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TWO ESSAYS ON BORROWING FROM BANKS AND LENDING SYNDICATES

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ABSTRACT OF DISSERTATION

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TWO ESSAYS ON BORROWING FROM BANKS AND LENDING SYNDICATES

ABSTRACT OF DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Business and Economics
at the University of Kentucky

by
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A loan “deal” is often composed of several components (for example, a 3-year revolving loan, a 10-year secured senior term loan, and a 5-year subordinated term loan). The division of a deal into two or more components, each with different risk characteristics, is called “tranching.” This study recognizes the importance of tranching and establishes tranching as an integral component of a syndicated loan structure.

In the first essay, we present a model to explain the economic value of tranching and show that riskier firms are more likely to take loans with multiple tranches. Therefore, the average credit spread on syndicated loans with multiple tranches is higher than that on non-tranched loans. However, after accounting for the risk characteristics of a tranched loan, we show that a given tranche of a multi-tranche loan, on average, has a lower credit spread than an otherwise similar loan that is not part of a multi-tranche loan. We also show that the benefits of tranching accrue primarily to borrowers with speculative debt ratings.

Prior studies have found an abnormal stock return of 100 to 150 basis points for firms that announce they have borrowed funds from a bank. Despite some conflicting evidence (Peterson and Rajan, 2002; Thomas and Wang, 2004; Billett, Flannery and Garfinkel, 2006), the literature tends to interpret this positive bank loan announcement effect as the market’s response to the mitigation of information asymmetry regarding the borrowing firm caused by the certification role of the lending banks who act as quasi-insiders.

In the second essay, we document that a strong selection bias exists in prior studies. We show that less than a quarter of the loans made by banks are ever announced by borrowing firms and the loans that are announced are systematically different from loans that are never announced by the firms. Firms with low debt ratings, firms with zero or negative profits but positive interest expense, firms that take large loans in relation to their assets base, firms with little analyst following, and firms with high forecasted EPS growth are more likely to announce their loans. We show that while there was a positive announcement effect over the period 1987 to 1995, loan announcements elicited zero or negative returns in the last ten years as the mix of companies announcing loans changed over time.

KEYWORDS: Syndicated Loans, Tranching, Selection Bias, Loan Announcement Effect, Borrower Peroformance

Pankaj Kumar Maskara

July 31, 2007

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To

My Teacher

Mrs. Geeta Rana

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION TO SYNDICATE LENDING

An important form of financing that has received relatively little attention in the finance literature is the syndicated loan (Panyagometh and Roberts, 2002; Eichengreen and Mody, 2000; Sufi 2007). While this medium provides annual potential funding (commitments issued) of over $1 trillion and represents 51% of the U.S. corporate borrowing in a given year (Weidner, 2000), only a few studies have investigated the formation of syndicates and the pricing of loans in this market.[1,2] The syndicated loan market is highly global, and 60% of all syndicated loans originated in the United States during 1981 to 1999 had some form of foreign bank participation.

I. Syndicated loans

A syndicated loan requires that two or more lending institutions jointly agree to provide credit to a borrower (Dennis and Mullineaux, 2000). Typically, a bank—referred to as a "lead bank"—wins the mandate to form and manage a syndicate on behalf of the borrower. The lead bank then selects the number and identity of institutions that will be invited to participate in the syndication, the menu of amounts ("brackets") that will be offered, and the size of each participant's allotment. The invited participants do not generally participate in the negotiation process.[3] Syndication allows lead banks to arrange large loans that, if they acted alone, they could not book without either breaching regulatory or internal concentration limits (Thomas and

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[1] According to the Loan Syndication and Trading Association (LSTA), new issue volume of syndicated loans was $930 billion in 2003 for the United States alone. In the same year, according to the Bond Market Association, new issues of corporate bonds totaled $765 billion. The gross issuance of new credit facilities globally was over $2 trillion in 1999 (Rhodes, 2000).

[2] Weidner (2000) reports in the *American Banker* that syndicated lending accounts for more underwriting revenue for the financial sector than both equity and debt underwriting.

[3] See Dennis and Mullineaux (2000) for details on the syndicated loan underwriting process.

Wang, 2004). To better address the factors influencing bank participation in syndicated lending, we must understand the history of the syndicated loan market.

II. The history and the evolution of the Syndicated loan market

Syndicated lending originated in the 1960s in the international banking market (Rhodes, 2000). The basic techniques of syndication were developed when groups of lenders came together to participate in large loans, primarily to governments. However, today's syndicated loan market is largely a result of financial innovation and developments in the United States (Armstrong, 2003).

In the 1980s, LBO and real estate development activities in the United States were at their peak. Banks regularly funded the large financial needs of corporations for such activities through loan syndications. The primary motivation for banks to syndicate loans was to limit their exposures to borrowers.[4] Over the nineties as the syndicated loan market grew, legal changes were made to standardize loan trading. The Loan Syndication and Trading Association (LSTA) was set up in 1995 to facilitate the growth of syndicated loan trading. S&P and Moody's started rating individual syndicated loans, and rate-of-return indexes were created to facilitate comparison with other asset classes. These developments resulted in the growth of non-investment-grade syndicated loans with credit spreads of 150 basis points or more over LIBOR (London Inter Bank Offer Rate).

Large loans today commonly comprise multiple components or "tranches" targeted to meet the risk-return needs of banks, insurance companies, and investment funds.[5] Now investments banks not only participate in syndicated loans but they compete with commercial banks to win mandates to lead them. Harjoto, Mullineaux, and Yi (2005) document that investment banks led

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[4] Section 84 of the National Banking Act, 12 U.S.C. Section *et seq*., limits the credit exposure of national banks to any one borrower to 15% of the unimpaired capital and unimpaired surplus of the bank (Wienke, 1994).

[5] A syndicated loan deal often comprises several components (for example, a three-year revolving loan, a ten-year secured senior term loan, and a five-year subordinated term loan). The division of a loan deal into two or more components, each with different risk characteristics, is called tranching, and each component is called a "tranche." One or more syndicate members can participate in any given tranche of a multi-tranche syndicated loan.

over 1,300 commercial loan syndications, raising almost $768 billion in funding, between 1996 and 2003 (inclusive). Like mortgages and consumer loans, corporate loans are often securitized.

The syndicated loan market that initially financed LBO and real estate development deals now serves corporate financing needs for a large universe of activities ranging from repayment of debt, project financing, and procurement of property, plant, and equipment to working capital financing. While one-third of syndicated loan volume from 1981 to 1990 was used to fund LBO and M&A activities, the majority of the funds raised over the last decade were used for general corporate purposes and for debt repayment. The syndication market now permits participants to tailor more precisely their credit risk exposures during both the primary distribution and secondary market trading phases (Armstrong, 2003). However, syndicated loans are not free of some common problems that plague any form of financing, namely adverse selection and moral hazard.

III. Adverse selection and moral hazard

In a syndicate setting, each bank is a direct lender to the borrower, with every member's claim evidenced by a separate note, although there is only a single loan agreement contract. Normally, the lead arranger acts as an agent for the group, distributing information about the borrower to the syndicate members, coordinating the documentation process, negotiating the loan with the borrower, and administering repayments, for a service fee of 10 to 40 basis points.[6] Since the lead arranger may have better information about the borrower than other syndicate members have, there is a potential for adverse selection and moral hazard problems. The lead arranger has an incentive to syndicate those loans on which its "inside information" is less favorable, for example. However, empirical evidence suggests that a lead bank generally does not abuse its information advantage over other syndicate members, presumably to maintain its reputation and to ensure that other banks will continue to participate in future syndicates led by the bank. Additionally, credit rating agencies now evaluate some syndicated loans and provide the participating banks with third-party assessments (Armstrong, 2003).

[6] Dennis and Mullineaux (2000) describe in detail the process the lead arrangers follow to originate a syndicated loan.

IV. Relationship-based and transaction-based characteristics

A syndicated loan is a hybrid form of debt that falls somewhere between private debt finance from a bank involving a single creditor and corporate bond finance where there are many creditors.[7] Syndication not only has the characteristics of traditional relationship-based bank financing, but also quite a few characteristics of transaction-based bond financing (Boot and Thakor, 2000). Each loan syndicate is organized for the execution of a narrow set of transactions associated with a single offering, which is analogous to a transaction-based debt offering in the capital market. Altman and Suggitt (2000) use a sample of syndicated loans over 1991 to 1996 and find that the mortality rates of syndicated loans measured cumulatively over a five-year period are quite similar to those on corporate bonds.

However, the transaction-based features of syndicated loans do not tell the complete story. The brief formal lifespan of syndicates belies the stable informal relationships among participating banks evidenced by extensive overlap in membership across syndicates (Eccles and Crane, 1988; Pichler and Wilhelm, 2001). Syndicated loans also embody information specific to the borrower, and the lead bank screens and monitors the borrower in a relationship-like context (Dennis and Mullineaux, 2000). Sufi (2007) finds that whenever the borrowing firm requires more investigation and monitoring, the lead arranger chooses participants who have prior relationships with the borrower. Also, unlike announcements of bond financing that are known to elicit negative stock returns, announcements of syndicated loans elicit zero or insignificantly positive stock returns (Eckbo, 1986; Jung, Kim, and Stulz, 1996; Howton, Howton, and Perfect, 1998; Gasbarro, Le, Schwebach, and Zumwalt, 2004).

[7] For a thorough review of the definition and the characteristics of a syndicated loan, see Armstrong's (2003) Bank of Canada working paper series.

CHAPTER 2

ECONOMIC VALUE IN TRANCHING OF SYNDICATED LOANS

I. Introduction

Bankers have long appreciated the credit risk diversification effect of multiple loans to borrowers in different industries and different regions. Banking regulations recognize this benefit and credit risk models explicitly account for such diversification. The academic literature tends to equate the credit risk diversification effect to the portfolio effect in equity holdings, despite the well-documented difference in the return distributions of equity and debt portfolios.[8] Another determinant of credit risk built into regulatory framework of banking and in credit risk models is the portfolio's granularity. Granularity reflects the extent to which only a few obligors account for a given fraction of a debt portfolio's default exposure. It is inversely proportional to credit concentration risk.[9] Banks tend to decrease their credit risk by selling or participating in syndicated loans. The division of a large loan into smaller, homogenous parts leads to higher granularity when spread across multiple banks. Borrower-specific risks get diversified in the process. This aspect of the syndicated loans is self-explanatory, given our understanding and knowledge of credit risks and portfolio diversification effects. However, another feature of syndicated loans has received little attention in the academic literature. Syndicated loans can be "tranched" into heterogeneous rather than homogenous components that can then be distributed across lenders differentiated by their risk aversion. We illustrate this distinction using an example below.

When company A borrows an additional $500 million from a single bank B, the lending bank B is exposed to a significant amount of credit risk because a sizeable percentage of B's debt

[8] Altman and Saunders (1997) survey the literature on credit risk measurement and discuss the return distributions of debt and equity portfolios.

[9] Credit concentration risk is associated with the probability of a large decline in the portfolio value because of default/downgrade of one or a few obligors that form a large percentage of the portfolio value.

portfolio is now exposed to a single obligor. The $500 million loan to company A decreases the granularity of B's portfolio and increases B's credit concentration risk. However, if B syndicates the loan to ten banks, it can divide the $500 million into ten pieces of $50 million each. The ten loans are made under the same loan contract, but each of them is now made by a different bank. This breakup of a loan among syndicate members ensures that no single bank assumes an oversized exposure to company A. This results in higher granularity of debt portfolios of all the participating banks in the loan syndicate and is known as the credit risk diversification effect. However, if company A is borrowing $500 million to repay $400 million in debt and to meet its working capital need of $100 million, then the $500 million loan can be structured as a multi-tranche deal.[10] The multi-tranche loan deal will have two components—a $100 million revolving line of credit and a $400 million term loan. This loan deal could then be financed by a loan syndicate. The participating banks in the syndicate with high risk aversion would participate in the relatively low risk revolving loan tranche, and other lenders with relatively higher tolerance for risk could participate in the riskier term loan tranche. In this case, a $500 million loan was tranched into two heterogeneous components—a revolving loan and a fixed term loan. Each component was then broken into homogenous slices and syndicated among the participating banks in each tranche.

The silence of the academic literature on this topic is intriguing because over 35% of all syndicated loan deals originated in the nineties had multiple tranches. The increased participation of investment banks and other financial and nonfinancial institutions in the syndicated loan market has made tranching more important. Our model shows that tranching will have value when lenders have varying levels of risk aversion. The entry of investment banks, hedge funds, and mutual funds into the syndicated loan market has fulfilled this basic requirement. For instance, 1,087 of the syndicated loans originated in 1999 had multiple tranches, compared with 692 of the 1995 deals and 343 of the 1990 deals (refer to Figure 2.2).[11] Though the majority of the tranched loans made during our sample period of 1987 to 1999 had only two tranches, some

[10] The word "deal" refers to a package of loans made to a borrower at the same time. In our study, for single-tranche loans (the regular loan of $500 million in our example), "deal" simply refers to the single tranche. Multi-tranche loans have also been referred to as "tranched loans." Single-tranche loans have also been referred to as "non-tranched loans" or "non-tranched loan deals."

[11] As a percentage of total number of syndicated loan deals, the number of loan deals with multiple tranches has not increased over the sample.

deals had as many as 11 (refer to Figure 2.1). A tranched deal had an average of 2.49 tranches during our sample period.

This research is the first to highlight this feature of syndicated loans. We show a basic difference in syndicated loans that use tranching and those that do not. We present a model that highlights the economic rationale behind this feature and provide empirical evidence to support our model. We show that loans to riskier borrowers are more likely to be tranched and, consequently, the average credit spread on tranched loans is higher than that on non-tranched loans. However, when we account for the risk characteristics of the loan, a tranche that is a part of a multi-part deal has a lower credit spread than a single-tranche loan with similar loan and borrower characteristics. We also show that the economic benefits of tranching are more pronounced in loans made to riskier borrowers with speculative senior debt ratings.

This chapter is organized as follows. In the next section we review the literature on syndicated loans and credit risk. This literature is silent on tranched syndicated loans, so we also review the securitization literature on tranching of other types of debt. In section III we present our theory on tranching and our hypotheses. Then we present empirical evidence to support our theory and test the robustness of our results. In section V, we conclude.

II. Literature Review

We borrow from four different strands of literature in this chapter. The first stream was pioneered by Dennis and Mullineaux (2000). This literature deals with the composition and structure of syndicated loans. A syndicated loan has some characteristics of traditional, relationship-based bank financing and some characteristics of transaction-based, bond financing (Boot and Thakor, 2000). The banking literature has focused primarily on issues of moral hazard, adverse selection, and the benefits of monitoring in analyzing relationship banking. The composition and structure of a syndicated loan is usually designed to address these major concerns. Simons (1993) argues that diversification is the primary motive for syndication. She also finds that loan managers, to protect their reputations, do not exploit their superior information about borrower quality. Along the same lines, Dennis and Mullineaux (2000) and

Ivashina (2005) find that lead managers keep a larger proportion of information-problematic loans in their own portfolios.[12] Dennis and Mullineaux (2000) also find that the likelihood a loan will be syndicated increases with the transparency of the borrower's information and the reputation of the syndicate's managing agent. Panyagometh and Roberts (2002) find evidence that lead banks take steps to resolve conflicts of interest in lending syndicates by retaining a large portion of loans to borrowers that are subsequently downgraded.

The lead syndicate arrangers usually have prior relationships with borrowers. The lead banks also play a significant role in identifying and selecting members of the lending group, depending on past or potential relationships.[13] Eccles and Crane (1988) and Pichler and Wilhelm (2001) document the extensive overlap in membership across syndicates. Sufi (2007) finds that whenever the borrowing firm requires more investigation and monitoring, the lead arranger chooses participants who have prior relationships with the borrower. Additionally, the lead arranger forms a concentrated syndicate (Lee and Mullineaux, 2004) and chooses participants that are geographically closer to the borrower when the creditor requires more intense investigation and monitoring efforts (Sufi, 2007). On the same lines, Esty and Megginson (2003) evaluate the syndicate structure on project finance syndicated loans to firms in 61 countries and find that loans in countries with weaker creditor protection have more syndicate members. They suggest this prevents strategic default by borrowers. Lee and Mullineaux (2004) find that reputable lead banks form large and diffuse syndicates, presumably because reputation formation and maintenance requires a large network of contacts and frequent repeat business. On similar lines, Corwin and Schultz (2004) examine IPO syndicates and find evidence that co-managers serve an important information production role and that previous relationships among syndicate members are strong determinants of future relationships. Although over 35% of the syndicated

[12] While agent banks generally hold a larger share of their low-quality loans, agent banks that have a greater concentration of lower quality loans in their portfolio hold a smaller share of their loans. This implies that some banks specialize in originating loans for borrowers who fall in the lower end of the credit spectrum, and such banks are relatively successful in finding participants for their loans (Jones, Lang, and Nigro, 2005)

[13] Not only do the lead banks have relationships with the borrower, but other participant banks may have prior relationship with the borrower. This decreases the information asymmetry problem. Additionally, the syndicate members oftentimes have relationships with each other.

loans in the United States are tranched, this stream of literature has ignored tranching as an integral component of syndicated loan structure.

The second strand of literature relevant to our study deals with the pricing of syndicated loans. This includes Dennis and Nandy, (2000); Harjoto, Mullineaux, and Yi (2006), and Ivashina (2005). This literature contends that loan pricing is a function of lender characteristics, borrower characteristics, and loan structure. Carey, Post, and Sharpe (1998) study different types of financial intermediaries and find evidence that, compared with banks, finance companies make secured loans more frequently and are more likely to lend to riskier borrowers. Harjoto, Mullineaux, and Yi (2006) find that investment banks lend to less profitable, more leveraged firms and charge smaller credit premia for leverage than commercial banks. Hao (2003) examines the effects of bank characteristics on loan spreads and finds that weakly capitalized banks and banks with greater monitoring power extract higher rents. Hubbard, Kuttner, and Palia (2002) find that banks with low capital tend to charge higher rates than well-capitalized banks. Coleman, Esho, and Sharpe (2002) find that lender monitoring ability, bargaining power, risk, and syndicate structure are significant influences in determining loan maturity and pricing.

Strahan (1999) finds that observably riskier firms face tighter non-price terms in their loan contracts. Loans to small firms, firms with low ratings, and firms with little cash available to service debt are more likely to be small credits, to be secured, and to have a short contractual maturity. He also finds that loan pricing is similar for unrated firms and those with speculative grade ratings. Ivashina (2005) observes that loan prices on syndicated loans are cheaper than sole lender loans, other things equal. Angbazo, Mei, and Saunders (1998) investigate highly leveraged loans and find that syndicated loans have lower spreads. Dennis and Nandy (2000) find similar results for revolving loans. Ivashina (2005) argues that agency problems and the cost of borrowing can be effectively reduced by controlling the share retained by the lead arranger. She finds a consistently persistent negative relationship between loan yields and the share retained by the lead arranger.

Gottesman (2004) investigates the relation between loan spreads and the default-free rate and finds that lenders increase commitment fees on revolving loans as LIBOR decreases. For the borrower, the increase in the commitment fee partially offsets the advantages of lower interest cost on borrowed funds. However, Gottesman (2004) finds no evidence of an increase in annual fees on term loans as LIBOR decreases. Harjoto, Mullineaux, and Yi (2006) find that investment banks commonly offer term loans rather than commitment contracts and price them more generously than do commercial banks.

