0.01	0.04	0.01	-0.02	0.00	0.00	-0.01	-0.01	-0.01	-0.01	0.00	1.00					
33	d	0.00	-0.01	0.03	-0.01	-0.01	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	1.00				
34	illiquidity	-0.58	-0.20	0.17	-0.19	0.42	-0.05	-0.10	-0.19	-0.21	-0.15	-0.02	-0.02	0.00	0.00	1.00			
35	edf	-0.08	-0.17	0.33	-0.07	0.02	-0.02	-0.05	-0.08	-0.05	0.03	0.11	0.06	0.04	0.03	0.24	1.00		
36	lnumrev	0.19	0.04	-0.03	0.01	-0.12	0.03	0.11	0.14	0.09	-0.05	-0.06	-0.02	-0.04	-0.01	-0.12	-0.01	1.00	
37	pctlbo_lag1	-0.14	0.16	-0.17	-0.03	0.12	0.05	-0.02	-0.02	-0.09	-0.06	-0.01	0.03	-0.02	0.00	0.03	-0.02	-0.04	1.00

Table 2. Differences in Spreads:Institutional vs. Bank Loans

This table shows the differences in initial loan yield spreads between institutional and bank loan tranches. The full sample contains 21,632 observations from 1995 to 2006, including 2,358 insitutional loan tranches. The subsample of leveraged loans contains 10,257 observations during the same period, including 2,030 institutional loan tranches. The subsample of insitutional and bank loan tranches within the same loan deal (within-the-deal subsample) contains 4,025 observations, including 1,964 insitutional loan tranches. Pannel A presents the full sample results over the entire sample period as well as year-by-year results. Pannel B and C presents the parallel anlysis for the leveraged loan subsample and within-the-deal subsample.

Panel A: Full Sample

	Institutional Loans				Bank Loans				Mean Dif. Test	
Year(s)	**Obs.**	**Mean**	**Median**	**Std. Dev.**	**Obs.**	**Mean**	**Median**	**Std. Dev.**	**Wilcoxon**	**t Statistics**
1995-2006	2358	307.18	300	121.29	19274	166.99	150	118.78	50.95***	53.97***
1995	56	306.76	325	87.99	1243	147.30	137.5	97.36	9.99***	12.04***
1996	90	300.97	300	40.07	1644	150.70	150	96.18	13.77***	14.75***
1997	128	278.61	275	40.27	2033	143.32	130	98.57	15.16***	15.44***
1998	179	275.28	275	58.49	1819	156.36	150	91.29	15.91***	17.08***
1999	207	324.33	325	65.32	1642	176.69	175	108.96	17.82***	19.07***
2000	159	340.09	350	81.75	1695	168.24	150	114.64	16.26***	18.46***
2001	115	328.85	325	87.48	1625	169.14	150	116.66	12.86***	14.4***
2002	168	344.43	325	127.18	1547	183.34	150	128.18	14.08***	15.48***
2003	263	335.48	325	117.91	1539	198.37	175	132.10	14.94***	15.79***
2004	366	308.76	275	152.33	1713	187.67	162.5	142.57	15.54***	14.57***
2005	291	283.90	225	168.47	1605	169.72	145	144.42	13.8***	12.08***
2006	336	280.88	250	134.13	1169	153.17	125	132.06	17.47***	15.57***

Panel B: Leveraged Loan Subsample

	Institutional Loans				Bank Loans				Mean Dif. Test	
Year(s)	**Obs.**	**Mean**	**Median**	**Std. Dev.**	**Obs.**	**Mean**	**Median**	**Std. Dev.**	**Wilcoxon**	**t Statistics**
1997-2006	2030	314.59	300	124.01	8227	259.52	250	101.40	22.97***	20.91***
1997	118	281.99	275	35.26	935	228.44	225	69.00	11.01***	8.29***
1998	163	281.98	275	52.91	979	224.07	225	56.17	11.63***	12.29***
1999	190	327.56	325	63.90	896	251.24	250	78.93	13.22***	12.49***
2000	141	351.60	350	72.08	851	258.75	250	80.38	12.67***	12.88***
2001	97	340.28	325	74.27	753	266.88	250	83.21	8.46***	8.27***
2002	151	350.35	325	128.96	764	282.43	275	97.31	7.44***	7.39***
2003	250	343.40	325	114.09	868	283.96	275	106.14	7.79***	7.67***
2004	348	312.34	275	153.81	922	278.20	250	129.53	4.1***	3.97***
2005	259	298.52	250	171.69	754	272.72	225	145.33	2.06**	2.35**
2006	312	286.86	250	135.68	502	260.11	225	132.27	4.78***	2.78***