Perceptions of credit risk form the primary basis for pricing loans, so the third field of literature relevant to our study focuses on credit risk models and credit risk diversification. Credit risk is defined as the degree of value fluctuations in debt instruments and derivatives because of changes in the underlying credit quality of borrowers and counterparties (Lopez and Saidenberg, 2000). Loans are characterized by returns distributions that are asymmetric and highly skewed and exhibit very flat tails on the downside, indicating a significant credit risk element. There are several components of this risk: default risk, migration risk, spread risk, recovery risk, and concentration risk.[14] Banks closely monitor the credit risk of their loan portfolios because their profitability and long run survival are a function of the amount of credit risk they take. Additionally, after amendments to the Basel Accord in 2004, banking institutions worldwide are encouraged to maintain regulatory capital based on the credit risk of their portfolio. Large banks commonly use Value at Risk (VaR) models to manage their portfolio credit risk (Altman and Suggitt, 2000). The four most widely used credit risk VaR models in the industry are CREDITRISK+ from Credit Suisse, CreditMetrics from JP Morgan, Credit Portfolio View from McKinsey & Co., and Portfolio Manager from KMV Moody's. These models account for the concentration risk and the default correlation across different borrowers in loan portfolios.[15] When a loan is syndicated and tranched, concentration risk in the credit portfolios of participating banks and the default correlation across different loans in the portfolio of each bank are decreased. This results in lower credit risk for all the participating banks.

[14] Default risk is associated with the possibility that the borrower will not meet its obligations to repay debt in a timely manner. Migration risk is associated with the possibility that the borrowing firm will be downgraded in the future thereby making the risk/return tradeoff on the loan inadequate. Spread risk is the risk that equilibrium conditions in the market will change and the return required for risky assets will change for all risk ratings (Verma et al., 1998, Crouhy et al., 2000). Recovery risk is the uncertainty associated with the amount the lender will receive in the default state.

[15] The models also account for recovery in the default state. Increased granularity because of tranching of syndicated loans does not affect recovery prospects.

For illustration purposes we consider a bank that has 15% of its debt portfolio exposed to the credit risk of its top five obligors. If this bank participates in a loan syndicate making a multi-tranche loan to some other obligor and adds a small loan to its debt portfolio, the total size of its debt portfolio will increase. As a result, less than 15% of its portfolio will now be exposed to its top five obligors. As long as the new loan does not add new exposure to its existing top obligors and is not relatively larger than a normal loan in the bank's portfolio, the concentration risk of the bank's debt portfolio will decrease. While the average syndicated loan, especially a multi-tranche syndicated loan, is almost two times larger than the average single-lender loan, the average loan after tranching and syndication to participating lenders is smaller than the mean single-lender loan. Second, when a small loan is added to the debt portfolio, the new loan is unlikely to have a perfect positive default correlation with the existing loans in the debt portfolio. Portfolio theory states that adding an asset with less than perfect positive return correlation with the existing assets results in diversification benefits. Hence, tranching a loan into two or more components and syndicating the tranches results in lower portfolio credit risk for all the participating banks.

Although no papers in the syndicated loan or credit risk literatures address tranching, several papers in the securitization literature do. Tranching in a securitization issue involves breaking a pool of homogenous assets (e.g., mortgages, auto loans, and credit card receivables) into groups with varying risk characteristics (e.g., different seniority, collateral, or liquidity characteristics) so that each tranche can be sold at different prices in the capital markets. DeMarzo (2005) surveys the literature on this strategy and notes three broad explanations for tranching: asymmetric information, market incompleteness, and transactions costs.

According to Boot and Thakor (1993) and Plantin (2004), tranching adds value when heterogeneous investors have different private information and different capabilities to screen investments. The models of DeMarzo and Duffie (1999) and DeMarzo (2005) account for the trade off between the information-destruction effect of pooling and the risk diversification effect of tranching.[16] Gaur, Seshadri, and Subrahmanyan (2003) suggest market incompleteness as the source of tranching's value. Tranching creates new assets with different risk and return profiles. This makes the market more complete by satisfying the unmet needs of some investors in certain states of the world. Duffie and Rahi (1995) and Riddiough (1997) note that explanations based on information asymmetry and market incompleteness could coexist with respect to different tranches within a single issue. For example, the senior tranche could be driven by asymmetric information and multiple junior tranches might be designed to exploit specific appetites of various investor clienteles. Other theories focus on the transaction costs of tranching. Cuchra and Jenkinson (2005) systematically test the theories on tranching using data on European securitizations and find support for the asymmetric information and market incompleteness explanations.

Tranching a syndicated loan also involves the bundling and repackaging of rights to future cash flows. The assets in a tranched syndicated loan are those of a single borrower, unlike the pool of various underlying assets in a securitized issue. Therefore, the return distribution of the underlying assets in securitization resembles that of an equity holding, whereas the distribution of the underlying assets in syndication tranching has the characteristics of debt. Most important, a syndicated loan is carved into two or more tranches to meet the different financing needs of the borrowers (such as revolving loans for short-term working capital needs and term loans for debt repayment). The main motive for securitization is to raise cash by removing assets from the balance sheet so that more loans can be originated.

Therefore, our model only partially resembles the theoretical explanations for securitization. As with the market incompleteness theory of securitization where junior tranches are designed to meet the specific needs of certain investors, our model also suggests that syndicated loans are carved into tranches with different risk characteristics to suit the different risk aversions of investors. However, in our model, we do not rely on information asymmetry between the participating syndicate lenders to explain tranching. Even though the participants in a syndicated loan may have different levels of private information on the borrower and have different

[16] In home-loan securitizations, when a large number of individual mortgages are pooled, the information regarding the creditworthiness of individual borrowers is lost in the process. This loss of information always increases uncertainty and is referred to as the information destruction effect.

capabilities to screen investments, our model does not assume such information asymmetry. We assume instead that different participant lending groups in syndicated loans have different levels of risk aversion. These differences in the risk aversion could reflect different levels of private information or different capabilities of screening investments, among other things.

III. The Model

The underlying assumption is that there are different types of participants, *i*, in the syndicated loan market.[17] For the sake of simplicity, we will assume two types of participants—banks (*B*) and non-banks (*NB*). These participants face different regulatory environments. Their primary source of funds also differs and, therefore, their cost of funds may be different. In our simple world, banks face stricter regulatory requirements and are bound by rules pertaining to acceptable risk-taking behavior. They have access to deposits that are explicitly or implicitly insured by the government and consequently have a low cost.[18] Non-banks face weaker regulatory requirements.[19] They are governed by sound business principles, but do not have access to deposits that are insured by the government and, consequently, have a higher cost of funds than banks. Rationality dictates that lenders will enter into loan agreements only if the returns on the loans are greater than the costs of funds. We refer to this minimum required return as the reservation return $\overline{R}$. This implies that reservation return of non-banks exceeds the reservation return of banks ($\overline{R}_{NB} > \overline{R}_{B}$). Also, reflecting differences in the characteristics of participants *i*, each participant type will have a different level of risk aversion, *A*, the return required to compensate them for a marginal unit of risk.[20]

$$A_i = f(\text{cost of funds, regulatory environment})$$

[17] Maskara (2006) shows that there are different types of participant groups in the syndicated loan market that behave differently.

[18] Harjoto, Mullineaux, and Yi (2006) state that investment banks differ from commercial banks in terms of (1) sources of funds, (2) regulation, (3) relevance of customer relationships, (4) prospects for economies of scope, and (5) accounting rules and regulations.

[19] Commercial banks are more heavily regulated than investment banks because they accept insured deposits (Harjoto, Mullineaux, and Yi, 2006).

[20] Commercial banks are examined regularly to prevent "excessive risk-taking," which effectively increases their risk aversion relative to non-examined lenders.

As its cost of funds increases, participant *i* must make increasingly riskier loans to cover the expense of borrowing. Therefore, A_i is a decreasing function of the cost of funds. On the other hand, A_i increases with the degree of regulation a participant faces. This implies that at a given risk level K, $A_{NB} < A_B$. Also, $A_i(K) \geq 0 \forall K$ and $A_i = 0 \forall K < K^{-1}(\overline{R}_i)$.

Both types of participants face a similar choice set of borrower/loan combinations. The borrower/loan combinations (BLC) are continuously distributed over a spectrum of credit risk, K, with a probability distribution function $p(K)$. We assume that the credit risk of a borrower is adequately characterized by the credit rating, Q, assigned to it by a rating agency. Moody's Investor Service (1991 p. 73) states that "ratings are intended to serve as indicators or forecasts of the potential for credit loss because of failure to pay, a delay in payment, or partial payment." Standard and Poor's (1998, p. 3) states that its ratings are an opinion of the general creditworthiness of an obligor based on relevant risk factors. The corporate rating of a firm is a function of its asset size, financial leverage, and business risk (Standard and Poor's, 2006). The credit risk of a loan is a function of the seniority of the loan, size of the loan, type of loan (whether term loan, revolver, or lease), maturity of the loan, and whether the loan is secured or not. This implies that the credit risk, K, of a BLC can be expressed as follows:

$K =$ f(Q, maturity, seniority, loan type, secured status, loan size-to-asset size ratio)

Where,

$Q = f$(asset size, financial leverage, business risk)

The participants in a syndicated loan consider the quality of both the borrower and the loan. Their objective function is to earn a return, R, based on the credit risk K, of the BLC such that

$$R_i(K) = \overline{R}_i + \int_{K^{-1}(\overline{R}_i)}^{K} A_i \, dK \qquad (1)$$

The firm's objective function is to borrow the required funds at the lowest total cost. If a BLC has a credit risk profile that implies R_B is less than the reservation return of the non-bank, the borrower has no incentive to borrow from the non-bank. However, if credit risk, K, of a BLC(B,L) implies $R_B(K) > \overline{R}_{NB}$, the borrower will always minimize costs by tranching the loan into two different loans of size α and 1-α, each with different loan characteristics, such that the credit risk, K_1, of BLC(B,αL) will imply $R_B(K_1) < \overline{R}_{NB}$ and the credit risk, K_2, of BLC(B,(1-α)L) will imply $R_B(K_2) > \overline{R}_{NB}$.[21] The tranching should be done such that $K_1 + K_2 \leq K$. This condition implies that no additional risk is created during the tranching process. The existing risk is just distributed differently among the two components of the loan. As illustrated earlier, tranching and syndicating loans can decrease concentration risk and allow for risk to be distributed across different lenders, thereby providing diversification benefits. Hence, after tranching the weighted total risk of the loan to participating lending banks may decrease. The total cost of borrowing of the tranched loan will be $R_B(K_1) + R_{NB}(K_2)$. This implies:

$$R(K_1 + K_2) = \alpha(\overline{R}_B + \int_{K^{-1}(\overline{R}_B)}^{K_1} A_B dK) + (1-\alpha)(\overline{R}_{NB} + \int_{K^{-1}(\overline{R}_{NB})}^{K_2} A_{NB} dK) \qquad (2)$$

If the borrower were to borrow loan L from banks or non-banks alone, its cost of borrowing would be $R_B(K) = \overline{R}_B + \int_{K^{-1}(\overline{R}_B)}^{K} A_B dK$, and $R_{NB}(K) = \overline{R}_{NB} + \int_{K^{-1}(\overline{R}_{NB})}^{K} A_{NB} dK$, respectively. As $\overline{R}_{NB} > \overline{R}_B$, $A_{NB} < A_B$ at any given level of risk $K > K^{-1}(R_B)$, and $A_{NB} = A_B = 0$ for $K < K^{-1}(R_B)$, we note that:

$$R(K_1 + K_2) < R_B(K), \text{ and } R(K_1 + K_2) < R_{NB}(K) \quad \forall R_B(K) > \overline{R}_{NB} \qquad (3)$$

Equation (3) shows that tranching creates economic value. It states that for all BLCs with credit risk that justifies a return higher than the reservation return of non-banks, the total cost of borrowing will be lower if the loan is tranched into two parts and the firm borrows each part from different types of participants rather than borrowing from either participant type alone. This leads to our first and second hypotheses.

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[21]The primary activity of a participant in the syndicated loan market is a good indicator of the risk aversion of the participant. Hence, Maskara (2006) categorizes participants in the syndicated loan market into groups based on their primary activity and shows that investment banks are more likely to arrange, to play a lead role, or to participate in a multi-tranche loan than a single-tranche loan. Using different measures of risk, he also shows that investment banks are more likely to participate in the riskier tranches of a multiple-tranche loan. Additionally, non-bank financial institutions operating in relatively less constrained regulatory environment are also more likely to participate in the riskier tranches of a syndicated loan.

Hypothesis 1: The total cost of borrowing to an average firm will be lower if the loan is tranched when compared with a non-tranched loan of the same size and risk characteristics.[22]

Hypothesis 2: The benefits of tranching will accrue primarily to borrowers with high credit risk.

As noted above, loan tranching has gained momentum over the last decade based on the entry of institutions such as hedge funds, mutual funds, and investment banks into the syndicated loan market. As our simple model illustrates, tranching has economic value when lenders have different levels of risk aversion. Our model can easily be extended to support *n* different types of participants. As we increase the value of *n*, the benefits from tranching will increase subject to the transaction costs of tranching.

Now we make an assumption of efficient markets and complete information. Under the environment of complete information, a borrower will not take a non-tranched loan when it is economically beneficial to take a tranched loan. Also, in an efficient market with unique prices $R_B < R_{NB}$ for $K < K^{-1}(\overline{R}_{NB})$, $R_B = R_{NB}$ for $K = K^{-1}(\overline{R}_{NB})$, and $R_B > R_{NB}$ for $K > K^{-1}(\overline{R}_{NB})$. Also, no loans can be made for $R < K^{-1}(\overline{R}_B) \forall K \in [0, \infty)$.

In an efficient market with complete information, all BLC(B,L) will be tranched such that credit risk level K_i of each BLC$(B, \alpha_i L)$ where $\sum \alpha_i = 1$ will be loaned by participant *i*, ordered in ascending order of reservation returns, such that $K_i = K^{-1}(\overline{R}_{i+1})$ if $K > K^{-1}(\overline{R}_{i+1})$. If $K > K^{-1}(\overline{R}_i)$, but $K < K^{-1}(\overline{R}_{i+1})$, $K_i = K$. In our simple example of two types of participants, all BLC(B,L) with credit risk $K > K^{-1}(\overline{R}_{NB})$ will be tranched into two loans of size α and 1-α, such that BLC(B, αL) has credit risk $K_1 = K^{-1}(\overline{R}_{NB})$ and BLC(B, (1-α)L) has a credit risk $K_2 < K - K_1$.

[22] We make no predictions regarding the structure of the tranched loan. We do not predict the size or risk characteristics of the different tranches of the tranched loan.

Given our set of assumptions, the expected return on all non-tranched loans and all tranched loans made to a population of BLC distributed continuously over a spectrum of credit risk, *K*, with a probability distribution function *p(K)* will be

$$E(R) = \int_{-\infty}^{\infty} R(K) * p(K) dK \qquad (4)$$

The expected return on all non-tranched BLC, BLC_{nt}, will therefore be

$$E(\mathrm{BLC}_{nt}) = \int_{K^{-1}(\bar{R}_B)}^{K^{-1}(\bar{R}_{NB})} \left((\bar{R}_B + \int_{K^{-1}(\bar{R}_B)}^{K} A_B) * p(K) \right) dK + 0 \qquad (5)$$

and the expected return on all tranched BLC, BLC_t will be

$$E(\mathrm{BLC}_t) = \bar{R}_{NB} * \int_{K^{-1}(\bar{R}_B)}^{K^{-1}(\bar{R}_{NB})} p(K) dK + \int_{K^{-1}(\bar{R}_{NB})}^{\infty} \left((\bar{R}_{NB} + \int_{K^{-1}(\bar{R}_{NB})}^{K} A_{NB}) * p(K) \right) dK \qquad (6)$$

Equations (5) and (6) suggest that the $E(\mathrm{BLC}_{nt}) \leq E(\mathrm{BLC}_t), \ \forall p(K)$. It is also worthwhile to note that, despite the economic value of tranching and lower cost of borrowing to firms using tranched loans, the average interest rate on the tranches of such loans lent by banks (i.e., low risk tranche of the tranched loan) is greater than (or equal to, based on the underlying distribution) the average interest rate on non-tranched loans. This underpins our third hypothesis.

Hypothesis 3: The average interest rate charged on tranched loans is higher than the average interest rate charged on non-tranched loans.

Our first hypothesis states that the cost of borrowing to an average borrower will be lower when a loan is tranched as compared with a non-tranched loan of similar size and characteristics. But our third hypothesis states that the average interest rate on tranched loans is higher than on non-tranched loans. Although our Hypotheses 1 and 3 appear to contradict each other, they can be true at the same time. This situation is analogous to the high all-in-spread observed for secured compared with unsecured loans. Rationality dictates that, all else equal, a secured loan has lower risk than an unsecured loan and it should therefore command a relatively lower return. Yet empirical evidence shows that high-risk loans tend more often to be secured rather than low-risk loans and, on average, secured loans have higher interest rates. Similarly, high-risk loans should be tranched, but low-risk loans need not be. Therefore, tranched loans, on average, will have higher interest rates.

Our results can be generalized for a market with *N* participants with different levels of risk aversion. In the absence of transaction costs, as *N* increases, the price benefit to borrowers from tranching increases. We have shown that as the types of participants, *n*, increase, a BLC will be tranched to *n* levels such that successive high-risk combinations will be tranched at the reservation utility of each participant. Real-world data indicate that some of the syndicate banks participate in more than one tranche. This does not necessarily contradict our theory because the regulatory capital requirements and economic capital requirements differ for different types of loans.[23] These capital requirements may decrease when a loan is broken into two different tranches, thereby creating economic value for the bank.

We need to interpret our results with caution, however. We have assumed efficient debt markets and complete information.[24] Neither assumption presumably holds in the real world. Relaxing these assumptions could weaken our results. Also, we have not considered the role of information asymmetry in our model. The existence of a prior relationship between a borrower and a bank can mitigate the perceived credit risk of the borrower. Information asymmetry might unravel some of the implications of our model.

IV. The Empirical Evidence

We test our hypotheses using tranche-level data from the *Dealscan* database compiled by the Loan Pricing Corporation (LPC). LPC maintains a database with detailed information on loans made to borrowers in different parts of the world from 1987 to the present. It contains both price and non-price terms of loans at the time of origination, along with information on the borrower's rating and sales in the year prior to the loan. The data in *Dealscan* come primarily from SEC filings, although LPC also receives data from large loan syndicators, as well as from a staff of reporters. LPC claims that its database contains most of the loans made to large, publicly traded companies. We use confirmed data in our study on U.S. borrowers that are not government

[23] The regulatory capital requirements for banks does not apply to loan commitments with a maturity of 365 days or less (Harjoto, Mullineaux, and Yi, 2006), for instance.