Panel C: Within-the-Deal Subsample

	Institutional Loans				Bank Loans				Mean Dif. Test	
Year(s)	**Obs.**	**Mean**	**Median**	**Std. Dev.**	**Obs.**	**Mean**	**Median**	**Std. Dev.**	**Wilcoxon**	**t Statistics**
1997-2006	1964	303.54	287.5	103.51	2061	274.65	275	80.58	9.94***	9.91***
1997	118	281.99	275	35.26	173	232.88	250	36.47	9.77***	11.43***
1998	163	281.98	275	52.91	232	233.42	225	48.37	8.8***	9.45***
1999	190	327.56	325	63.90	243	277.88	275	53.74	8.44***	8.78***
2000	141	351.60	350	72.08	197	289.72	300	47.02	8.77***	9.54***
2001	97	340.28	325	74.27	132	298.69	300	72.27	4.03***	4.25***
2002	149	348.00	325	127.91	166	317.83	300	91.29	2.22**	2.43***
2003	238	333.09	312.5	103.44	199	311.37	325	74.45	1.34	2.47***
2004	316	277.59	250	88.38	256	280.87	275	86.39	-1.17	-0.45
2005	245	272.67	225	129.40	235	270.54	250	112.27	-1.08	0.19
2006	307	281.60	250	129.20	228	251.66	245	92.27	2.39**	2.98***

Table 3. Loan Yield Spreads Models--Firm Fixed Effects Models

This table reports loan yield spread regression results controlling for firm fixed effects. Definitions of the variables are provided in the appendix. The dependent variable is the log of one plus all-in-drawn spread (%). Colume (1) shows the results for the full sample. Column (2) and (3) report the results for the leveraged loan and within-the-deal loan subsample (excluding all the second-lien loans), respectively. The variable of interest "instloan" is a dummy variable taking the value of 1 if the loan is term loan B or above, or 0 otherwise. Standard error of the estimated coefficiet is reported in the bracket. The standard errors are clustered at the loan deal level.

	(1)		(2)		(3)	
	Full Sample		**Leveraged Loans**		**Within-the-Deal Loans**	
Variable	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
instloan	**0.119*** **	**[0.007]**	**0.088*** **	**[0.008]**	**0.086*** **	**[0.008]**
maturity	0.001	[0.004]	0.01	[0.007]	0.001	[0.018]
secured	0.110***	[0.008]	0.049***	[0.012]	0.025	[0.020]
size	-0.054***	[0.008]	-0.028**	[0.012]	-0.057***	[0.020]
market to book	-0.023***	[0.005]	-0.01	[0.008]	0.005	[0.016]
leverage	0.225***	[0.035]	0.168***	[0.044]	0.335***	[0.093]
cash	0.076	[0.047]	-0.079	[0.080]	0.255	[0.191]
edf	0.207***	[0.023]	0.190***	[0.023]	0.157**	[0.061]
pricing grid	-0.020***	[0.007]	-0.052***	[0.009]	-0.017	[0.012]
relationship	-0.003	[0.005]	-0.012	[0.009]	-0.019	[0.016]
leveraged loan	0.286***	[0.010]				
second lien loan	0.420***	[0.036]	0.387***	[0.039]		
resold	0.054***	[0.010]	0.037***	[0.011]	0.008	[0.010]
loan size	-0.018***	[0.004]	-0.012**	[0.006]	0.008	[0.010]
facility ratio	-0.067***	[0.010]	-0.081***	[0.016]	-0.101***	[0.027]
financial covenant	-0.001	[0.008]	-0.002	[0.013]	-0.014	[0.020]
number of lender	-0.013***	[0.005]	-0.009	[0.007]	-0.012	[0.009]
Credit Rating Dummies	Yes		Yes		Yes	
Loan Purpose Dummies	Yes		Yes		Yes	
Year Dummies	Yes		Yes		Yes	
Observations	12024		5089		1657	
Adjusted R-square	0.899		0.767		0.829	

Table 4. Loan Yield Spreads Models--Deal Fixed Effects Models

This table reports loan yield spread regression results controlling for deal fixed effects. Definitions of the variables are provided in the appendix. The dependent variable is the log of one plus all-in-drawn spread (%). Colume (1) of Panel A shows the deal fixed effects model results for the full sample. Colume (2) and (3) of Panel A report the results for the leveraged loan and within-the-deal loan subsample (excluding all the second-lien loans), respectively. In Panel B, the main variable of interest "instloan" is segragated by years. Similar to Panel A, the analyses are conducted for the full sample, leveraged loan subsample, and within-the deal loan subsamples in colume (1), (2), and (3), respectively. The standard errors are clustered at the loan deal level.

Panel A: Insitutional Loan Effect

	(1) Full Sample		(2) Leveraged Loans		(3) Within-the-Deal Loans	
Variable	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
instloan	**0.084*** **	[0.011]	**0.073*** **	[0.010]	**0.084*** **	[0.009]
maturity	0.008	[0.005]	0.014	[0.011]	0.014	[0.020]
secured	0.035	[0.049]	-0.008	[0.029]	-0.009	[0.031]
pricing grid	-0.018	[0.017]	-0.029	[0.019]	-0.011	[0.014]
relationship	-0.026	[0.037]	-0.039	[0.049]	-0.026	[0.051]
leveraged loan	0.134	[0.095]				
second lien loan	0.364***	[0.087]	0.363***	[0.075]		
resold	0.016	[0.013]	0.016	[0.012]	0.015	[0.010]
facility ratio	-0.067***	[0.014]	-0.077***	[0.015]	-0.068***	[0.018]
number of lender	-0.007	[0.015]	-0.013	[0.017]	-0.012	[0.013]
Loan Purpose Dummies	Yes		Yes		Yes	
Year Dummies	Yes		Yes		Yes	
Observations	12642		5362		1749	
Adjusted R-square	0.99		0.955		0.912	

Panel B: Dynamic Changes of the Insitutional Loan Effect

	(1) Full Sample		(2) Leveraged Loans		(3) Within-the-Deal Loans	
Variable	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
instyy1995	**0.153*** **	[0.042]				
instyy1996	**0.105*** **	[0.025]				
instyy1997	**0.145*** **	[0.017]	**0.134*** **	[0.016]	**0.143*** **	[0.014]
instyy1998	**0.109*** **	[0.040]	**0.122*** **	[0.026]	**0.130*** **	[0.020]
instyy1999	**0.122*** **	[0.021]	**0.115*** **	[0.017]	**0.122*** **	[0.013]
instyy2000	**0.141*** **	[0.021]	**0.139*** **	[0.021]	**0.148*** **	[0.017]
instyy2001	**0.115*** **	[0.041]	**0.107*** **	[0.034]	**0.116*** **	[0.027]
instyy2002	**0.084***	[0.046]	**0.050***	[0.026]	**0.060*** **	[0.020]
instyy2003	**0.058** **	[0.024]	**0.053** **	[0.022]	**0.063*** **	[0.018]
instyy2004	**0.012**	[0.028]	**0.01**	[0.024]	**0.035***	[0.020]
instyy2005	**0.024**	[0.037]	**0.008**	[0.036]	**0.019**	[0.029]
instyy2006	**0.049**	[0.032]	**0.041**	[0.029]	**0.050** **	[0.023]
lmaty	0.007	[0.005]	0.008	[0.010]	-0.003	[0.020]
secd	0.032	[0.048]	-0.009	[0.028]	-0.009	[0.029]
perfpricing	-0.019	[0.017]	-0.03	[0.019]	-0.012	[0.013]