[24] Ivashina (2005) concludes that the syndicated loan market is competitive, putting bargaining power in the hands of the borrower.

entities, banks, or financial institutions. From 1987 to 1999 (inclusive), 31,233 loan deals with 43,603 tranches were made to such borrowers.[25]

In its tranche-level database, LPC records every component of a multi-tranche loan deal as a separate observation. Every record has a field for deal amount and a field for tranche amount. All the tranches of a given multi-tranche loan deal have the same deal amount, but the tranche amount may differ for each component. We tag a loan as tranched when the tranche amount is less than the deal amount. For a non-tranched loan, the deal amount is the same as the tranche amount. As mentioned earlier, we refer to a single-tranche loan (a loan that is not a part of a multi-tranche loan deal) as a non-tranched loan deal. Because of data errors, for some records the tranche amount was greater than the deal amount, or the tranche amount was less than the deal amount even when the loan was not part of a multi-tranche loan deal. After deleting such records, we are left with 43,334 tranches and 30,975 deals. Of these observations, 16,282 deals had more than one lender, and 8,148 deals had multiple tranches. A tranched deal had an average of 2.49 tranches, and a median of 2. Our study focuses on syndicated loans, so we exclude all loans that have only one lender participating in the loan deal. Thus our final sample includes 23,721 loan observations.[26]

As illustration, we present here an example of a senior secured loan deal for $365 million to Classic Cable (Ticker: CLSC), a provider of cable TV services with $182 million in sales the previous year. The loan syndicate was led by Goldman Sachs Credit Partners on 28 July, 1999, for refinancing debt and for financing the takeover of Buford Television, Inc. Union Bank of California was the administrative agent and Chase Manhattan was the documentation agent for the loan deal. The syndicate included 12 lenders. The other members were Mercantile Bank, PNC Bank, SunTrust Bank, CIT Group, Heller Financial, Natexis Banque, Summit Bank, U.S. Bank, and BNP Paribas. This deal had four tranches with the following characteristics.

[25] *Dealscan* adds new loans to its database as and when it discovers loans missing from its database. We have noted newly added entries in the database dating back to 2000. The loans added to the database after significant delay could be systematically different from loans added to the database as soon as the loan is originated. This could result in a possible selection bias error. Hence, we have used data till 1999 only. Data from 2000 through 2006 could be used to further test our model.
[26] A loan observation could either be a tranche of a multi-tranched loan deal or it could be a non-tranched loan.

Revolving loan: The deal included a $75 million revolving line of credit maturing on 31 July, 2007, with a commitment fee of 50 basis points if the maximum ratio of debt to assets (D/A) of the borrower was greater than 5.5 and 37.5 basis points otherwise. The line of credit was also priced based on D/A as follows: if D/A $\geq$ 6.5 then Libor + 250 basis points; if 6.5 > D/A $\geq$ 6 then Libor + 225 basis points; if 6 > D/A $\geq$ 5.5 then Libor + 200 basis points; if 5.5 > D/A $\geq$ 5 then Libor + 175 basis points; if D/A < 5 then Libor + 150 basis points. All twelve members of the syndicate participated in this tranche of the deal.

Term Loan A maturing on 31 July, 2007, in the amount of $100 million. This tranche was priced similar to the revolving line of credit. All twelve members of the syndicate participated in this tranche of the deal.

Term Loan B maturing on 31 Jan, 2008, in the amount of $100 million. This tranche was also priced based on D/A as follows: if D/A $\geq$ 5.5 then Libor + 275 basis points, otherwise Libor + 250 basis points. Only three members of the syndicate (Goldman Sachs, Union Bank, and Chase Manhattan) participated in this tranche.

Term Loan C maturing on 31 Jan, 2008, in the amount of $90 million. Only Goldman Sachs participated in this tranche, which was priced the same as term loan B, but was an add-on term loan to back the company's repurchase of a high-yield bond.

Goldman Sachs was the lead arranger in the deal because it had a prior relationship with the borrowing firm. It had also underwritten public debt for Classic Cable earlier in the month. Goldman Sachs kept the riskiest tranche of the loan deal in its own portfolio, presumably to avoid moral hazard issues. As implied by our theory, Goldman Sachs, an investment bank with lower levels of risk aversion compared with the majority of the other lenders in the deal, participated in the riskier tranches of the loan deal, namely term loan B and term loan C.

The dependent variable in our study is the all-in-spread drawn (AIS). The *Dealscan* item AIS captures the interest rate that the borrower pays the lender for the amount drawn on the loan. It is calculated as the coupon spread plus the annual fee, and it is expressed in basis points.[27] At the deal-level data, when a loan deal has several tranches, LPC calculates the AIS for the loan deal as the weighted average of the spreads for each tranche, where the weight is the amount of the loan in that tranche relative to the total amount of that loan. However, because we use tranche-level data, the AIS measure in our study is not the weighted average of the spread for each tranche. In our study, each tranche of a multi-tranche loan deal can have a different AIS measure depending on the commitment fee, annual fee, and interest rate charged on the tranche.

We use the following explanatory variables in our study. Similar specifications have been used by Mei, Angbazo, and Saunders (1998), Dennis and Nandy (2000), Yi and Mullineaux (2006), and Harjoto, Mullineaux, and Yi (2006).

L_SALES: The log of the annual sales of the borrower.
L_AMT: The log of the loan amount of the tranche.
TICKER_Y_N: A dummy variable that takes unit value if the borrower has a ticker symbol.
SECURE: A dummy variable that takes unit value if the loan is secured.
M_S: A dummy variable that takes unit value if the loan maturity is one year or less.
M_I: A dummy variable that takes unit value if the loan maturity is five years or less but more than a year.
R1 thru R9: A set of dummy variables taking unit value for a company senior debt credit rating of C, CC, CCC, B and so on and 0 otherwise. R9 measures the highest possible rating of AAA.
TRANCH: A dummy variable that takes unit value if the loan deal has more than one tranche.
REVOLVE: A dummy variable that takes unit value if the loan tranche is a revolving loan and zero otherwise.[28]
S1: A dummy variable that takes unit value if the loan tranche is senior.[29]

[27] The coupon spread is quoted over LIBOR for most of the loans. For loans not quoted against LIBOR, the differentials used in the AIS reported in the LPC data set are as follows: +205 basis points for the prime rate, -19 basis points for the commercial paper rate, -125 basis points for the Treasury-Bill rate, -25 basis points for the federal funds rate, -12 basis points for the banker's acceptance rate, and -9 basis points for the rates on negotiable certificates of deposit. Hubbard, Kuttner, and Palia (2002) find that replacing these constants with time-varying differentials based on year-specific average spreads has minimal impact.
[28] A loan tranche is considered to be a revolver if the loan type is 364 day facility, Revolver/Line < 1 Yr, Revolver/Line >= 1 Yr, Revolver/Term Loan, Bridge Loan, Demand Loan, Guidance Line (Uncommitted), Limited Line, Multi-Option Facility, or Standby Letter of Credit.

[29] LPC categorizes loans into the following five categories based on seniority: senior, senior-subordinated, mezzanine, junior-subordinated, and subordinated.

YEAR: A set of dummy variables equal to 1 for years 1990 through 1998. 1999 is the excluded year. We also have a dummy variable to capture all loans made prior to 1990.

In our database the $365 million loan deal of Classic Cable is recorded in four observations: the revolving loan, term loan A, term loan B, and term loan C. Each of these four observations would have the same deal amount of $365 million. The observation for the revolving loan would have a loan amount of $75 million and the observation for term loan A would have a loan amount of $100 million. Each observation would have a unit value for the TRANCH variable indicating that each observation represents a tranche of a multi-tranche loan deal. Only those tranches with collateral would have a unit value for the SECURE variable.

We present descriptive statistics for our data in Table 2.1. Of the 23,721 loan observations, 52% were a part of a multi-tranche loan deal. This implies that 11,325 (48%) were single-tranche loans. The largest syndicated loan deal in our sample was for $20 billion and the smallest was for $500,000. The average credit spread per tranche was 187 basis points. The borrowers of a majority of the loans had a senior debt rating of BBB, BB, or B. Of the loan tranches in our sample, 73% were revolving loans and 51% had a maturity of five years or less but more than one year. The deal with the largest number of lenders had 88 participating banks in the syndicate. The borrower with the smallest sales had only $200,000 of sales in the year prior to the loan, while the borrower with the highest sales had almost $274 billion of sales in the year prior to the loan. About 77% of the tranches were secured.

In Table 2.2 we compare the descriptive statistics of loan tranches that were a part of a multi-tranche loan deal with those of single-tranche loans. We note that, as expected, the average deal amount of tranched loans is almost twice that of non-tranched. Borrowers taking tranched loans are less likely to have ticker symbols. About 85% of the observations that are a part of multi-tranche loan deal are secured as compared with only 63% of non-tranched loans. Since loans to risky borrowers are more likely to be secured, this suggests that loans to riskier firms are more likely to be tranched. This is consistent with our hypothesis that riskier firms have more incentive to use tranched syndicated loans. Consistent with our third hypothesis, the average AIS of a tranche of a multi-tranche loan deal is about 216 basis points over the LIBOR, whereas the average AIS of a non-tranched loan is 147 basis points. Table 2.2 also shows that borrowers rated BB or lower are more likely to have multiple tranches in their loan deal than those rated BBB or higher. Tranched loans are also less likely to have short maturities and more likely to be senior loans.

We also note that only 56% of the tranched loans are revolving loans, compared with 92.5% of the non-tranched loans. This observation also is consistent with our model, which implies that BLCs that justify a return less than the reservation return of non-banks are not tranched. The average credit spread on revolving loans is lower than that on term loans.[30] Additionally, commercial banks are more likely to lead and participate in non-tranched loans. They have access to deposits as a source of funds and are therefore better suited to make revolving loans (Harjoto, Mullineaux, and Yi, 2006).[31] In Table 2.3 we compare the descriptive statistics of revolving loan tranches with those of term loan tranches. Consistent with our earlier observation, only 43% of the revolving loans in our sample were part of a multi-tranche loan deal, but 88% of the term loans in our sample were part of a multi-tranche loan deal. Borrowers of 55% of the revolving loan tranches in our sample were public companies, but only 44% of the term loan borrowers were public companies. The average maturity of term loan tranches was 5.77 years, compared with 3.93 years for revolving loan tranches. A higher proportion of term-loan borrowers had a senior debt rating of BB or lower. A higher percentage of borrowers of revolving loan tranches had investment grade ratings for their senior debt. Term-loan borrowers showed average sales that were less than half the average sales of borrowers using revolving-loan tranches. Our data suggest that revolving loan tranches are likely to be less risky than term loans because revolvers are made to public firms, with bigger sales size, better debt rating, and relatively short-term maturity. Hence, they justify lower returns. We find that the average AIS for revolving loans was only 163 basis points in our sample, compared with an average AIS of 246 basis points for term loans.

[30] Table 3 shows that the average credit spread on revolving loans is 163 basis points, compared with average credit spread of 246 basis points on term loans.

[31] Large corporations use revolving lines of credit for commercial paper backup. At the times of liquidity crisis when corporations cannot roll over their existing commercial papers, they access their lines of credit from the commercial banks. The banking literature has established that precisely during liquidity crisis commercial banks have larger inflows of deposits, and they are therefore able to meet the liquidity needs of the corporations.

Tables 2.4 and 2.5 show the results of regressions of AIS on borrower and loan characteristics. We perform separate regressions for loan tranches that were made to borrowers with senior debt ratings and those made to unrated borrowers. The parameter estimate of the TRANCH coefficient in Table 2.4 suggests that tranches of loans to rated borrowers have 17.83 basis points higher cost than non-tranched loans, other things equal. Similarly, the parameter estimate of the TRANCH coefficient in Table 2.5 suggests that tranches to unrated borrowers have 23.72 basis points higher cost of borrowing than non-tranched loans. However, these regressions assume that the decision to divide a loan into multiple tranches is exogenous. We have argued that the decision to tranche depends on loan and borrower characteristics and is therefore endogenous. Our theory suggests that high-risk borrowers who face higher AIS are more likely to take tranched syndicated loans than are low-risk borrowers.[32] Hence, the coefficient estimates of these regressions are potentially misleading.

To account for this selection problem, we run two-stage least squares regressions for rated and unrated loans. We first calculate the probability that a loan will be tranched based on borrower and loan characteristics. We then use this predicted probability of tranching to create a dummy variable PT that takes a unit value if the predicted probability is higher than a designated cut-off level. We then use PT as an independent variable to ascertain the effect of tranching on the pricing of syndicated loans. Tables 2.6 and 2.8 show the results of our logistic procedure to predict the probability that a tranche is a part of a multi-tranche loan deal.

Consistent with our expectations, Table 2.6 suggests that risky loans are more likely to be tranched. We get positive coefficient estimates for dummy variables indicating a senior debt rating of BB and lower but negative coefficients for dummy variables for senior debt rating indicators of BBB, A, and AA. The AAA rating is the excluded category in our regression. We get negative coefficient estimates for dummy variables for short-term loans and intermediate-maturity loans. We also get a negative coefficient estimate for the revolving loan dummy. These estimates suggest that revolving loans and loans with maturity of fewer than five years are less

[32] As observed in earlier studies, the results in Table IV show that secured loans are priced 64.60 basis points higher than nonsecured loans. This is also because loans to high risk borrowers who face higher AIS are more likely to be secured than otherwise.

likely to be tranched. We get a significant negative coefficient for the log of borrower's sales size. This suggests that loans to borrowers with higher sales are less likely to be tranched. As expected, we get significant positive coefficient for the log of deal amount, suggesting that large loans are more likely to be tranched. In Table 2.8 we find similarly signed coefficients for loan tranches made to unrated borrowers. We find significant negative coefficient for sales size, short-term maturity, intermediate-maturity, and revolving loans and significant positive coefficient for deal amount.

In Table 2.7 and Table 2.9 we show the marginal probabilities that loans made to rated and unrated borrowers will be tranched, respectively. In Table 2.7 we show that the predicted probability that an actual revolving loan made to Chiquita Brands International in 1996 would be a part of a multi-tranche loan deal was about 34%.[33] The amount of this deal was $125 million, and Chiquita had sales of $2,533 million in the prior year. Chiquita is a public company and had a senior debt rating of B, while the maturity of the revolving loan was less than five years. However, if the company had taken a $250 million loan rather than $125 million loan, our predicted probability of tranching would have increased by 18.7% to 52.5%. If Chiquita were to have had a senior debt rating of AAA instead of B, the probability of the revolving loan being a part of a $125 million multi-tranche loan deal rather than being a stand-alone $125 million revolving loan would have decreased by 17.8% to 16%. If the loan in question had been a term loan rather than a revolving loan, then the probability of tranching would have increased to 79.5% for this loan. In Table 2.9 we show that the predicted probability of tranching of a hypothetical $125 million revolving loan with a maturity of five years or less made in 1996 to a private company with sales of $2,500 million was 34.3%. However, if this deal amount were $250 million, the probability of tranching rises to 43.7%. If the loan in question were a term loan instead of a revolving loan, the probability of tranching increases to 83.1%.

Based on the coefficient estimates from our logistic regressions, we can predict the probability a loan will be a part of multi-tranche loan deal. However, we need to predict the value of the TRANCH variable. Therefore, we find a cutoff level of probability such that the number of loans

[33]Based on our logistic regression we predicted the probability to be only 33.8% that this loan would be a part of multi-tranche loan deal and in the real world this actual loan was not a part of a multi-tranche loan deal.

in our sample with a predicted probability of tranching greater than that cutoff level is the same as the number of loans that were actually a part of a tranched loan.[34] For syndicated loans to rated borrowers we find that at a cutoff level of 40.5%, the number of loans predicted to be a part of multi-tranche loan deal is the same as the actual number of loans that were a part of such deals. For loans to unrated borrowers, we find the cutoff level is 29.5%.

In Table 2.10 we present the results of our regression of AIS on PT (the predicted value of the TRANCH variable) and other borrower and loan characteristics. PT takes a unit value for loans with predicted probability of tranching greater than the cutoff level of 40.5% in this regression. We find that the coefficient estimate for PT in panel A of Table 2.10 is significantly different from the coefficient estimate of TRANCH in Table 2.4. In Table 2.4 we found a significant, positive coefficient estimate for the TRANCH variable suggesting that loans that are part of multi-tranche loan deal have higher cost than non-tranched loans. After accounting for the endogeneity of the tranching decision, we find that tranched loans have 8.44 basis points lower cost of borrowing. This provides positive evidence in support of our first hypothesis that the total cost of borrowing for a tranched loan is lower than an otherwise identical non-tranched loan. Given that the average deal amount for a syndicated loan is $382.35 million and the average maturity of a syndicated loan is 4.86 years, a decrease of AIS by 8.44 basis points amounts to savings of over $1.5 million in borrowing costs over the life of an average loan. The AIS on a loan made to a borrower with senior debt rating of AA is only 9.07 basis points higher than on an otherwise identical loan made to a borrower of AAA rating. In other words, an 8.44 basis points decrease in borrowing costs in light of tranching effectively lowers the cost of borrowing for AA-rated firms to that of AAA-rated firms.

The coefficient estimates for other variables in our regression are in line with the results of earlier studies. The coefficient estimate for the SECURE variable suggests that collateralized loans are priced 67.64 basis points higher than unsecured loans. Revolving loans are priced 38.7 basis points lower than term loans. Loans to firms with higher credit ratings have lower credit spreads. A loan made to a borrower with a senior debt rating of B has a credit spread that is 141 basis points higher than the credit spread on otherwise identical loan made to a firm with AAA

[34] Palepu (1986) highlights the pitfalls related to using arbitrary cutoff levels.

rating. We capture year-fixed effects in our regression to account for the prevailing interest rate environment and other year-specific factors.

In panel B of Table 2.10, we capture the individual impact of tranching on the pricing of loans to borrowers with different senior debt ratings. We interact the PT variable with each of the dummy variables for different senior debt ratings. Our second hypothesis states that the benefits of tranching accrue primarily to risky borrowers. We note that the coefficient estimates for the interaction of the PT variable with the dummy variables for senior debt ratings of CCC, B, and BB are significantly negative. Our results suggest that the borrowing costs for a firm with a senior debt rating of CCC are 109.83 basis points lower for a multi-tranche loan than the borrowing costs for an otherwise identical non-tranched loan.[35] Similarly, tranching decreases the cost of borrowing for B-rated borrowers and BB-rated borrowers by 21.59 basis points and 15.72 basis points, respectively. We do not find negative coefficients for the interaction of PT with other investment-grade rating dummies.[36] This shows that the benefits of tranching accrue to borrowing firms with speculative grade ratings. As the borrower's credit risk increases, the benefits of tranching to the borrower also increase. In Table 2.11 we show the results of regressing AIS on the predicted value of TRANCH for unrated borrowers. The coefficient estimate for PT suggests that among unrated firms the credit spread on a tranched loan is 28.26 basis points lower than an otherwise identical non-tranched loan. Strahan (1999) shows that loan prices to unrated borrowers are similar to those to borrowers with speculative grade ratings. Our results also show that the beneficial pricing impact of tranching to unrated firms is similar to the benefits to borrowers with speculative grade ratings.

Theory and data suggest that revolving loans are less likely to be tranched, but tranched loan deals usually have a revolving facility. Our model suggests that revolving loans that are a part of multi-tranche loan deal should have a lower credit spread when compared with otherwise

[35] We do not have an interaction term between PT and rating dummies for CC and C in our regression because all loans to CC- and C-rated borrowers in our sample had a unit value for PT.

[36] We find a significant positive coefficient for the interaction term of PT and rating A dummy. The positive coefficient by itself does not contradict any of our hypotheses. According to our model, the benefits of tranching accrue to all BLCs that justify a return higher than the reservation return of non-banks. According to our model, all BLCs with low credit risk should not be tranched. However, if they are tranched then the credit spread on such BLCs can be higher than on non-tranched loans.

identical revolving loans. Hence, we test the robustness of our results on a subsample containing revolving loans only. We first regress the AIS of revolving loans on TRANCH and other loan and variable characteristics. In Table 2.12 we show the regression results for revolving loans made to borrowers with senior debt ratings. As expected, we find a significant positive coefficient, suggesting that revolving loans that are a part of a multi-tranche loan have 20.60 basis points higher cost of borrowing than otherwise identical non-tranched revolving loans. In Table 2.16 we show similar regression results for revolving loans made to unrated borrowers. However, the coefficient estimates in Table 2.12 and Table 2.16 do not account for endogeneity of the tranching decision and can therefore be misleading. Hence, in Tables 2.13 and 2.17 we predict the probability a revolving loan will be a part of a multi-tranche loan. We find that the sign and significance of the coefficient estimates for different loan and borrower characteristics in Tables 2.13 and 2.17 are similar to those of Tables 2.6 and 2.8. We do not find any notable differences in the magnitude of the coefficient estimates. In Tables 2.14 and 2.18 we present the marginal probability of a revolving loan being a part of a multi-tranche loan deal to borrowers with senior debt rating and to unrated borrowers, respectively. For revolvers to rated borrowers, we find that at a cutoff level of 43.5%, the number of loans with estimated probability of tranching greater than this cutoff level is the same as the number of actual loans with unit value for TRANCH. We find the cutoff level is 39% for revolving loans made to unrated borrowers. We calculate the value of PT based on the appropriate cutoff levels, and in Tables 2.15 and 2.19 we report the results of our regression of AIS on PT and other loan and borrower characteristics for revolving loans made to rated borrowers and to unrated borrowers, respectively. Our results suggest that, for rated borrowers, the credit spread on a revolving loan that was a part of a multi-tranche loan was 6.95 basis points lower than an otherwise identical revolving loan. For the unrated borrowers, revolving loans that were a part of a multi-tranche loan deal were priced 24.09 basis points lower than otherwise identical non-tranched revolvers.

In our study we have used cutoff levels such that the number of firms with the predicted probability of tranching greater than the cutoff level is equal to the number of loans that actually had a unit value for TRANCH in the relevant sample. However, common sense dictates that loans that had more than 50% probability of being a part of a multi-tranche loan deal should be estimated to have a unit value for the TRANCH variable, and those loans with lower than 50%

probability should have a zero value for TRANCH. Hence, in Table 2.20 we use 50% as the cutoff level to estimate the value of PT and regress the AIS on PT and other loan and borrower characteristics. We find that all our results remain qualitatively the same. We find a significant positive coefficient for PT in columns II and III, indicating that tranching results in lower credit spreads for both rated and unrated borrowers. The coefficient estimates in column I suggest that the benefits of tranching accrue primarily to borrowers with speculative grade ratings.

Hao, Nandy, and Roberts (2005) use a dummy variable for covenants at the tranche level arguing that the inclusion of covenants in a loan tranche requires the borrower to release detailed financial and/or accounting information to the lenders on a regular basis which may in turn affect the loan price. Hence we also include a dummy variable for covenants in our regression, but find that adding this variable does not alter our results (results unreported).

V. Conclusion

The literature on syndicated loans has ignored the phenomenon of tranching, even though over 45% of all syndicated loans have tranches. This chapter recognizes the importance of tranching and shows why it is an integral component of many syndicated loan structures. We present a theory to explain the economic value of tranching and show that riskier firms are more likely to take loans with multiple tranches. Therefore, the average credit spread on a syndicated loan with multiple tranches is higher than that on a non-tranched loan. However, after accounting for the risk characteristics of a tranched loan, we show empirically that borrowings that are part of tranched loans have lower credit spreads than otherwise identical non-tranched loans. We also show that the benefits of tranching accrue primarily to risky borrowers. We find our results are robust to alternative specifications.

Table 2.1: Descriptive Statistics – Syndicated Loans

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
Tick_Y_N	1 if borrower has ticker; otherwise 0	23,721	0.53	0.50	-	1.00
D_amt	Loan deal amount (millions)	23,721	382.35	811.37	0.50	20,000.00
Tranch	1 if loan was tranched; 0 otherwise	23,721	0.52	0.50	-	1.00
Maturity	Maturity of the loan tranche (years)	20,906	4.86	2.79	-	35.00
Secure	1 if loan tranche is secured; 0 otherwise	12,399	0.77	0.42	-	1.00
AIS	All-in-spread drawn	19,080	187.37	115.68	2.33	1,480.00
r1	1 if borrower's senior debt rating =C	23,721	0.00	0.02	-	1.00
r2	1 if borrower's senior debt rating =CC	23,721	0.00	0.04	-	1.00
r3	1 if borrower's senior debt rating =CCC	23,721	0.01	0.09	-	1.00
r4	1 if borrower's senior debt rating =B	23,721	0.11	0.31	-	1.00
r5	1 if borrower's senior debt rating =BB	23,721	0.10	0.30	-	1.00
r6	1 if borrower's senior debt rating =BBB	23,721	0.08	0.27	-	1.00
r7	1 if borrower's senior debt rating =A	23,721	0.05	0.21	-	1.00
r8	1 if borrower's senior debt rating =AA	23,721	0.01	0.11	-	1.00
r9	1 if borrower's senior debt rating =AAA	23,721	0.00	0.05	-	1.00
unrated	1 if borrower's senior debt is not rated	23,721	0.63	0.48	-	1.00
revolve	1 if loan tranche is a revolver; 0 otherwise	21,602	0.73	0.45	-	1.00
m_s	1 if maturity less than or equal to 1 year	20,906	0.11	0.32	-	1.00
m_i	1 if maturity > 1 yr and maturity <=5yrs	20,906	0.51	0.50	-	1.00
s1	1 if the loan is senior; 0 otherwise	21,471	0.98	0.15	-	1.00
lenders	Number of lenders participating in tranche	23,721	8.22	8.88	2.00	88.00
sales	Borrower's sales in prior year (millions)	18,568	1,912.74	6,915.14	0.20	273,834.00

Table 2.2: Descriptive Statistics – Tranched vs. Non-Tranched Loans

		Tranched Loans			Non-Tranched Loans			Diff of Means	
Variable	Label	N	Mean	Std Dev	N	Mean	Std Dev	t-stat	
Tick_Y_N	1 if borrower has ticker; otherwise 0	12,396	0.502	0.50	11,325	0.551	0.50	-7.56	*
D_amt	Loan deal amount (millions)	12,396	497.93	983.12	11,325	255.84	538.89	23.78	*
Maturity	Maturity of the loan tranche (years)	11,636	5.058	2.49	9,270	4.612	3.12	11.20	*
Secure	1 if loan tranche is secured; 0 otherwise	7,826	0.848	0.36	4,573	0.629	0.48	26.60	*
AIS	All-in-spread drawn	11,138	215.93	109.21	7,942	147.32	112.58	42.02	*
r1	1 if borrower's senior debt rating =C	12,396	0.001	0.03	11,325	0.000	0.01	3.00	*
r2	1 if borrower's senior debt rating =CC	12,396	0.002	0.04	11,325	0.001	0.03	1.75	
r3	1 if borrower's senior debt rating =CCC	12,396	0.011	0.10	11,325	0.007	0.08	3.32	*
r4	1 if borrower's senior debt rating =B	12,396	0.136	0.34	11,325	0.083	0.28	13.15	*
r5	1 if borrower's senior debt rating =BB	12,396	0.106	0.31	11,325	0.099	0.30	1.67	
r6	1 if borrower's senior debt rating =BBB	12,396	0.059	0.23	11,325	0.104	0.30	-12.66	*
r7	1 if borrower's senior debt rating =A	12,396	0.038	0.19	11,325	0.058	0.23	-7.21	*
r8	1 if borrower's senior debt rating =AA	12,396	0.009	0.09	11,325	0.014	0.12	-3.67	*
r9	1 if borrower's senior debt rating =AAA	12,396	0.002	0.04	11,325	0.002	0.05	-0.88	
unrated	1 if borrower's senior debt is not rated	12,396	0.637	0.48	11,325	0.632	0.48	0.88	
revolve	1 if loan tranche is a revolver; 0 otherwise	11,919	0.563	0.50	9,683	0.925	0.26	-68.83	*
m_s	1 if maturity less than or equal to 1 year	11,636	0.093	0.29	9,270	0.139	0.35	-10.28	*
m_i	1 if maturity > 1 yr and maturity <=5yrs	11,636	0.450	0.50	9,270	0.576	0.49	-18.30	*
s1	1 if the loan is senior; 0 otherwise	11,486	0.998	0.05	9,985	0.956	0.20	19.64	*
lenders	Number of lenders participating in tranche	12,396	9.700	10.10	11,325	6.590	6.97	27.80	*
sales	Borrower's sales in prior year (millions)	9,698	1,718.40	5,934.44	8,870	2,125.20	7,843.22	-3.96	*

***** significant at 5% level

Table 2.3: Descriptive Statistics – Revolvers vs. Term Loans

		Revolving Loans			Term Loans			Diff of Means	
Variable	Label	N	Mean	Std Dev	N	Mean	Std Dev	t-stat	
Tick_Y_N	1 if borrower has ticker; otherwise 0	15,665	0.551	0.50	5,937	0.441	0.50	14.52	*
D_amt	Loan deal amount (millions)	15,665	405.70	877.07	5,937	383.87	737.57	1.84	
Tranch	1 if loan was tranched; 0 otherwise	15,665	0.428	0.49	5,937	0.878	0.33	-77.61	*
Maturity	Maturity of the loan tranche (years)	13,579	3.930	2.17	5,459	5.773	2.29	-50.92	*
Secure	1 if loan tranche is secured; 0 otherwise	8,037	0.714	0.45	3,784	0.932	0.25	-33.71	*
AIS	All-in-spread drawn	13,315	163.062	112.20	5,477	245.990	98.34	-50.36	*
r1	1 if borrower's senior debt rating =C	15,665	0.000	0.02	5,937	0.001	0.03	-1.30	
r2	1 if borrower's senior debt rating =CC	15,665	0.001	0.04	5,937	0.002	0.04	-0.92	
r3	1 if borrower's senior debt rating =CCC	15,665	0.006	0.08	5,937	0.014	0.12	-4.88	*
r4	1 if borrower's senior debt rating =B	15,665	0.079	0.27	5,937	0.165	0.37	-16.30	*
r5	1 if borrower's senior debt rating =BB	15,665	0.093	0.29	5,937	0.113	0.32	-4.12	*
r6	1 if borrower's senior debt rating =BBB	15,665	0.100	0.30	5,937	0.037	0.19	18.49	*
r7	1 if borrower's senior debt rating =A	15,665	0.065	0.25	5,937	0.011	0.10	22.78	*
r8	1 if borrower's senior debt rating =AA	15,665	0.016	0.12	5,937	0.002	0.04	12.44	*
r9	1 if borrower's senior debt rating =AAA	15,665	0.003	0.06	5,937	0.000	0.01	6.21	*
unrated	1 if borrower's senior debt is not rated	15,665	0.636	0.48	5,937	0.656	0.48	-2.69	*
m_s	1 if maturity less than or equal to 1 year	13,579	0.161	0.37	5,459	0.032	0.18	32.74	*
m_i	1 if maturity > 1 yr and maturity <=5yrs	13,579	0.616	0.49	5,459	0.363	0.48	32.60	*
s1	1 if the loan is senior; 0 otherwise	14,007	0.998	0.05	5,491	0.998	0.04	-0.56	
lenders	Number of lenders participating in tranche	15,665	8.490	8.94	5,937	8.820	9.49	-2.32	*
sales	Borrower's sales in prior year (millions)	12,414	2,268.61	7,779.19	4,409	1,075.57	4,086.02	12.82	

***** significant at 5% level

Table 2.4: Regression Results for AIS Based on Tranching of Syndicated Loans to Firms with Senior Debt Rating

Variable	Label	Parameter Estimate	Standard Error	t Value	Pr > |t|
intercept	Intercept	226.34	30.50	7.42	<.0001
Tranch	1 if loan was tranched; 0 otherwise	17.83	2.51	7.11	<.0001
l_sales	Natural log of borrower's sales in prior year	-7.08	0.84	-8.42	<.0001
secure	1 if loan tranche is secured; 0 otherwise	64.60	3.38	19.13	<.0001
revolve	1 if loan tranche is a revolver; 0 otherwise	-32.01	2.55	-12.56	<.0001
tick_Y_N	1 if borrower has ticker; otherwise 0	-1.37	2.19	-0.62	0.5327
r1	1 if borrower's senior debt rating =C	272.08	34.71	7.84	<.0001
r2	1 if borrower's senior debt rating =CC	176.65	27.17	6.50	<.0001
r3	1 if borrower's senior debt rating =CCC	180.37	24.56	7.34	<.0001
r4	1 if borrower's senior debt rating =B	140.57	23.91	5.88	<.0001
r5	1 if borrower's senior debt rating =BB	95.14	23.82	3.99	<.0001
r6	1 if borrower's senior debt rating =BBB	47.49	23.74	2.00	0.0455
r7	1 if borrower's senior debt rating =A	24.22	23.84	1.02	0.3096
r8	1 if borrower's senior debt rating =AA	9.56	24.91	0.38	0.7013
y89	1 If year <1990; 0 otherwise	30.13	14.21	2.12	0.034
y90	1 if year = 1990; 0 otherwise	-17.93	11.55	-1.55	0.1206
y92	1 if year = 1991; 0 otherwise	-32.38	9.38	-3.45	0.0006
y92	1 if year = 1992; 0 otherwise	-28.21	5.64	-5.00	<.0001
y93	1 if year = 1993; 0 otherwise	-32.91	4.82	-6.83	<.0001
y94	1 if year = 1994; 0 otherwise	-42.97	4.33	-9.93	<.0001
y95	1 if year = 1995; 0 otherwise	-38.34	4.21	-9.11	<.0001
y96	1 if year = 1996; 0 otherwise	-43.47	3.68	-11.80	<.0001
y97	1 if year = 1997; 0 otherwise	-52.20	3.31	-15.77	<.0001
y98	1 if year = 1998; 0 otherwise	-42.19	3.26	-12.94	<.0001
m_s	1 if maturity less than or equal to 1 year	4.14	4.11	1.01	0.3138
m_i	1 if maturity > 1 yr and maturity <=5yrs	0.33	2.45	0.13	0.8934

N=4282 R-squared = .6235 F-value = 284.59

Table 2.5: Regression Results for AIS Based on Tranching of Syndicated Loans to Firms without Senior Debt Rating

Variable	Label	Parameter Estimate	Standard Error	t Value	Pr > |t|
intercept	Intercept	418.43	20.03	20.89	<.0001
Tranch	1 if loan was tranched; 0 otherwise	23.72	2.94	8.06	<.0001
l_sales	Natural log of borrower's sales in prior year	-13.31	0.96	-13.86	<.0001
secure	1 if loan tranche is secured; 0 otherwise	100.45	3.53	28.49	<.0001
revolve	1 if loan tranche is a revolver; 0 otherwise	-37.85	3.16	-11.96	<.0001
tick_Y_N	1 if borrower has ticker; otherwise 0	-17.80	2.65	-6.72	<.0001
y89	1 If year <1990; 0 otherwise	0.09	5.42	0.02	0.9867
y90	1 if year = 1990; 0 otherwise	-16.27	7.53	-2.16	0.0308
Y91	1 if year = 1991; 0 otherwise	27.79	7.82	3.55	0.0004
y92	1 if year = 1992; 0 otherwise	0.11	6.75	0.02	0.9864
y93	1 if year = 1993; 0 otherwise	-17.32	6.12	-2.83	0.0047
y94	1 if year = 1994; 0 otherwise	-26.88	5.66	-4.75	<.0001
y95	1 if year = 1995; 0 otherwise	-35.34	5.47	-6.46	<.0001
y96	1 if year = 1996; 0 otherwise	-30.06	5.01	-6.00	<.0001
y97	1 if year = 1997; 0 otherwise	-58.57	4.91	-11.94	<.0001
y98	1 if year = 1998; 0 otherwise	-37.55	5.21	-7.21	<.0001
M_s	1 if maturity less than or equal to 1 year	53.85	4.97	10.83	<.0001
M_i	1 if maturity > 1 yr and maturity <=5yrs	13.09	2.94	4.45	<.0001

N=5431 R-squared = .3055 F-value = 141.53

Table 2.6: Logistic Regression to Predict Probability of Tranching in Syndicated Loans to Firms with Senior Debt Rating

Parameter	Label	Estimate	Standard Error	Wald Chi-square	Pr > ChiSq
Intercept	Intercept	-13.11	0.81	260.17	<.0001
l_d_amt	Natural log of the deal amount	1.12	0.04	737.14	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	0.00	0.07	0.00	0.9635
l_sales	Natural log of borrower's sales in prior year	-0.31	0.03	116.75	<.0001
r1	1 if borrower's senior debt rating =C	12.37	266.40	0.00	0.963
r2	1 if borrower's senior debt rating =CC	1.32	0.59	5.05	0.0246
r3	1 if borrower's senior debt rating =CCC	0.90	0.42	4.44	0.035
r4	1 if borrower's senior debt rating =B	1.05	0.36	8.29	0.004
r5	1 if borrower's senior debt rating =BB	0.12	0.36	0.11	0.7393
r6	1 if borrower's senior debt rating =BBB	-0.70	0.35	3.86	0.0496
r7	1 if borrower's senior debt rating =A	-0.48	0.36	1.80	0.1796
r8	1 if borrower's senior debt rating =AA	-0.74	0.38	3.82	0.0508
y89	1 If year <1990; 0 otherwise	0.26	0.31	0.69	0.4056
y90	1 if year = 1990; 0 otherwise	-0.94	0.24	15.51	<.0001
y91	1 if year = 1991; 0 otherwise	-0.49	0.21	5.40	0.0201
y92	1 if year = 1992; 0 otherwise	0.10	0.16	0.35	0.5557
y93	1 if year = 1993; 0 otherwise	-0.12	0.14	0.83	0.3632
y94	1 if year = 1994; 0 otherwise	0.03	0.12	0.06	0.8001
y95	1 if year = 1995; 0 otherwise	0.08	0.12	0.44	0.5086
y96	1 if year = 1996; 0 otherwise	-0.17	0.12	2.07	0.1499
y97	1 if year = 1997; 0 otherwise	-0.25	0.11	5.34	0.0208
y98	1 if year = 1998; 0 otherwise	0.04	0.11	0.14	0.7046
M_s	1 if maturity less than or equal to 1 year	-0.28	0.11	7.23	0.0072
M_i	1 if maturity > 1 yr and maturity <=5yrs	-0.48	0.08	38.79	<.0001
revolve	1 if loan tranche is a revolver; 0 otherwise	-2.03	0.10	421.39	<.0001

N=6641 Likelihood Ratio = 2677.27 Wald Stats = 1450.19

Table 2.7: Marginal Probability of Tranching in Syndicated Loans to Firms with Senior Debt Rating

	Base Value*	Change to	New Probability	change in Probability
Deal amount (millions)	125	250	52.5%	18.7%
Ticker symbol	Y	N	33.7%	-0.1%
Sales size (millions)	2533	5000	29.3%	-4.5%
Rating	B	AAA	16.0%	-17.8%
Year	1996	1999	37.7%	3.9%
Maturity (years)	1<x<=5	>5	45.3%	11.5%
Loan type	Revolving	Fixed term	79.5%	45.7%
Probability of being a tranche of multi-tranche loan at base value	33.80%			

*Base values are for an actual loan made to Chiquita Brands International. The actual loan was not tranched.