relationship	-0.026	[0.036]	-0.041	[0.048]	-0.027	[0.050]
levloan	0.129	[0.092]				
secondlien	0.376***	[0.079]	0.375***	[0.070]		
resold	0.013	[0.011]	0.01	[0.011]	0.009	[0.009]
facratio	-0.061***	[0.014]	-0.068***	[0.015]	-0.050***	[0.019]
lnlender	-0.002	[0.015]	-0.004	[0.017]	-0.003	[0.013]
Loan Purpose Dummies	Yes		Yes		Yes	
Observations	12642		5362		1749	
Adjusted R-square	0.99		0.958		0.921	

Table 5. Treatment Effects Models: The Choice of Issuing Insitutional Loan and Loan Yield Spread Models

This table reports the two-step treatment regression results. Panel A lists the results for the first-step probit regression in which the dependent variable is the dummy variable "instloan", which takes the value of 1 if the loan is term loan B or above, or 0 otherwise. Panel B shows the results for the second-step loan yield spread regression in which the dependent variable is the log of one plus all-in-drawn spread (%). Definitions of the independent variables are provided in the appendix. In Panel A and B, Colume (1) shows the results for the full sample. Colume (2) and (3) report the results for the leveraged loan and within-the-deal loan subsample (excluding all the second-lien loans), respectively. Standard error of the estimated coefficiet is reported in the bracket. The standard errors are clustered at the loan deal level.

Panel A: The Choice of Issuing Institutional Loans

	(1)		(2)		(3)	
	Full Sample		**Leveraged Loans**		**Within-the-Deal Loans**	
Variable	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
maturity	1.202***	[0.068]	1.211***	[0.076]	-0.029	[0.108]
secured	0.269***	[0.068]	0.088	[0.008]	0.016	[0.017]
size	-0.064**	[0.032]	-0.058	[0.038]	0.163***	[0.007]
market to book	-0.04	[0.033]	-0.018***	[0.004]	-0.030***	[0.006]
cash	-0.643**	[0.311]	-0.661*	[0.338]	-0.055	[0.485]
edf	0.127	[0.129]	0.098	[0.141]	0.129	[0.025]
illiquidity	-0.052	[0.034]	-0.074*	[0.039]	-0.090*	[0.007]
investment grade loan	-1.250***	[0.181]	-0.167	[0.189]		
not rated	-0.229***	[0.062]	-0.021***	[0.008]	-0.039	[0.011]
pricing grid	-1.081***	[0.056]	-0.068***	[0.064]	-1.250***	[0.026]
relationship	0.001	[0.054]	-0.047	[0.006]	-0.055	[0.084]
leveraged loan	0.617***	[0.075]				
loan size	0.304***	[0.034]	0.316***	[0.039]	-0.180***	[0.060]
facility ratio	-1.373***	[0.094]	-0.140***	[0.011]	-0.096**	[0.042]
financial covenant	0.459***	[0.073]	0.001	[0.009]	0.911***	[0.023]
number of lender	-0.141***	[0.038]	-0.110**	[0.005]	-0.091	[0.007]
lnumrev	-0.717***	[0.089]	-0.874***	[0.106]	-0.451***	[0.160]
pctlbo_lag1	1.944**	[0.992]	1.73	[1.074]	1.177	[1.519]
Industry Dummies	Yes		Yes		Yes	
Year Dummies	Yes		Yes		Yes	
Observations	11900		4980		1617	