Table 2.8: Logistic Regression to Predict Probability of Tranching in Syndicated Loans to Firms without Senior Debt Rating

Parameter	Label	Estimate	Standard Error	Wald Chi-square	Pr > ChiSq
Intercept	Intercept	-2.87	0.47	38.03	<.0001
L_d_amt	Natural log of the deal amount	0.57	0.03	387.85	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	-0.22	0.05	18.87	<.0001
l_sales	Natural log of borrower's sales in prior year	-0.25	0.02	136.90	<.0001
y89	1 If year <1990; 0 otherwise	-0.41	0.10	15.69	<.0001
y90	1 if year = 1990; 0 otherwise	-0.46	0.13	11.65	0.0006
y91	1 if year = 1991; 0 otherwise	-0.21	0.14	2.06	0.151
y92	1 if year = 1992; 0 otherwise	-0.61	0.14	19.42	<.0001
y93	1 if year = 1993; 0 otherwise	-0.40	0.12	11.06	0.0009
y94	1 if year = 1994; 0 otherwise	-0.28	0.11	6.39	0.0115
y95	1 if year = 1995; 0 otherwise	-0.49	0.11	19.11	<.0001
y96	1 if year = 1996; 0 otherwise	-0.35	0.11	10.79	0.001
y97	1 if year = 1997; 0 otherwise	-0.46	0.10	19.70	<.0001
y98	1 if year = 1998; 0 otherwise	-0.47	0.11	18.32	<.0001
M_s	1 if maturity less than or equal to 1 year	-0.25	0.09	7.79	0.0052
M_i	1 if maturity > 1 yr and maturity <=5yrs	-0.39	0.06	42.51	<.0001
revolve	1 if loan tranche is a revolver; 0 otherwise	-2.24	0.08	883.36	<.0001

N=8,730 Likelihood Ratio = 2616.16 Wald Stats = 1445.13

Table 2.9: Marginal Probability of Tranching in Syndicated Loans to Firms without Senior Debt Rating

	Base Value	Change to	New Probability	change in Probability
Deal amount (millions)	125	250	43.7%	9.4%
Ticker symbol	N	Y	29.5%	-4.8%
Sales size (millions)	2500	5000	30.5%	-3.8%
Year	1996	1999	42.6%	8.3%
Maturity (years)	1<x<=5	>5	43.5%	9.2%
Loan type	Revolving	Fixed term	83.1%	48.8%
Probability of being a tranche of multi-tranche loan at base value	34.30%			

Table 2.10: Regressions for AIS Based on Predicted Tranching for Syndicated Loans to Rated Firms

Panel A

Variable	Label	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	230.38	30.67	7.51	<.0001
Pt	1 if probability of tranching > .405; Else 0	-8.44	2.88	-2.93	0.0034
l_sales	Natural log of borrower's sales in prior year	-6.04	0.85	-7.13	<.0001
Secure	1 if loan tranche is secured; 0 otherwise	67.64	3.37	20.10	<.0001
revolve	1 if loan tranche is a revolver; 0 otherwise	-38.70	2.52	-15.34	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	-1.27	2.20	-0.58	0.5636
r1	1 if borrower's senior debt rating =C	275.88	34.87	7.91	<.0001
r2	1 if borrower's senior debt rating =CC	179.49	27.30	6.57	<.0001
r3	1 if borrower's senior debt rating =CCC	180.26	24.69	7.30	<.0001
r4	1 if borrower's senior debt rating =B	141.06	24.02	5.87	<.0001
r5	1 if borrower's senior debt rating =BB	94.27	23.94	3.94	<.0001
r6	1 if borrower's senior debt rating =BBB	43.94	23.88	1.84	0.0659
r7	1 if borrower's senior debt rating =A	22.06	23.97	0.92	0.3573
r8	1 if borrower's senior debt rating =AA	9.07	25.04	0.36	0.7173
y89	1 If year <1990; 0 otherwise	35.84	14.28	2.51	0.0121
y90	1 if year = 1990; 0 otherwise	-27.06	11.66	-2.32	0.0203
y91	1 if year = 1991; 0 otherwise	-39.39	9.44	-4.17	<.0001
y92	1 if year = 1992; 0 otherwise	-29.97	5.68	-5.28	<.0001
y93	1 if year = 1993; 0 otherwise	-37.04	4.87	-7.61	<.0001
y94	1 if year = 1994; 0 otherwise	-44.37	4.35	-10.19	<.0001
y95	1 if year = 1995; 0 otherwise	-39.67	4.23	-9.38	<.0001
y96	1 if year = 1996; 0 otherwise	-44.46	3.70	-12.01	<.0001
y97	1 if year = 1997; 0 otherwise	-53.33	3.33	-16.03	<.0001
y98	1 if year = 1998; 0 otherwise	-42.09	3.28	-12.85	<.0001
m_s	1 if maturity less than or equal to 1 year	1.76	4.14	0.42	0.6714
m_i	1 if maturity > 1 yr and maturity <=5yrs	-4.69	2.49	-1.88	0.0602

N=4282 R-squared = .6198 F-value = 280.16

Panel B

Variable	Label	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	231.94	30.55	7.59	<.0001
l_sales	Natural log of borrower's sales in prior year	-6.17	0.84	-7.31	<.0001
Secure	1 if loan tranche is secured; 0 otherwise	66.77	3.35	19.94	<.0001
revolve	1 if loan tranche is a revolver; 0 otherwise	-40.05	2.52	-15.89	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	-0.86	2.19	-0.39	0.6937
r1	1 if borrower's senior debt rating =C	271.68	34.66	7.84	<.0001
r2	1 if borrower's senior debt rating =CC	176.67	27.14	6.51	<.0001
r3	1 if borrower's senior debt rating =CCC	271.97	28.53	9.53	<.0001
r4	1 if borrower's senior debt rating =B	157.00	24.33	6.45	<.0001
r5	1 if borrower's senior debt rating =BB	104.79	24.05	4.36	<.0001
r6	1 if borrower's senior debt rating =BBB	44.62	23.85	1.87	0.0615
r7	1 if borrower's senior debt rating =A	12.85	24.26	0.53	0.5962
r8	1 if borrower's senior debt rating =AA	7.25	26.89	0.27	0.7875
tr3	1 if r3=1 and probability of tranching > .405	-109.83	17.07	-6.43	<.0001
tr4	1 if r4=1 and probability of tranching > .405	-21.59	5.67	-3.81	0.0001
tr5	1 if r5=1 and probability of tranching > .405	-15.72	4.80	-3.27	0.0011
tr6	1 if r6=1 and probability of tranching > .405	1.71	4.95	0.35	0.7292
tr7	1 if r7=1 and probability of tranching > .405	16.47	7.44	2.21	0.0269
tr8	1 if r8=1 and probability of tranching > .405	4.87	16.69	0.29	0.7704
m_s	1 if maturity less than or equal to 1 year	-2.36	4.17	-0.57	0.5709
m_i	1 if maturity > 1 yr and maturity <=5yrs	-6.84	2.51	-2.72	0.0065
	N=4282	R-squared = .6245		F-value = 238.33	

We also include year fixed effects in the regression.

Table 2.11: Regression Results for AIS Based on Predicted Tranching for Syndicated Loans to Firms without Senior Debt Rating

Variable	Label	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	463.75	20.76	22.33	<.0001
Pt	1 if probability of tranching > .295; Else 0	-28.26	4.75	-5.95	<.0001
l_sales	Natural log of borrower's sales in prior year	-12.81	0.96	-13.32	<.0001
Secure	1 if loan tranche is secured; 0 otherwise	103.88	3.50	29.71	<.0001
revolve	1 if loan tranche is a revolver; 0 otherwise	-49.05	3.01	-16.27	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	-20.46	2.67	-7.66	<.0001
Y89	1 If year <1990; 0 otherwise	-4.77	5.45	-0.87	0.3822
Y90	1 if year = 1990; 0 otherwise	-22.23	7.57	-2.94	0.0033
Y91	1 if year = 1991; 0 otherwise	22.01	7.85	2.80	0.0051
Y92	1 if year = 1992; 0 otherwise	-12.75	6.90	-1.85	0.0649
Y93	1 if year = 1993; 0 otherwise	-22.94	6.16	-3.72	0.0002
Y94	1 if year = 1994; 0 otherwise	-29.35	5.68	-5.17	<.0001
Y95	1 if year = 1995; 0 otherwise	-40.59	5.51	-7.37	<.0001
Y96	1 if year = 1996; 0 otherwise	-32.85	5.03	-6.53	<.0001
Y97	1 if year = 1997; 0 otherwise	-62.11	4.92	-12.62	<.0001
Y98	1 if year = 1998; 0 otherwise	-41.89	5.22	-8.02	<.0001
M_s	1 if maturity less than or equal to 1 year	49.40	5.02	9.84	<.0001
M_i	1 if maturity > 1 yr and maturity <=5yrs	7.29	2.96	2.46	0.0137

N=5431 R-squared = .3018 F-value = 139.04

Table 2.12: Regression Results for AIS Based on Tranching of Revolving Syndicated Loans to Firms with Senior Debt Rating

Variable	Label	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	232.33	32.40	7.17	<.0001
Tranch	1 if loan was tranched; 0 otherwise	20.60	2.62	7.86	<.0001
l_sales	Natural log of borrower's sales in prior year	-9.10	0.99	-9.22	<.0001
Secure	1 if loan tranche is secured; 0 otherwise	60.90	3.71	16.43	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	-4.34	2.69	-1.61	0.1072
r1	1 if borrower's senior debt rating =C	298.30	44.60	6.69	<.0001
r2	1 if borrower's senior debt rating =CC	195.80	28.68	6.83	<.0001
r3	1 if borrower's senior debt rating =CCC	192.87	24.92	7.74	<.0001
r4	1 if borrower's senior debt rating =B	139.88	23.66	5.91	<.0001
r5	1 if borrower's senior debt rating =BB	90.97	23.52	3.87	0.0001
r6	1 if borrower's senior debt rating =BBB	45.32	23.41	1.94	0.053
r7	1 if borrower's senior debt rating =A	20.22	23.50	0.86	0.3895
r8	1 if borrower's senior debt rating =AA	13.30	24.59	0.54	0.5887
y89	1 If year <1990; 0 otherwise	49.20	16.29	3.02	0.0025
y90	1 if year = 1990; 0 otherwise	-10.86	12.58	-0.86	0.3878
y91	1 if year = 1991; 0 otherwise	-31.95	11.09	-2.88	0.004
y92	1 if year = 1992; 0 otherwise	-18.20	6.94	-2.62	0.0088
y93	1 if year = 1993; 0 otherwise	-21.33	5.68	-3.76	0.0002
y94	1 if year = 1994; 0 otherwise	-37.74	5.11	-7.39	<.0001
y95	1 if year = 1995; 0 otherwise	-35.91	5.04	-7.13	<.0001
y96	1 if year = 1996; 0 otherwise	-43.11	4.45	-9.70	<.0001
y97	1 if year = 1997; 0 otherwise	-47.34	4.12	-11.49	<.0001
y98	1 if year = 1998; 0 otherwise	-38.81	4.21	-9.21	<.0001
m_s	1 if maturity less than or equal to 1 year	10.68	4.45	2.40	0.0163
m_i	1 if maturity > 1 yr and maturity <=5yrs	6.71	3.03	2.21	0.0269

N=2834 R-squared = .6117 F-value = 186.97

Table 2.13: Logistic Regression to Predict Probability of Tranching in Syndicated Revolvers to Firms with Senior Debt Rating

Parameter	Label	Estimate	Standard Error	Wald Chi-square	Pr > ChiSq
Intercept	Intercept	-13.96	0.85	269.33	<.0001
l_d_amt	Natural log of the deal amount	1.00	0.04	541.01	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	-0.03	0.07	0.12	0.7251
l_sales	Natural log of borrower's sales in prior year	-0.25	0.03	70.76	<.0001
r1	1 if borrower's senior debt rating =C	12.06	255.90	0.00	0.9624
r2	1 if borrower's senior debt rating =CC	1.20	0.62	3.73	0.0536
r3	1 if borrower's senior debt rating =CCC	0.86	0.44	3.84	0.0499
r4	1 if borrower's senior debt rating =B	0.86	0.37	5.46	0.0194
r5	1 if borrower's senior debt rating =BB	0.02	0.36	0.00	0.9623
r6	1 if borrower's senior debt rating =BBB	-0.64	0.36	3.27	0.0704
r7	1 if borrower's senior debt rating =A	-0.46	0.36	1.67	0.1968
r8	1 if borrower's senior debt rating =AA	-0.76	0.38	3.93	0.0473
y89	1 If year <1990; 0 otherwise	0.19	0.31	0.37	0.5453
y90	1 if year = 1990; 0 otherwise	-0.98	0.26	13.71	0.0002
y91	1 if year = 1991; 0 otherwise	-0.38	0.22	2.89	0.089
y92	1 if year = 1992; 0 otherwise	0.03	0.17	0.04	0.8454
y93	1 if year = 1993; 0 otherwise	-0.17	0.14	1.40	0.2375
y94	1 if year = 1994; 0 otherwise	0.00	0.13	0.00	0.9793
y95	1 if year = 1995; 0 otherwise	0.05	0.13	0.13	0.7135
y96	1 if year = 1996; 0 otherwise	-0.22	0.13	3.17	0.0751
y97	1 if year = 1997; 0 otherwise	-0.26	0.12	4.98	0.0257
y98	1 if year = 1998; 0 otherwise	0.01	0.11	0.01	0.9129
m_s	1 if maturity less than or equal to 1 year	-0.34	0.11	9.69	0.0019
m_i	1 if maturity > 1 yr and maturity <=5yrs	-0.52	0.08	38.87	<.0001
	N=4835	Likelihood Ratio = 1,100.12		Wald Stats = 796.50	

Table 2.14: Marginal Probability of Tranching in Syndicated Revolvers to Firms with Senior Debt Rating

	Base Value	Change to	New Probability	change in Probability
Deal amount (millions)	125	250	50.2%	16.7%
Ticker symbol	Y	N	34.0%	0.6%
Sales size (millions)	2533	5000	29.7%	-3.7%
Rating	B	AAA	17.6%	-15.9%
Year	1996	1999	38.6%	5.1%
Maturity (years)	1<x<=5	>5	45.9%	12.4%
Probability of being a tranche of multi-tranche loan at base value	33.42%			

Table 2.15: Regression Results for AIS Based on Predicted Tranching for Syndicated Revolving Loans to Firms with Senior Debt Rating

Variable	Label	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	223.21	32.71	6.82	<.0001
pt	1 if probability of tranching > .435; Else 0	-6.95	2.95	-2.35	0.0187
l_sales	Natural log of borrower's sales in prior year	-7.65	1.01	-7.60	<.0001
Secure	1 if loan tranche is secured; 0 otherwise	64.20	3.72	17.27	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	-4.12	2.72	-1.51	0.1303
r1	1 if borrower's senior debt rating =C	307.38	45.04	6.83	<.0001
r2	1 if borrower's senior debt rating =CC	200.05	28.97	6.91	<.0001
r3	1 if borrower's senior debt rating =CCC	193.49	25.17	7.69	<.0001
r4	1 if borrower's senior debt rating =B	141.03	23.90	5.90	<.0001
r5	1 if borrower's senior debt rating =BB	90.12	23.76	3.79	0.0002
r6	1 if borrower's senior debt rating =BBB	42.75	23.67	1.81	0.071
r7	1 if borrower's senior debt rating =A	18.81	23.74	0.79	0.4284
r8	1 if borrower's senior debt rating =AA	13.48	24.85	0.54	0.5874
y89	1 If year <1990; 0 otherwise	56.07	16.46	3.41	0.0007
y90	1 if year = 1990; 0 otherwise	-21.34	12.79	-1.67	0.0954
y91	1 if year = 1991; 0 otherwise	-41.09	11.23	-3.66	0.0003
y92	1 if year = 1992; 0 otherwise	-21.12	7.02	-3.01	0.0027
y93	1 if year = 1993; 0 otherwise	-27.23	5.78	-4.71	<.0001
y94	1 if year = 1994; 0 otherwise	-40.18	5.16	-7.78	<.0001
y95	1 if year = 1995; 0 otherwise	-38.23	5.09	-7.51	<.0001
y96	1 if year = 1996; 0 otherwise	-44.98	4.50	-10.00	<.0001
y97	1 if year = 1997; 0 otherwise	-49.44	4.16	-11.87	<.0001
y98	1 if year = 1998; 0 otherwise	-38.58	4.25	-9.07	<.0001
m_s	1 if maturity less than or equal to 1 year	5.88	4.57	1.29	0.1982
m_i	1 if maturity > 1 yr and maturity <=5yrs	-1.43	3.22	-0.44	0.6576

N=2834   R-squared = .6040   F-value = 181.01

Table 2.16: Regression Results for AIS Based on Tranching of Revolving Syndicated Loans to Firms without Senior Debt Rating

Variable	Label	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	392.55	23.59	16.64	<.0001
Tranch	1 if loan was tranched; 0 otherwise	24.63	3.10	7.94	<.0001
l_sales	Natural log of borrower's sales in prior year	-14.16	1.14	-12.42	<.0001
Secure	1 if loan tranche is secured; 0 otherwise	98.17	3.80	25.81	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	-20.39	3.17	-6.44	<.0001
y89	1 If year <1990; 0 otherwise	9.78	6.55	1.49	0.1356
y90	1 if year = 1990; 0 otherwise	-3.00	9.03	-0.33	0.7399
y91	1 if year = 1991; 0 otherwise	38.14	9.59	3.97	<.0001
y92	1 if year = 1992; 0 otherwise	10.87	7.98	1.36	0.1736
y93	1 if year = 1993; 0 otherwise	-8.70	7.29	-1.19	0.2326
y94	1 if year = 1994; 0 otherwise	-23.87	6.80	-3.51	0.0004
y95	1 if year = 1995; 0 otherwise	-29.86	6.52	-4.58	<.0001
y96	1 if year = 1996; 0 otherwise	-31.94	6.04	-5.29	<.0001
y97	1 if year = 1997; 0 otherwise	-52.88	5.91	-8.95	<.0001
y98	1 if year = 1998; 0 otherwise	-34.06	6.28	-5.43	<.0001
m_s	1 if maturity less than or equal to 1 year	55.91	5.52	10.13	<.0001
m_i	1 if maturity > 1 yr and maturity <=5yrs	16.62	3.70	4.49	<.0001

N=3831 R-squared = .3016 F-value = 104.36

Table 2.17: Logistic Regression to Predict Probability of Tranching in Syndicated Revolvers to Firms without Senior Debt Rating

Parameter	Label	Estimate	Standard Error	Wald Chi-square	Pr > ChiSq
Intercept	Intercept	-4.83	0.50	92.39	<.0001
l_d_amt	Natural log of the deal amount	0.52	0.03	288.55	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	-0.23	0.05	17.52	<.0001
l_sales	Natural log of borrower's sales in prior year	-0.22	0.02	92.06	<.0001
y89	1 If year <1990; 0 otherwise	-0.35	0.11	9.96	0.0016
y90	1 if year = 1990; 0 otherwise	-0.47	0.14	10.89	0.001
y91	1 if year = 1991; 0 otherwise	-0.21	0.15	1.89	0.1688
y92	1 if year = 1992; 0 otherwise	-0.52	0.15	12.17	0.0005
y93	1 if year = 1993; 0 otherwise	-0.39	0.13	9.36	0.0022
y94	1 if year = 1994; 0 otherwise	-0.31	0.12	6.71	0.0096
y95	1 if year = 1995; 0 otherwise	-0.52	0.12	18.77	<.0001
y96	1 if year = 1996; 0 otherwise	-0.40	0.11	12.24	0.0005
y97	1 if year = 1997; 0 otherwise	-0.51	0.11	21.64	<.0001
y98	1 if year = 1998; 0 otherwise	-0.50	0.12	18.04	<.0001
m_s	1 if maturity less than or equal to 1 year	-0.25	0.09	7.44	0.0064
m_i	1 if maturity > 1 yr and maturity <=5yrs	-0.47	0.07	51.23	<.0001