Panel B: Loan Yield Spread Model Controlling for Treatment Effects

	(1)		(2)		(3)	
	Full Sample		**Leveraged Loans**		**Within-the-Deal Loans**	
Variable	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
instloan	**0.259*** **	**[0.017]**	**0.080*** **	**[0.023]**	**0.122** **	**[0.062]**
maturity	0.008**	[0.003]	0.013**	[0.007]	1.315***	[0.027]
secured	0.123***	[0.005]	0.057***	[0.084]	-0.322**	[0.132]
size	-0.048***	[0.002]	-0.013***	[0.004]	-0.01	[0.058]
market to book	-0.037***	[0.002]	-0.031	[0.037]	0.04	[0.052]
cash	0.021	[0.025]	0.019	[0.032]	0.211***	[0.057]
edf	0.309***	[0.012]	0.264***	[0.013]	0.209***	[0.213]

illiquidity	-0.016***	[0.003]	-0.010***	[0.003]	-0.006	[0.054]
investment grade loan	-0.267***	[0.006]	-5.102	[0.000]		
not rated	-0.004	[0.005]	-0.229***	[0.069]	0.019*	[0.094]
pricing grid	-0.016***	[0.005]	-1.070***	[0.008]	-0.035	[0.089]
relationship	0.005	[0.004]	-0.011*	[0.061]	-0.018*	[0.010]
leveraged loan	0.245***	[0.006]				
loan size	-0.015***	[0.003]	-0.002	[0.004]	-0.006	[0.007]
facility ratio	-0.084***	[0.007]	-1.138***	[0.107]	2.053***	[0.215]
financial covenant	-0.002	[0.006]	0.515***	[0.089]	0.014	[0.136]
number of lender	-0.007**	[0.003]	-0.027***	[0.045]	-0.029***	[0.059]
Industry Dummies	Yes		Yes		Yes	
Year Dummies	Yes		Yes		Yes	
Endogeneity Test: Chi(2) statistics is reported in the ().						
rho	-0.275		0.096		-0.173	
Lamda	-0.056	(-5.52)***	0.018	(-1.32)	-0.029	(-0.8)
Observations	11900		4980		1617	

Table 6. Switching Regressions with Endogenous Switching

This table presents results from a switching-regression model with endogenous switching. The switching-regression model consists of the first stage probit equation (the borrower-institutional lender matching model) and the second stage loan pricing regressions for institutional loans and non-institutional loans respectively. The dependent variable for the first satge borrower-insitutional lender matching model is the dummy variable "instloan", which takes the value of 1 if the loan is term loan B or above, or 0 otherwise. The dependent variable for the second stage loan pricing regressions is the natural logarithm of one plus initial all-in-drawn spread (%). Definitions of the independent variables are provided in the appendix. Inverse Mills-ratios calculated from the first stage are used to adjust for self-selection. The difference between the coefficients of the two categories is reported in the last column. Heteroskadesticity corrected robust standard errors adjusted for clustering at the deal level is presented in parenthesis.

	First-Stage Model		Second-Stage Models				Difference	
			Insitutional Loan Model		Bank Loan Model		Institutional-Bank	
Variable	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Diff.	Std. Err.
maturity	1.202***	[0.105]	-0.061	[0.057]	-0.005	[0.003]	-0.056	[0.044]
secured	0.269***	[0.065]	0.050**	[0.021]	0.119***	[0.009]	-0.069***	[0.026]
size	-0.064**	[0.032]	-0.013	[0.025]	-0.051***	[0.009]	0.038***	[0.010]
market to book	-0.04	[0.031]	-0.029**	[0.014]	-0.037***	[0.005]	0.007	[0.009]
cash	-0.643**	[0.275]	0.17	[0.194]	0.014	[0.049]	0.156**	[0.079]
edf	0.127	[0.126]	0.312***	[0.084]	0.301***	[0.026]	0.011	[0.047]
illiquidity	-0.052	[0.036]	-0.016	[0.024]	-0.015*	[0.008]	0	[0.013]
investment grade loan	-1.250***	[0.215]	-0.268***	[0.097]	-0.255***	[0.011]	-0.014	[0.103]
not rated	-0.229***	[0.055]	0.042	[0.030]	-0.005	[0.011]	0.048**	[0.020]
pricing grid	-1.081***	[0.060]	-0.025	[0.042]	-0.002	[0.008]	-0.023	[0.035]
relationship	0.001	[0.049]	-0.031	[0.020]	0.007	[0.005]	-0.037**	[0.016]
leveraged loan	0.617***	[0.078]	0.138***	[0.050]	0.241***	[0.011]	-0.103***	[0.035]
loan size	0.304***	[0.036]	-0.001	[0.017]	-0.020***	[0.004]	0.019	[0.014]
facility ratio	-1.373***	[0.092]	0.032	[0.049]	-0.053***	[0.012]	0.085*	[0.044]
financial covenant	0.459***	[0.071]	-0.048	[0.033]	-0.003	[0.009]	-0.045	[0.027]
number of lender	-0.141***	[0.038]	-0.027**	[0.011]	0	[0.005]	-0.028**	[0.011]
lnumrev	-0.717***	[0.096]						
pctlbo_lag1	1.944*	[1.006]						
imr			-0.043	[0.056]	-0.188***	[0.027]	0.145***	[0.046]
Observations	11900		951		10949			
Pseudo/Adj. R-square	0.448		0.379		0.766			

Table 7. Actual versus Hypothetical Primary Market All-in-Drawn Spread

This table compares the means and medians of actual loan spreads (in %) with their hypothetical counterparts for institutional loans and bank loans. The hypothetical loan yield spreads are calculated using the switching regression with endogenous switching model as presented in Table 6. The hypothetical measures reflect what the spread would be if institutional loans had been made by commercial banks and similarly if bank loans had been made by institutions. Panel A reports the results for the full sample, while Panel B and C report those for leveraged loan and within-the-deal loan subsample respectively. The *t* -statistics for differences in means are reported in the last column.

Panel A: Full Sample

		Observations	Mean	Standard Deviation	*Median*	Difference in means	t-statistics
Institutional Loans	Actual	951	2.785	0.279	2.750	0.384	12.85***
	Hypothetical	951	2.401	0.205	2.475		
Bank Loans	Actual	10949	1.293	0.507	1.250	-0.850	-120***
	Hypothetical	10949	2.144	0.337	2.378		

Panel B: Leveraged Loans

		Observations	Mean	Standard Deviation	*Median*	Difference in means	t-statistics
Institutional Loans	Actual	812	2.860	0.264	2.750	0.278	8.98***
	Hypothetical	812	2.581	0.146	2.569		
Bank Loans	Actual	4168	2.354	0.237	2.250	-0.670	-54.89***
	Hypothetical	4168	3.024	0.148	3.010		

Panel C: Within-the-Deal Loans

		Observations	Mean	Standard Deviation	*Median*	Difference in means	t-statistics
Institutional Loans	Actual	787	2.797	0.243	2.750	0.222	7.54***
	Hypothetical	787	2.575	0.145	2.561		
Bank Loans	Actual	830	2.553	0.220	2.500	-0.309	-13.31***
	Hypothetical	830	2.862	0.137	2.859		

Table 8. Changes in Probability of Default Before and After Loan Issues

This table reports the probability of default (measured by the expected default frequency (EDF))of firms before and after issuing insitutional loans or bank loans. Relative year t is the loan issue year. t-5,t-4,...,t+4, and t+5 indicate 5 years before, 4 years before, ..., 4 years after and 5 years after the loan issue, respectively. Panel A presents the univariate results and Panel B shows the results of the difference-in-differences regression analyses. The differeces reported in Panel B are the estimated coefficients on the interaction terms between each realtive year dummy (t-5, t-4, ..., t+4, t+5) and institutional loan dummy.

Panel A: Univariate Results

Relative Year	Firms issuing institutional loans	Firms issuing bank loans	Difference	t-statistics
t-5	0.109	0.0499	0.059	8.95***
t-4	0.115	0.0530	0.062	10.47***
t-3	0.089	0.0552	0.034	6.54***
t-2	0.096	0.0508	0.045	10.24***
t-1	0.096	0.0472	0.049	12.48***
t	0.097	0.0560	0.041	17.86***
t+1	0.117	0.0677	0.049	18.99***
t+2	0.163	0.0947	0.068	14.67***
t+3	0.190	0.1104	0.079	11.08***
t+4	0.148	0.1107	0.037	4.01***
t+5	0.107	0.1086	-0.002	-0.14
t-(t-3)	0.009	0.001		
	1.19	-0.51		
(t+3)-t	0.092	0.054		
	12.85***	34.02***		