N=6342 Likelihood Ratio = 518.29 Wald Stats = 461.92

Table 2.18: Marginal Probability of Tranching in Syndicated Revolvers to Firms without Senior Debt Rating

	Base Value	Change to	New Probability	change in Probability
Deal amount (millions)	125	250	43.2%	8.9%
Ticker symbol	N	Y	29.6%	-4.7%
Sales size (millions)	2500	5000	31.2%	-3.1%
Year	1996	1999	44.1%	9.8%
Maturity (years)	1<x<=5	>5	45.7%	11.4%
Probability of being a tranche of multi-tranche loan at base value	34.58%			

Table 2.19: Regression Results for AIS Based on Predicted Tranching for Syndicated Revolving Loans to Firms without Senior Debt Rating

Variable	Label	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	434.19	24.37	17.81	<.0001
pt	1 if probability of tranching > .39; Else 0	-24.09	3.60	-6.68	<.0001
l_sales	Natural log of borrower's sales in prior year	-13.82	1.14	-12.11	<.0001
Secure	1 if loan tranche is secured; 0 otherwise	101.90	3.77	27.06	<.0001
Tick_Y_N	1 if borrower has ticker; otherwise 0	-25.55	3.23	-7.92	<.0001
Y89	1 If year <1990; 0 otherwise	2.37	6.61	0.36	0.7203
Y90	1 if year = 1990; 0 otherwise	-16.23	9.17	-1.77	0.0768
y91	1 if year = 1991; 0 otherwise	25.39	9.70	2.62	0.0089
y92	1 if year = 1992; 0 otherwise	-8.72	8.29	-1.05	0.2929
y93	1 if year = 1993; 0 otherwise	-21.47	7.45	-2.88	0.004
y94	1 if year = 1994; 0 otherwise	-31.85	6.88	-4.63	<.0001
y95	1 if year = 1995; 0 otherwise	-42.86	6.71	-6.39	<.0001
y96	1 if year = 1996; 0 otherwise	-40.86	6.13	-6.67	<.0001
y97	1 if year = 1997; 0 otherwise	-62.46	6.01	-10.40	<.0001
y98	1 if year = 1998; 0 otherwise	-44.34	6.36	-6.97	<.0001
m_s	1 if maturity less than or equal to 1 year	46.96	5.64	8.33	<.0001
m_i	1 if maturity > 1 yr and maturity <=5yrs	2.55	3.92	0.65	0.5146

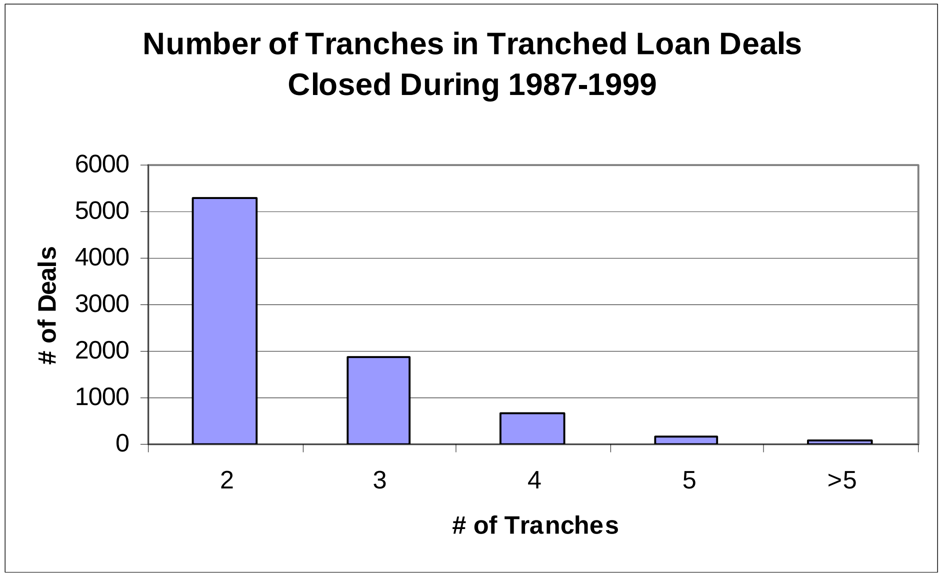
N=3831 R-squared = .2983 F-value = 102.74

Table 2.20: Regressions for AIS Based on Predicted Tranching for Syndicated Loans

		Rated				Unrated	
Variable	Label	I		II		III	
Intercept	Intercept	235.82	*	231.13	*	451.35	*
pt	1 if probability of tranching > .50; Else 0			-5.97	*	-12.66	*
l_sales	Natural log of borrower's sales in prior year	-6.35	*	-6.18	*	-13.01	*
Secure	1 if loan tranche is secured; 0 otherwise	66.55	*	67.76	*	104.73	*
revolve	1 if loan tranche is a revolver; 0 otherwise	-40.43	*	-38.79	*	-53.02	*
Tick_Y_N	1 if borrower has ticker; otherwise 0	-0.79		-1.31		-19.86	*
r1	1 if borrower's senior debt rating =C	271.75	*	275.24	*		
r2	1 if borrower's senior debt rating =CC	176.50	*	177.74	*		
r3	1 if borrower's senior debt rating =CCC	249.24	*	179.46	*		
r4	1 if borrower's senior debt rating =B	151.82	*	140.26	*		
r5	1 if borrower's senior debt rating =BB	99.23	*	93.59	*		
r6	1 if borrower's senior debt rating =BBB	45.22		44.02			
r7	1 if borrower's senior debt rating =A	11.12		22.04			
r8	1 if borrower's senior debt rating =AA	8.94		9.26			
tr3	1 if r3=1 and probability of tranching > .50	-90.66	*				
tr4	1 if r4=1 and probability of tranching > .50	-16.79	*				
tr5	1 if r5=1 and probability of tranching > .50	-9.66	*				
tr6	1 if r6=1 and probability of tranching > .50	1.14					
tr7	1 if r7=1 and probability of tranching > .50	23.97	*				
tr8	1 if r8=1 and probability of tranching > .50	3.18					
m_s	1 if maturity less than or equal to 1 year	-2.07376		1.77		50.47	*
m_i	1 if maturity > 1 yr and maturity <=5yrs	-6.76011	*	-4.55		6.12	*
N		4,282		4,282		5,431	
R-squared		0.6241		0.6195		0.299	
F Value		237.94	*	279.75	*	137.22	*

All regressions include year fixed effects.
* Significant at 5% level

Figure 2.1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Closed During 1987-1999
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4000
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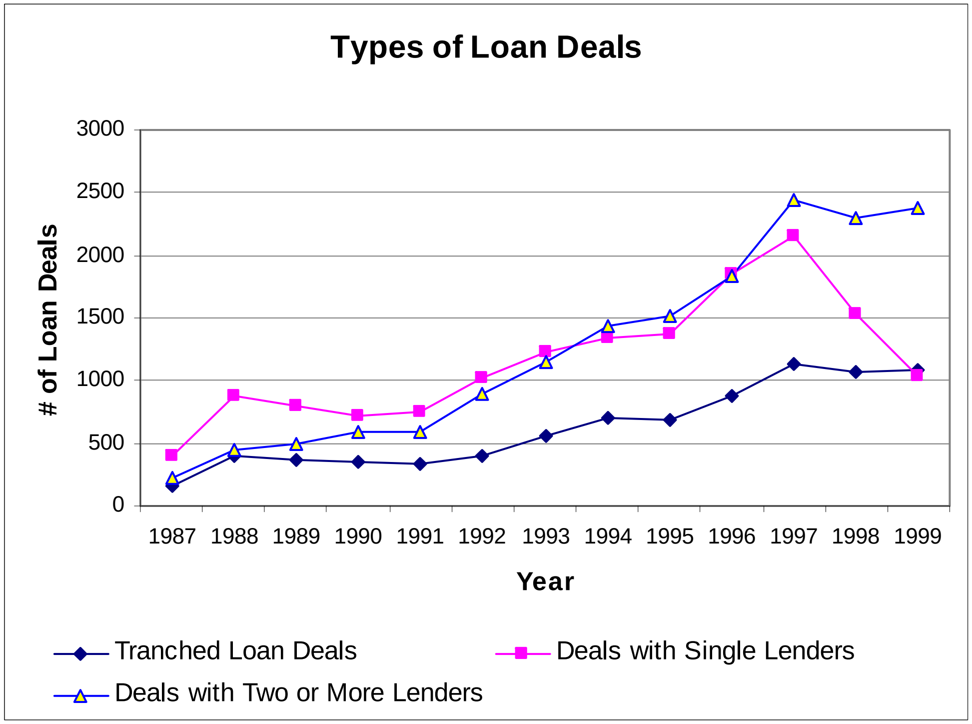
2000
1000
0
# of Deals
2
3
4
5
>5
# of Tranches

Figure 2.2


Types of Loan Deals
# of Loan Deals
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2500
2000
1500
1000
500
0
1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
Year
Tranched Loan Deals
Deals with Single Lenders
Deals with Two or More Lenders

CHAPTER 3

Are Bank Loans Special?
Evidence from bank loan announcements

I. Introduction

Announcements regarding equity issuance have been shown to elicit negative stock returns, on average, and those regarding debt issuance elicit zero or slightly negative stock returns. However, bank loan announcements generally have positive announcement effects (Mikkelson and Partch, 1986; James, 1987; Lummer and McConnell, 1989). This has led researchers to conclude that the bank loans are somehow special. The literature tends to treat banks as quasi-insiders. The positive bank loan announcement effect is normally justified as the market's response to lowered information asymmetry regarding the borrowing firm. The literature views the act of making a loan by the bank as a certification of the quality of the borrowing firm. Recent studies have questioned this justification of the positive announcement effect (Preece and Mullineaux, 1994; Peterson and Rajan, 2002; Billett, Flannery, and Garfinkel, 1995, 2006; Thomas and Wang, 2004). Yet the information asymmetry hypothesis is the most widely accepted explanation for the well-documented positive loan announcement effect.

In this chapter, we show that the positive loan announcement effect was a temporal phenomenon that no longer exists. Also, we show that prior studies suffered from a selection bias problem. Loans that are announced are systematically different from those that are not announced. Firms with lower credit ratings and firms with low or negative operating earnings but high interest costs are more likely to announce their loans than other firms. All studies on loan announcement effects were performed on loans made in or before 1995 (pre-95), so we compare the announcement returns of loans made in or before 1995 with those made after 1995 (post-95). We find that pre-95 there was a positive announcement effect, but post-95 announcing firms, on average, experienced zero or negative announcement returns.

We also find that loan announcements are not random events. We document that firms that take large loans relative to their asset base are more likely to announce their loans, for example. We also find that firms that have little analyst following are more likely to announce their loans than firms followed by many analysts. Firms that have higher analyst coverage attract more media space than other firms, so loan announcements by firms with low analyst coverage may reflect an attempt by such firms to make their presence known. Additionally, we find that firms with high predicted EPS growth over the next three-to-five years are more likely to announce loans than other firms.

Prior studies interpreted positive stock returns on loan announcements as an evidence for the information asymmetry hypothesis. They argued that the positive bank loan announcement effect was the market's response to the mitigation of information asymmetry, reflecting the certification role of the lending banks as quasi-insiders. For a couple of reasons, we argue that the positive loan announcement effect observed in the prior studies cannot be construed convincingly as evidence in support of the certification effect. First, our study shows that strong selection bias exists in prior studies. Second, the announcement effect no longer exists.

Prior studies on loan announcement effects generated a database of bank loan announcements made in the study period and studied the market's response to the announcements. They performed keyword searches in news databases such as *WSJ* and *DJ Newswire*, searching for keywords such as "credit" and "loan." Unfortunately, this methodology captured only loans that were explicitly announced in the media during the study period. Some of these studies acknowledged that their methodology was exposed to "loan reporting bias." Both lenders and borrowers are more likely to announce positive rather than negative information, so these studies were likely to be biased toward higher quality loans. Firms that were able to procure loans at favorable rates were also more likely to announce their loans than firms that had their loans renewed at unfavorable terms or were allowed to expire. To avoid this selection bias problem, we use a different methodology in this paper. Rather than beginning with the loan announcements, we start with the loans themselves and then search for the announcement of randomly selected loans. We find that less than a quarter of all the loans made in the period are announced by the company.[37] We argue that if there was a well-known positive announcement effect of bank loans, every firm would have an incentive to announce its bank loans. Yet over three quarters of borrowing firms choose not to announce their loans even though the cost of issuing a press release is marginal. We show that the loans that are announced are systematically different from those that are unannounced.

Second, prior studies that found positive loan announcement effects used data from the pre-95 period. After these studies were published, several later studies showed that the positive loan announcement effect was not universal across different sized firms. The positive effect was limited to small firms; even within small firms, only those that announced renewals of loans on favorable terms experienced positive loan announcement returns (Lummer and McConnell, 1989; Slovin et al., 1992). These findings were again construed as evidence of the information asymmetry hypothesis because small firms face higher information asymmetry than large firms. Consequently, small firms benefit more from the certification of quality by the lending banks. However, we show that the positive loan announcement effect no longer exists even for small firms.

This chapter makes the following contributions to the existing literature. It documents that less than 25% of bank loans are announced by borrowing companies. When loans are announced, the information flows within five trading days of the loan start date, generally the day after the loan closes. We introduce a new methodology to account for selection bias in event studies and show that prior studies suffered from selection bias. Firms that announce loans are systematically different from those firms that do not. We show that firms with low debt ratings, high interest expense but low operating income, little analyst following, and high forecasted EPS growth rate, and firms that take relatively large loans in comparison with their asset base are more likely to announce their loans. We also show that the positive loan announcement effect observed in prior studies is limited to their sample period. No positive loan announcement effect exists over the last ten years. On the contrary, loan announcements elicit insignificantly negative returns.

[37] We consider a loan to have been announced if any news story in any of the newswires covered by Factiva database explicitly mentions the loan in question. Our study period is 1987 to 2004.

Billett, Flannery, and Garfinkel, 2006 (hereafter, "BFG") have documented underperformance of bank borrowers in three years following the event, and we find similar underperformance in our study. Based on prior studies of loan announcements, BFG (2006) state that the underperformance of bank borrowers after positive announcement returns indicates reversal, which means that the market is not only initially wrong about the magnitude of the loan's effect on firm value, but it is also wrong about the direction. But in our study we show that post-95 loan announcements elicit negative announcement returns, thereby rightly predicting the future negative abnormal stock returns of the borrowing firms. Furthermore, borrowers of the loans announced by the company pre-95 actually had significantly higher EPS growth rates over five years after the event than did non-announcing borrowers.

The rest of the chapter is organized as follows. We review the existing literature in section II of the paper. In section III we discuss our methodology and data. Section IV discusses our results and we test the robustness of our results in section V. We offer some possible explanations for our observations and discuss avenues for future research in section VI. We conclude in section VII and elaborate on our calculation of the test statistics in the Appendix section of the chapter.

II. Literature Review

Myers and Majluf (1984) argue that issuance of equity by a firm signals that managers of the firm consider it to be overvalued. Hence, announcement of a seasoned equity offering (SEO) results in an average negative return of 2 to 3% (Asquith and Mullins, 1986; Masulis and Korwar, 1986). Announcements of public bond issues have been shown to generate zero or slightly negative returns by Eckbo (1986), and Howton, Howton, and Perfect (1998). Jensen and Meckling (1976) argue that announcements of debt by firms with free cash flow should result in positive returns because the additional monitoring of the managers by the new lenders mitigates agency problems between the managers and the shareholders. Unlike public debt, loans from commercial banks have been shown to generate positive abnormal returns (Mikkelson and Partch, 1986; James, 1987; Lummer and McConnell, 1989).

The positive abnormal returns on announcement of bank loans have been rationalized using asymmetric information arguments and the monitoring benefits offered by a bank. Prior studies argue that banks capture "soft" and *private information* in their day-to-day dealings with borrowers (BFG, 1995).[38] Commercial banks possess the unique power to provide corporate demand deposit services, for instance. They capture valuable information from the deposit accounts of the borrower and have better estimates of the firm's true risk. They also have enhanced ability to monitor the borrower (Kane and Malkiel, 1965; Black, 1975; Fama, 1985). Puri (1996) analyzed pricing of bank-underwritten securities and investment-house-underwritten securities in the pre-Glass-Steagall period and found that investors were willing to pay a higher price for securities underwritten by banks rather than investment houses. These results support a certification role of commercial banks.

However, some evidence suggests that commercial banks may not have superior private information regarding their borrowers. Peterson and Rajan (2002) state that even if lenders do not have the rich soft information obtained by commercial banks from infrequent, but close, contact with the borrower, more timely hard information about creditworthiness of public firms is readily available to all lenders. BFG (2006) find that earnings announcement returns for borrowing firms are significantly more volatile post-loan than pre-loan. Also, the standard deviation of the price reaction to earnings announcements by borrowing firms is always higher than that of their peer firms. They interpret this finding as a reduction in earnings transparency and conclude that bank loans do not mitigate asymmetric information problems of the borrower. They report that bank borrowers have significantly lower operating performance as compared with their peers in the year before announcing their loans, and this continues for three years after the announcement. Preece and Mullineaux (1994), and BFG (1995) investigate whether the lender's identity influences the market's reaction to a loan announcement and find that no significant difference exists between the market's response to bank and non-bank loans.[39]

[38] Peterson and Rajan (2002) define soft information as information that is hard to communicate to others, let alone capture in written documents.

[39] Billett, Flannery, and Garfinkel (1995) consider both commercial banks and investment banks to be banks.

Thomas and Wang (2004) find that the special role of banks as corporate quasi-insiders has been eroding and that bond market liquidity factors affect bank loan pricing.

The literature on bank loan announcement effects started with Mikkelson and Partch (1986). They performed a longitudinal study of 360 firms and analyzed the stock returns on these firms around announcement of various types of securities offering. They discovered positive stock returns around announcements of bank loans. Their results were then confirmed in a separate study by James (1987). James searched the *Wall Street Journal* Index for loan announcements by 300 firms over a period of ten years from 1974 to 1983. He found a positive announcement effect for bank loans and a negative announcement effect for issuance of straight debt to repay bank loans. Lummer and McConnell (1989) added a new dimension to the bank loan announcement effect literature, showing that there was positive loan announcement effect for loan renewals but not for loan initiations.

Bank loan announcement studies began producing inconsistent results after Lummer and McConnell (1989). Slovin et al. (1992) found no significant difference between the loan announcement returns of loan initiations and loan renewals. Aintablian and Roberts (2000) found positive returns for loan renewals and loan initiations for Canadian firms that are small or have low credit ratings. Slovin et al. (1992) found significantly positive loan announcement returns for small capitalization stocks, but not for large firms. Preece and Mullineaux (1994) found positive announcement effect even for non-bank loans.

Theoretical work in the field distinguishes private debt from arms-length borrowing and justifies the positive announcement effect of bank loans by viewing institutional lenders as insiders who monitor firm performance and reduce information asymmetry (Fama, 1985; Berlin and Loeys, 1988; Kwan and Carleton, 1998). Though syndicated loans do not necessarily fall into either of the two categories—private debt or arms-length borrowing—positive announcement effects have been documented for syndicated loans as well. Preece and Mullineaux (1996) examine the relation between the number of lenders and market reaction to announcements of syndicated loans.[40] They find that only the smallest syndicated group generates a positive and significant

[40] We include all loans in our study, including syndicated loans.

return. They document an inverse relationship between the number of syndicate members and the price reaction. Aintablian and Roberts (2000) find that syndicated loans in Canada also result in lower excess returns than non-syndicated loans. They interpret their results as the market's positive reaction to higher contractual flexibility and fewer free-rider issues when comparing single-bank loans with syndicated loans. Gasbarro, Le, Schwebach, and Zumwalt (2004) find that announcements of syndicated loans elicit positive returns, but only for revolving credit agreements and not for term loans. The latter elicit significantly negative returns on announcement. Mikkelson and Partch (1986) and Lummer and McConnell (1989) find a positive market response to revolving credit agreements, but no significant response to term loans.

Several articles have shown that the market's reaction to a loan announcement varies with borrower characteristics. Slovin, Johnson, and Glascock (1992) find that larger borrowers receive smaller announcement returns.[41] Best and Zhang (1993) find that firms with negative recent earnings trends or greater dispersion in expected earnings receive larger bank loan announcement returns. Wansley, Elayan, and Collins (1992) argue that credit announcement effect would be higher for firms that are more difficult to analyze. They find that firms with higher market-to-book ratios (i.e, more growth options) are associated with slightly larger equity returns.

III. Methodology

Loan announcement studies have employed relatively similar methodologies. We list the main papers in this literature in Table 3.1 and highlight the methodologies and sample sizes in these papers. All the studies perform a keyword search in one or more news databases for bank loan announcements. The downside to this methodology is that only those loans that are explicitly announced in the media are included in their samples. This introduces a loan reporting bias because borrowers and lenders are more likely to announce positive rather than negative information. Some of these studies have explicitly acknowledged this bias (Mosebach, 1999; Fery et al., 2003).

[41] This is consistent with Fama (1995) who suggests that larger firms operate under the scrutiny of numerous external monitors.

Only Fery et al. (2003) make an effort to address this bias. They state that prior studies are likely to have samples biased toward higher quality loans. To address this problem, they include unannounced loans in their sample. They distinguish between published and unpublished loans in Australia and find that the market reacts positively to published loans while unpublished loans fail to elicit any positive returns. As Table 3.1 shows, all the prior studies employ relatively small samples (between 100 and 750 observations) even though the total number of loans made in their sample period was at least ten times as large.[42] For example, Aintablian and Roberts (2000) have 137 observations in their sample, compared with 7,500 loans that we have in the Loan Pricing Corporation (LPC) database for the same period.

III. a. Data Collection

Our main source of information on the population of syndicated and non-syndicated loans made to borrowers in the United States is the Loan Pricing Corporation's (LPC) *Dealscan* database. The database contains both price and non-price terms of loans at origination. It also contains borrower-specific information such as the firm's senior debt rating and sales at the time of origination of the loan. The data in *Dealscan* primarily comes from SEC filings, large loan syndicators, and a staff of reporters. LPC claims that its database contains most of the loans made to large, publicly traded companies. It is one of the leading sources of data for research on loans worldwide. We use confirmed data in our study on U.S. borrowers that are not government entities or utilities between 1987 and 2004 (inclusive). Since we are interested in the information content of bank loans as reflected in the movement of the borrower's stock price, we delete all observations lacking a ticker symbol. We are left with 20,140 loan observations. This constitutes our full sample of loans—single-bank loans and syndicated loans—made to public borrowers in the United States between 1987 and 2004.

To start, we randomly pick 200 loans without replacement from the total population of 20,140 loans. We analyze the characteristics of our sample of loans and compare it with those of the

[42] Gasbarro, Le, Schwebach, and Zumwalt (2004) provide an exception because they do not delete contaminated announcements and include multiple announcements for the same loan. Yet they have only 2,061 observations as compared with 9,669 loans present in the Loan Pricing Corporation's *Dealscan* database for the same period.

population and find it representative.[43] We thoroughly search for the announcements of these loans in the Factiva database.[44] We do not use a computer program to search for the announcement. Rather we read through the text of news stories and search for each announcement manually to minimize measurement error. While searching for each loan announcement, we use possible combinations of the company name, ticker, bank names, loan amount, loan purpose, and any other possible keyword(s). Our search window is six months prior to and two months after the loan start date. No prior studies have analyzed the average timing of a loan announcement relative to the loan start date, so one of the contributions of our study is to document the average time period between the loan closing date and the loan announcement date.

We are able to find some form of mention in the media for 57 of the 200 loan announcements in our sample. Of the 57 instances, five media reports talked about a borrower either seeking the loan or expecting to receive the loan or a lead bank inviting syndicate members to participate in a loan. The remaining 52 announcements confirmed that the loan was made. Of these announcements, 37 were made by the company and one was made by the lending bank. We considered a loan to have been announced by the company when the media report said “in a press release the company said” or “the company announced today.” We also considered an announcement to have been made by the company when the news story had a quote from the company’s top management. The source of information in ten announcements was either reporters or SEC filings and we could not ascertain the source of information in four announcements.

We noted that majority of the loan announcements took place on or right after the loan closing date. Of the 52 announcements only one announcement took place 17 days before closing. All the other announcements took place within 15 days. Seven of the loan announcements were made on the day the loan closed, and 12 announcements were made the next trading day. Of the 52 announcements, 34 were made within five days of the loan start date. Eleven loan

[43] Important characteristics include loan amount, loan maturity, distribution method, number of facilities in the loan, lender identity, borrower rating, borrower sales size, and the year the loan was originated.

[44] Factiva collects its information from 10,000 authoritative sources that include exclusive combinations of the *Wall Street Journal, Financial Times*, Dow Jones and Reuters newswires, and the Associated Press.

announcements were made prior to the loan start date and seven were made after more than five days past the loan start date. We also capture the hour of the loan announcements. After accounting for announcements that were made after 4:00 P.M., 13 of the 52 announcements were effectively made the next trading day.

All the announcements in our sample of 200 firms except one took place within 15 days of the loan start date, so we now randomly pick 600 more loans from our population of 20,140 loans and search for their announcements in a narrower window of +/- 15 days from the loan start date. Figure 3.1 shows the histogram for all the loan announcements in our sample of 800 loans relative to the loan start date.[45] It shows that most of the loan announcements took place on the day after the loan start day. Over two thirds of the announcements (159 of 232) took place within five days after the closing date. In Figure 3.2 we show the histogram for loan announcements made by the company. The shape of the histogram in Figure 3.2 is similar to that of Figure 3.1 except for one major difference. In Figure 3.1, 41 of the total of 232 announcements (17.6%) took place more than a day before the loan start date, while only 12 of 168 announcements (7.1%) made by the company took place more than a day before the loan start day. This shows that companies announce their loans very close to the closing date. Reporters may be more likely to announce loans based on rumor and before the actual closing date.

We also keep track of all news stories in the media regarding the borrowing firms in our sample around the loan closing date and the loan announcement date. We find that 100 of the 232 loan announcements had contaminating news within three days of the loan announcement day. We consider the following news as contaminating: (1) ratings initiation, downgrade or upgrade, (2) buyback of shares, (3) creation of a subsidiary, (4) acquiring or losing a big order, (5) new exchange listing of a subsidiary or options/IPO initiations, (6) earnings/dividends announcements, (7) union strike or failed union renegotiations, (8) acquisition, spinoff, or tender offer, (9) filing of major lawsuit or settlement, (10) sale of a division, (11) growth/expansion in a

[45] Mosebach (1999) documents that large loans are usually captured through *Gold Sheets*. Large banks inform the reporters at Loan Pricing Corporation of the large loans made during the week ending Thursday evening. Information on these loans is then usually distributed in the market through *Gold Sheets*. Hence, we are unable to find press releases for any major loan above $1 billion. In our conversation with an officer at Loan Pricing Corporation it was confirmed that *Gold Sheets* capture very large and mid-cap loans only (usually over $500 million).

new market or introduction of a new product, (12) appointment or resignation of a board member or senior management, and (13) announcement of other loans or securities. We keep track of all the important news stories in the media around the loan start date for all firms in our sample irrespective of whether the borrowing company made an announcement. We consider news to be contaminating if a material news story was published in the media within three days of the loan start date.

We then get return data on the borrowing firms and the market from CRSP. From the 800 loans we are able to find return data on the borrowing firms for 741 loans. We get the returns of the borrowing firms and the market on the announcement day and +/-1 trading days around the announcement day. When the announcement was made on a non-trading day, we consider the announcement to have been made on the next trading day. We also get the returns of the borrowing firms and the market on the loan start date and +/-1 trading days of the loan start date. For the purposes of calculating the *t*-statistics we also get the returns of the borrowing firm and the market for a year ending 30 days before the loan closing date. To calculate three-year abnormal returns we get the returns of all borrowers and the market for three years beginning with the loan closing date. We then get financial data on the borrowing firm from Compustat. We get financial data for seven years beginning with the year prior to the one in which the loan was made. We get the following data: (1) total assets (DATA6), (2) net sales (DATA12), (3) operating income before depreciation (DATA13), (4) interest expense (DATA15), (5) price—calendar year—close (DATA24), (6) common shares outstanding (DATA25), (7) employees (DATA29), and (8) net income (DATA172). We are able to get borrower financial data for 735 loans out of the 800 loans in the sample.

We get analyst forecast data for our borrowing firms from I/B/E/S. We use the identification file of I/B/E/S to match the CUSIP number of our borrowing firms with the unique ticker used by I/B/E/S. We then get the following data on our borrowing firms: (1) number of analyst estimates for a firm in a given month, (2) standard deviation of the EPS estimates, (3) mean of the EPS estimates, (4) mean of the forecasted long-term EPS growth, and (5) median of the forecasted long-term EPS growth. We also get data on actual five-year EPS growth for our borrowing firms. We are able to get analyst forecast data for 636 loans.[46]

We calculate the number of analysts following a borrowing firm as the maximum number of annual EPS estimates for the borrowing firm in any month of the year in which the loan was made. We account only for annual EPS estimates because all analysts that make quarterly forecasts of EPS for a firm also make annual forecasts. To calculate the coefficient of variation of EPS estimates we calculate the average of the mean annual EPS estimates for the twelve months of the loan year and the average of the standard deviation of the annual EPS estimate for the twelve months of the loan year. We then calculate the coefficient of variation (CV) for each borrowing firm for the loan year by dividing the average of the standard deviation by the average of annual EPS estimate. We then use the absolute value of the CV measure as a proxy for dispersion of opinion among analysts regarding EPS of the firm. When a company is followed by only one analyst, the standard deviation of the estimate cannot be calculated. For each loan we find the mean of the forecasted long-term growth estimates of the borrowing firm and the median forecasted long-term growth estimates in the month of the loan start date. When there was no long term EPS growth estimate made for the borrowing firm in the month of the loan start date, we take the estimates from a month in the same year closest to the loan closing date. The long-term growth estimate is a measure of the expected annual increase in operating earnings of a company over its next full business cycle, which is usually three to five years. The mean forecasted long-term growth measure for a firm is the mean of the several analysts' estimates of long-term growth for the firm and it captures the average of all the predictions of analysts following the firm. The median forecasted long-term growth measure for a firm is the median of the several analysts' estimates of long term growth for the firm, and it captures the expectation of an average analyst. We get the actual five-year EPS growth of the borrowing firm in the month of the loan start date and also in the 60th month from the loan start date. I/B/E/S reports five-year actual EPS growth rate as the average annualized growth in EPS for the last five years measured as the slope of least square curve fit to the logarithm of the reported earnings.

[46] We could not ascertain the borrower's CUSIP number for ten loans in our sample.

IV. Results

Some distinguishing features of this chapter are our methodology and our database on announcements of bank loans. We are able to distinguish between loans that were announced in the media and ones that were never announced. We are also able to identify the source of information for the announcement, whether it was the borrowing company, the lending bank, or a third party. However, we first need to show that our sample of loans was representative of the population. In Table 3.2 we compare the descriptive statistics for the population of all loans in the LPC's *Dealscan* database with that of our sample of loans. The average rating of a loan in the *Dealscan* database is 5.51, which represents a rating between BBB and BB.[47] Similarly, the average rating of loans in our sample is 5.69, which also represents a rating between BBB and BB. Loans in the *Dealscan* database have an average loan size of $273 million and maturity of 3.73 years. Loans in our sample have an average loan size of $309.6 million and maturity of 3.45 years. Of the loans in the population, 59% were syndicated, and an average of 5.46 lenders participated in a loan. Similarly, in our sample 63% of the loans were syndicated and an average of 6.15 lenders participated. For the population, the borrowers' average sales in the year prior to the loan were $2.28 billion; in our sample that number was $3.23 billion. The all-in-spread-drawn (AIS), a measure of the interest rate charged on the loan over the base rate, usually LIBOR, was 199.68 basis points for the population and 182 basis points for the sample. This indicates that the loans in our sample were on average similar to the loans in the population. The high standard deviations of loan and borrower characteristics in the population of loans indicate that the mean of the loan and borrower characteristics of loans in our sample were not statistically or economically different from those of the population.

IV. a. Event day returns

In Table 3.3 we show that pre-95 loan announcements elicited positive announcement returns as documented in the prior studies. We use two measures of abnormal returns to capture the announcement effect of bank loans. The first measure is the holding period return (HPR) on the

[47] Firms with the highest senior debt rating of AAA are deemed to have a value of nine for the rating variable, and those with the lowest rating of C are deemed to have a value of one.

stock for the event date. This measure of abnormal return assumes that the expected return for a stock on a given day is zero. The second measure of abnormal return is the market-adjusted return. This measure assumes that the return on the market on any given day is an unbiased estimate for the average return on a sample of firms. We calculate the abnormal return on our sample of firms as the average of the difference between the realized return on the sample of firms and the market on the given day. We use the value-weighted return (including disbursements) on CRSP stocks as a proxy for the market.

As noted by Brown and Warner (1980), the standard deviation of returns is higher during the announcement periods. Consequently, calculating the test statistics using standard deviation of abnormal returns on the announcement date can lead to erroneous results. Therefore, we use the standard deviation of the daily abnormal return for the sample firms for the year ending 30 days before the announcement date. We elaborate on our methodology in Appendix A1. This method of calculating the test statistics assumes cross-sectional independence of the excess returns. To account for the possible cross-sectional dependence, we also calculate test statistics using the "portfolio" methodology of Brown and Warner (1985). We elaborate on this methodology in Appendix A2. We report the average abnormal return of the borrowing firms on the event date and the test statistics in Table 3.3.

We find that the average abnormal return on the announcement day for our sample of borrowing firms was not significantly different from zero. However, the pre-95 average holding period return was 132 basis points on the announcement day for the sample of borrowing firms that did not have other contaminating news in the media within three days of the announcement. The average market adjusted abnormal return on the announcement day for such firms was 113 basis points. These results are consistent with the results of prior studies. However, post-95, the average holding period return and the average market adjusted abnormal return on the announcement day for the sample of borrowing firms are negative. The holding period return was minus 46 basis points and the market adjusted abnormal return was significantly negative at 82 basis points below the market. This finding is at odds with prior studies.

IV. b. Syndicated loans vs. non-syndicated loans

Earlier studies have distinguished between syndicated loans and non-syndicated loans and have found that the positive loan announcement effect is lower for syndicated loans. Perhaps our results are driven primarily by an increase in syndicated lending over the last ten years. Therefore, we perform our analysis separately for syndicated loans and non-syndicated loans. The results are reported in Table 3.4. We find that pre-95 syndicated loans earned lower announcement returns than did non-syndicated loans. In the post-95 period, the abnormal returns for non-syndicated loans on the event day were more negative than those of syndicated loans. Pre-95 the HPR and the market-adjusted return on the event date were 2.7% and 2.5% respectively for the non-syndicated loans and 0.3% and 0.1% for the syndicated loans. Post-95, the non-syndicated loans had event day HPR of -1.2% and market adjusted return of -1.5%, compared with HPR of 0% and market adjusted return of -0.5% for syndicated loans. Our analysis shows that our results are not driven by announcements of syndicated loans.

IV. c. Selection bias—announcing versus non-announcing firms

To show that earlier studies suffered from a selection bias, we must demonstrate that firms that announce loans are systematically different from those firms that do not. We therefore divide our sample firms based on their senior debt rating. We have borrowing rating information for 342 of the 800 loans in our sample. We find that none of the firms rated AA or higher announced their loans. Less than 20% of the firms rated BBB or higher announced their loans, but over 40% of the loans made to firms rated BB or lower were announced (see Table 3.5, panel A). Less than 5% of the loans made to investment grade companies (debt rating of A or higher) were announced by the company itself, but over 23% of the loans made to speculative grade companies (debt rating of BB or lower) were announced by the company. This indicates that firms with low credit ratings consider that closing a bank loan is an important event and therefore announce their bank loans.

Similarly, in panel B of Table 3.5, we show that firms that had either negative or zero operating earnings in the prior year were twice as likely to announce their loans compared with other firms.

Table 3.6 shows that only 25% of the loans made to firms with Interest-to-EBITDA ratio of less than 0.1 were announced, but over 40% of the loans made to firms with negative operating earnings were announced. Additionally, when a loan to a firm with negative operating income was announced, the company itself was more likely to be the source of information. Only 17% of the loans to firms with an interest to EBITDA ratio of less than 0.1 (but greater than equal to zero) were announced by the borrowing firm, but 39% of the loans to firms with negative EBITDA, but positive interest expense, were announced by the borrowing firm. Perhaps firms with little or negative earnings find it difficult to get new loans and therefore consider raising a bank loan an event worth announcing.

Earlier studies have shown that small firms experience higher stock returns on bank loan announcements compared with large firms. We show in Table 3.7 that small firms are more likely to announce their bank loans compared with large firms. We show that 35% of the loans made to companies with a market capitalization of less than $100 million were announced, versus only 7% of the loans made to companies with market capitalization of over $10 billion. In addition, only 1% of the companies with capitalization over $10 billion announced their loans, versus 30% of the firms with capitalization less than $100 million. Similarly, we show in Table 3.8 that 48% of the loans with loan size-to-borrower asset ratios of over 50% were announced compared with just 8% of the loans with loan size-to-borrower asset ratios of less than 5%. Loans are more likely to be announced when they form a sizeable portion of the borrower's capital.

In Table 3.9 we show that firms with eight or fewer analysts are more than twice as likely to announce their loans, compared with firms with more than eight analysts. This holds true for loans made pre-95 and post-95. Post-95, 33% of the loans made to firms with one to four analysts were announced by the company, compared with only 5% of the loans made to firms with 16 or more analysts. In Table 3.12 we show that the average number of analysts following a borrowing firm that announced its loan is significantly lower than the average number of analysts following a borrowing firm that did not. For our sample period, a borrowing firm that announced had 4.32 analysts on average, but a company that did not announce had, on average, twice as many analysts following the firm. The difference in the average number of analysts following the announcing and the non-announcing borrowing firms was significant both pre-95 and post-95.