Panel B: Multivariate Results

	Regression 1		Regression 2	
Relative Year	Coefficients	Std. Err.	Coefficients	Std. Err.
t-5	0.017	[0.023]	0.030	[0.025]
t-4	0.029	[0.022]	0.041*	[0.024]
t-3	0.009	[0.017]	0.019	[0.018]
t-2	0.033*	[0.017]	0.049***	[0.017]
t-1	0.035**	[0.017]	0.055***	[0.017]
t	0.026**	[0.010]	0.038***	[0.010]
t+1	0.040***	[0.010]	0.043***	[0.011]
t+2	0.079***	[0.016]	0.065***	[0.016]
t+3	0.104***	[0.022]	0.083***	[0.022]
t+4	0.082***	[0.027]	0.064**	[0.027]
t+5	0.065*	[0.038]	0.043	[0.039]
Industry Dummies	Yes		Yes	
Year Dummies	No		Yes	
Time trend control	Yes		Yes	
Differences in Coefficient:				
t - (t-3)	0.017		0.019	
	(0.78)		(0.92)	
(t+3) - t	0.078		0.045	
	(3.53)***		(2.01)**	
Observations	291881		291881	
Adjusted R-square	0.16		0.16	

Table 9. Post-Issue Probability of Default: Propensity Score Matching and Treatment Effect Model

This table analyses the post-issue probability of default of the institutional loan borrowing firms after controlling for the potential selection problem. Panel A column (3) reports the avergae expected default frequency of the insitutional loan borrowers at loan issue year (t), one year (t+1) and two year (t+2) after the loan issue. The corresponding information for the propensity score matched bank loan borrowers is reported column (4). t statistics for the mean difference tests are reported in the last column of Panel A. Panel B presents the two step treamtment regression results. The dependent variables are expected default frequency (EDF) at t+1 and at t+2 for regressions in column (1) and (2) of Panel B respectively. Standard error of the estimated coefficiet is reported in the bracket. The standard errors are clustered at the loan deal level.

Panel A: Expected Default Frequency of Treatment Group and Control Group--Propensity Score Matching

Year	Obs.	Firms issuing institutional loan	Matching Firms	Differece	t-statisitics
t	530	0.084	0.073	0.011	0.92
t+1	444	0.119	0.074	0.045	2.96***
t+2	294	0.138	0.07	0.068	3.28***

Panel B: Post-Issue Expected Default Frequency (EDF)--Treatment Model

	(1)		(2)	
	EDF after One Year		**EDF after Two Years**	
Variable	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
instloan	**0.061*** **	**[0.017]**	**0.056*** **	**[0.021]**
size	-0.002	[0.002]	-0.010***	[0.035]
market to book	-0.010***	[0.002]	-0.009***	[0.035]
cash	0.004	[0.024]	0.002	[0.029]
edf	0.388***	[0.012]	0.246***	[0.147]
illiquidity	0.012***	[0.003]	-0.074*	[0.003]
investment grade loan	-0.037***	[0.005]	-1.342***	[0.179]
not rated	0.006	[0.005]	-0.008	[0.070]
pricing grid	0.004	[0.005]	-0.932***	[0.006]
relationship	0.003	[0.004]	0.001	[0.005]
loan size	0.004	[0.003]	0.425***	[0.003]
facility ratio	-0.013*	[0.007]	-1.933***	[0.009]
financial covenant	-0.009*	[0.005]	-0.002	[0.074]
number of lender	0	[0.003]	-0.110***	[0.004]
Industry Fixed Effects	Yes		Yes	
Year Dummies	Yes		Yes	
Endogeneity Test: Chi(2) statistics is reported in the ().				
rho	-0.164		-0.118	
Lamda	-0.031	(-3.05)***	-0.024	(-1.96)**
Obs.	11517		9788	