In Table 3.10 we show that the mean forecasted long-term growth measure for borrowing firms that announced their bank loans is significantly higher than the same measure for firms that did not. At the time of the loan, the operating earnings of the announcing firms were forecasted to grow, on average, at a rate of 19.72% over the next three to five years, compared with 15.88% for non-announcing firms. Pre-95 we do not find any significant difference between the forecasted long-term growth measures of the announcing and the non-announcing firms, but post-95 the difference is more pronounced and significant. The operating earnings of the announcing firms were forecasted to grow at a rate of 20.19% compared with 15.58% for the non-announcing firms. However, we show in Table 3.13 that the EPS of an average announcing firm did not grow any faster over the five years prior to the loan than a non-announcing firm. The mean five-year EPS growth rate of an announcing firm at the time of loan was 12.58%, compared with 10.78% for a non-announcing firm. We do not find any statistical significance for the difference in the two means.

In the literature, the coefficient of variation measure is used to measure dispersion of opinion among analysts following a firm. Table 3.11 shows that 17.7% of the firms that had a CV measure of less than .05 announced their loans, but 33.3% of the firms with a CV measure of 0.5 or more announced their loans. The difference of proportions test shows that the proportion of firms announcing their loans is significantly different between firms that have CV of less than .25 and those with CV of .25 or more. Prior studies have argued that firms with high dispersion of analyst estimates are more likely to benefit from mitigation of information asymmetries. In panel B of Table 3.12, we compare the mean CV measure for announcing firms and non-announcing firms, but we do not find any statistical significance in the difference of the means.

IV. d. Probability of announcement

Thus far we have analyzed several characteristics of the borrowing firms and have shown that some firms are more likely to announce their loans than others. In Table 3.14 we present the descriptive statistics of our sample loans and in Tables 3.15 through 3.22 we analyze the impact of different loan and borrower characteristics on the likelihood a firm will announce its bank loan. Table 3.14 shows that 29% of the loans in our sample were announced and only 21% were announced by the company. Of the loans in our sample, 63% were syndicated loans. On average, bank loans were one-third the size of the total assets of the borrowing firms. Of the borrowing firms in our sample, the average market capitalization was $4.7 billion. The biggest firm was valued at $162 billion and the smallest firm at only $1.2 million. Of the borrowing firms, 36% had a market capitalization of over $1 billion. Of the loans in our sample, 23% were made in the pre-95 period. An average of 7.73 analysts followed the borrowing company, up to a maximum of 41. The average forecasted long-term growth of the borrowing firms was 16.55%. The highest forecasted three- to five-year growth rate was 75%. Of the borrowing firms in our sample, 15% did not have positive operating earnings.

In Table 3.15 we present the results of logistic regression to predict the probability a loan will be announced in the media either by the borrowing firm, the lending institution, or a third party. We use several loan and borrower characteristics as the independent variables. Even though we have shown earlier that announcing firms have lower senior debt ratings than non-announcing firms, we do not use a rating variable in our regression because we do not have senior debt rating data for a significant number of observations. We contend that the independent variables capturing the loan size to total assets ratio, the market value of the firm, and the operating income of the firms reasonably capture the impact of debt rating on the likelihood of a loan announcement.[48] The results of our regressions show that the probability of a loan being announced in the media increases with the forecasted growth rate of the firm. A syndicated loan is more likely to be announced than a single-bank loan, and the probability of loan announcement is lower for firms with more than eight analysts. The probability of announcement increases with dispersion of opinion among analysts regarding the firm's EPS. As the ratio of loan size-to-total assets increases, the loan is more likely to be announced. Table 3.15 provides information on the sign and statistical significance of each coefficient estimate, but the magnitude of impact of each independent variable on the probability of announcement is not obvious. In Table 3.16 we show

[48] Our results remain qualitatively the same when we include the rating variable in the regression, but the power of our regression decreases reflecting a lower number of observations.

the change in the probability of announcement for a given change in the independent variable. For a non-syndicated loan for $100 million made post-95 to a firm with less than $1 billion market capitalization, $300 million of total assets (implying loan size-to-assets ratio of .33), positive operating earnings, followed by eight or fewer analysts, forecasted to grow at 10% over the next three to five years, and a CV measure of 0.20, the probability of loan announcement was 22.34%. If the firm were to take a $200 million loan (implying a loan size-to-assets ratio of .67), the probability of announcement would increase to 34.97%. If the firm were to take a $100 million syndicated loan rather than non-syndicated loan, the probability of announcement would increase to 36.97%. If our base firm were to be followed by more than eight analysts, the probability of announcement would decrease to 12.87%. An increase of forecasted long-term growth of our base firm from 10% to 20% would increase the probability of announcement from 22.34% to 28.67%. The probability of loan announcement was 1.47% less pre-95 than in the post-95 period.

We have shown that pre-95 there was a positive announcement return, but post-95 there is no positive announcement effect. Rather, the announcement returns on average have been negative post-95. This raises the obvious question: Why have the loan announcement returns changed? In Table 3.17 and Table 3.18 we show that the mix of firms that announced their loans pre-95 is significantly different from the group of firms that announced their loans post-95. This change in the nature of firms that announced loans can explain the change in the announcement returns pre-95 and post-95. The logistic regression in Table 3.17 includes the interaction term between the pre-95 variable and other independent variables. The interaction terms capture the differential impact of each borrower and loan characteristic on the probability of loan announcement pre-95 and post-95. In Table 3.18, we show the change in the probability of loan announcement for a firm as the borrower and loan characteristics changed pre- and post-95. The results of our regression suggest that the probability of loan announcement for our base loan was 22.90% post-95, but the probability of announcement for the same loan was only 15.24% pre-95. Post-95, an increase in the forecasted growth rate of the base firm from 10% to 20% would increase the probability of announcement from 22.9% to 31.34%, but pre-95 such an increase in the forecasted growth rate would have increased the probability of announcement from 15.24% to just 16.12%. Additionally, post-95 an increase in the number of analysts following our base firm from fewer than eight analysts to more than eight analysts would have *decreased* the probability of announcement from 22.90% to 10.80% only, but pre-95 such an increase in the analyst following would have *increased* the probability of announcement from 15.24% to 19.43%. The results show that post-95 small firms that took large loans had high forecasted growth rates and little analyst-following announced their loans. Whereas, in the pre-95 period, the firms that announced their loans were relatively mature and had relatively higher analyst following than firms announcing their loans post-95.

In Tables 3.14 through 3.18 we calculate the probability of a loan announcement in the media by the company, the lending bank, or a third party, but in Table 3.19 through 3.22 we calculate the probability the borrowing firm will announce its loan. Our results in Table 3.19 suggest that a company was more likely to announce its loan post-95 than pre-95. As in prior regressions, the results show that post-95 growth-hungry small firms with little analyst-following announced their loans; whereas, mature companies with better analyst-following and relatively larger assets bases announced their loans pre-95. The higher risk associated with small, relatively unknown, growth firms makes the mix of firms announcing their loans post-95 significantly different from the mix of firms announcing their loans pre-95. This difference in the risk level of the announcing firms may explain the difference in the announcement effect of bank loans pre-95 and post-95.

IV. e. Long-run abnormal returns

Thus far we have established that firms that announce their loans have significantly different characteristics from those that do not. Announcing firms experienced a positive loan announcement effect pre-95 but zero or negative announcement returns post-95. We have also established that the firms announcing their loans pre-95 were different from the firms announcing their loans post-95. Now we analyze the post-announcement operating performance and abnormal returns of announcing and non-announcing firms. BFG (2006) has already documented the long-run underperformance of bank borrowers. Our objective is to compare the performance of borrowing firms that announced their loans with the performance of those that did not. Measuring long-term abnormal performance is a very challenging task because every known way of calculating normal returns has shortcomings. Recent studies have favored the control matched-sample approach of Barber and Lyon (1997) over the traditional approach of comparing the returns of the event portfolio with that of the benchmark market portfolio. Their approach ameliorates the problems related to skewness of the abnormal returns calculated using the traditional approach, and it adjusts for the biases that may arise from new listing and market portfolio balancing. In this chapter, we compare the abnormal returns of firms that announced their loans and the firms that did not. Since both sets of firms experienced the same corporate event—taking a bank loan—and because the abnormal returns for both sets of firms would experience similar problems regarding skewness, new listing, and rebalancing, the abnormal returns calculated using the traditional approach should be comparable across the two sets of firms. Additionally, the control matched-sample approach relies on matching criteria like the SIC classification and the size of the firm, which do not always result in true match for the firms in question. Also, if we were to use the control matched-sample approach, we would lose valuable observations from our sample because we do not have data on SIC classifications and size for the borrowing firms for 71 loans in our sample.[49] Hence we use the traditional approach to calculate buy-and-hold abnormal returns (BHAR) and cumulative abnormal returns (CAR), but test the robustness of our results by comparing the abnormal returns of our borrowing firms over beta-matched and standard deviation-matched portfolios.

In Table 3.24 we present the BHAR for the borrowing firms of our sample loans. We calculate BHAR as follows:

$$BHAR_i = \left[\prod_{t=1}^{1,095} (1 + HPR_{i,t}) - \prod_{t=1}^{1,095} (1 + HPR_{market}) \right] - 1$$

where t is the number of calendar days since the loan start date and i is the borrowing firm. We use the value-weighted market return as the market HPR in our calculation of abnormal returns. We need return data for three years after the loan start date to calculate three-year BHAR, so we lose a significant number of observations either because the borrowing firm took a loan toward the end of our sample period or because the firm was delisted or acquired within three years of the loan closing. We are able to calculate BHAR for firms taking 506 loans in our sample. Given

[49] BFG (2006) have 7,882 loans in their sample when they match loans based on two-digit SIC as compared with 9,730 loans when they match based on size alone. This represents a loss of almost 19% of the observations.

the skewness of BHAR, the average BHAR is a biased indicator of the average performance of a borrowing firm, but the median BHAR is not. Hence, we compare the median BHAR of announcing and non-announcing firms in Table 3.25. The median BHAR over the value-weighted market for our sample of borrowing firms was -9% for the firms that did not announce their loans and -4% for firms that did. This implies that the stock of an average borrowing firm that did not announce its loan performed 9% lower than the value-weighted market over a period of three years from the loan closing date, while the stock of an average borrowing firm that announced its loan underperformed the market by 4%. BFG (2006) have already documented the underperformance of borrowing firms. They found a median three-year BHAR of -9.70% for borrowing firms using a control matched-sample approach based on SIC codes and size. Despite our use of the traditional approach, our results for median BHAR are comparable with those of BFG (2006). When we use the equal-weighted returns to calculate BHAR instead of the value-weighted return the underperformance of borrowing firms is more pronounced. However, our objective in this chapter is to compare the performance of borrowing firms that announced their loans with the abnormal returns of the firms that did not. We therefore perform the median test on the two sets of borrowing firms. We do not find evidence of a significant difference in the median BHAR for the announcing and the non-announcing firms.

However, the distribution of BHAR in Table 3.24 suggests that announcing firms form a large proportion of the firms that either perform very well or very poorly relative to the market. More than 26% of the firms that had BHAR of 100% above the market or 100% below the market announced their loans. On the other hand, only 14% of the firms that had BHAR between -100% and +100% announced their loans. This suggests that announcing firms are more likely to severely underperform or overperform the market and therefore are riskier than the average firm in the market. Pre-95 over 26% of the borrowing firms that had a three-year BHAR of less than -100% or greater than +100% announced their loans, compared with less than 8% of the firms with a BHAR between -100% and +100%. We observe similar results for the post-95 period also. We calculate BHAR over the equal-weighted market also and find similar results. To test the hypothesis that announcing firms either performed extremely well or extremely poorly relative to the value-weighted market index, we calculate the absolute value of the BHAR over the value-weighted market and compare the mean absolute BHAR for announcing and the non-announcing firms. The mean of the absolute BHAR for announcing firms is significantly higher than the mean of the absolute BHAR for non-announcing firms. We also perform the median test to compare the median of the absolute BHARs for announcing and non-announcing firms. We find that the median absolute BHAR for announcing firms is significantly higher than the median absolute BHAR for non-announcing firms. We find similar results pre-95 and post-95.

IV. f. Post-announcement operating efficiency

We have documented that there was no significant difference between the BHARs for announcing and non-announcing firms. However, in the three years after the loan, announcing firms either performed very well or very poorly relative to the non-announcing firms, on average. We now compare the relative operating performance of the announcing and non-announcing firms. The prior literature on relationship lending suggests that firms that borrow from banks get monitoring benefits. Perhaps firms that expect higher monitoring benefits are more likely to announce their bank loans. Since monitoring benefits should result in higher operating efficiency, we compare some of the measures of such efficiency for announcing and non-announcing firms. Our first measure of operating efficiency captures the operating earnings generated by the firm per dollar of assets, the ratio of EBITDA (DATA13) to total assets (DATA6). Our second measure captures the net profit margin of the borrowing firm, the ratio of net income (DATA172) to net sales (DATA12). Our third measure is the firm’s net income per dollar of assets, which is calculated as net income divided by total assets. We also measure employee productivity by calculating the ratio of operating earnings to number of employees. We also calculate the ratio of total assets to total employees (DATA29). We next calculate the annual growth rate of each measure of operating efficiency for each sample firm over the six years including the year in which the loan was taken. In Table 3.29, we show the median growth rate of the several measures of operating efficiency for each year, starting with the year the loan was closed. We do not find any significant difference in the improvement of operating efficiency of an average borrowing firm that announced its loan relative to one that did not. In the year after the loan, an employee at an average borrowing firm that announced its loan produced 6% more operating earnings than the previous year. However, an employee at an average non-announcing borrowing firm produced 2% more operating earnings in the year after the loan compared to the prior year. This difference in the median growth rate of operating earnings per employee was statistically significant. We found no other statistically significant differences between the growth rate of operating measures between announcing and non-announcing firms. In Table 3.30, we compare the cumulative growth in operating measures of operating efficiency over a period of time after the bank loan was taken. We find no statistically significant differences in the median growth rates of operating measures between announcing and non-announcing firms.

We showed earlier that firms that announce their loans have higher forecasted growth rates of EPS than non-announcing firms. In Table 3.31, we compare the realized annualized five-year EPS growth rate of announcing and non-announcing firms. The average growth rate of firms that announced their loans was 13.28% compared with 10.95% for non-announcing firms. This difference in the mean growth rates of the announcing and the non-announcing firms is not statistically significant at the 5% level. However, pre-95, the median five-year annualized EPS growth rate for announcing firms was significantly higher than that of non-announcing firms. The EPS of an average announcing firm in the pre-95 period grew at the rate of 11.95% per year over the next five years, but the EPS of an average non-announcing firm grew at the rate of 5.36% per year only. This may explain the positive announcement returns experienced by an average firm pre-95. Post-95 we do not find any significant difference in the realized growth rates of average announcing and non-announcing firms.

V. Robustness check

Prior studies have used an event window rather than an event date to measure the abnormal returns for the firms announcing their bank loans. Therefore, as a robustness test and for the sake of comparability we also calculate the abnormal returns for our sample firms over an event window. We calculate abnormal returns for our sample firms over the following three different event windows: (-1,0) days, (0,1) days, and (-1,1) days around the announcement date. Our results remain unchanged using these different event windows. In Table 3.4, we report the three-day event window abnormal returns for our sample firms. For brevity, we do not report the results for the two-day event windows.

Measurement of abnormal returns requires that we calculate the difference between the realized return and the expected return. While realized returns can be measured precisely, expected returns cannot. In our measures of abnormal return we assumed a zero-expected return on a stock when we used the holding period return as a measure of abnormal return, and we assumed the expected return was identical to the market return when we used market-adjusted return as a measure of abnormal return. These assumptions are subject to argument. Therefore, as a robustness test, we use the “beta excess return” and the “standard deviation excess return” from the *CRSP Eventus* database as two additional measures of abnormal return. A firm’s beta excess return is the difference between the daily holding period return on the stock and the daily holding period return on a portfolio of stocks with the same beta measure as the stock in question. This measure adjusts for the systematic risk of the stock. The standard deviation excess return is the difference between the daily return on the stock and the daily return on a portfolio of stocks with similar return standard deviations. This measure adjusts for the return volatility of the stock. We report these measures of abnormal returns for the sample of borrowing firms in Table 3.3 along with our other measures of abnormal return. The magnitude of average beta excess returns and average standard deviation excess returns for our sample firms is not significantly different from that of their average holding period returns and average market adjusted returns. This suggests that our measure of abnormal returns is robust to alternative specifications.

We next segregate our sample period into two sub-periods in Table 3.3 and show that the positive loan announcement effect was a temporal phenomenon. We use the year 1995 as our cutoff year. We contend that the positive loan announcement effect disappeared over time because of a change in the mix of firms announcing their loans, so our results should not be highly sensitive to the choice of the cutoff year. We therefore perform our analysis using different years such as 1993 and 1994 as the cutoff year and our results remain qualitatively unchanged (results unreported). Similarly, earlier studies have found that small firms experience positive loan announcement effects but large firms do not. Perhaps our results for the last ten years are driven by large firms that elicit no positive announcement effects. Therefore, we perform our analysis only on small firms, finding that small firms did not experience positive announcement returns in the last ten years.

To attribute the stock returns on a particular day or over a particular window to a particular event it is important to ensure that no other important events occurred close to the event being studied. Therefore, in event studies, observations where other contaminating events take place close to the event in question typically are deleted from the sample. This decreases the number of observations in the study and reduces the power of the tests. A researcher balances the cost of deleting observations against the benefits of having a clean sample. We deleted all observations that had any contaminating news published within three days of the loan announcement. We now test the sensitivity of our results to this event window of +/-3 days and deem a news story contaminating only when published within (-3,+1) days of the loan announcement. This new scheme of categorization does not significantly alter our results. Our results again remain unchanged when we use a (-2, +1) days window.

Mosebach (1999) states that firms that take large lines of credit (over $1 billion) do not announce their loans because the information becomes readily available to the market via *Gold Sheets*.[50] It is possible that over time, because of improvements in communication technologies, the speed of information diffusion has increased to an extent that firms no longer consider it important to announce their loans. Perhaps the market becomes aware of the new loan from loan reporters or publications like *Gold Sheets* as soon as the loan is closed. We therefore use the loan closing date as the event date and calculate the abnormal returns for all firms in our sample that did not announce their loans. If bank lending mitigates information asymmetry and if the hypothesis regarding the increased speed of information diffusion are true, then we should observe positive returns on the event dates for the sample firms that did not have any other contaminating event within three days of the loan start date. However, we find no such positive returns.

In Table 3.10 we report that the average of the mean forecasted long-term growth estimates for the borrowing firms that announced their loans was higher than those of non-announcing firms. As mentioned earlier, the mean forecasted long-term growth measure for a firm is the mean of the long-term growth estimates made by several analysts following the firm. When a borrowing firm is followed by only a few analysts, the mean can be highly sensitive to the growth forecasts

[50] *Gold Sheets*, a publication of Loan Pricing Corporation, provides information about new loan origination and loan terms. It is widely used by practitioners.

of one or two highly pessimistic or optimistic analysts. Since announcing firms, on average, have fewer analysts following the firm, our results in Table 3.10 panel A might be driven by a positive bias in the mean forecasted long-term growth measure. Hence, in panel B of Table 3.10, we compare the average of the median forecasted long-term growth of announcing and non-announcing firms. The median long-term growth forecast is less susceptible to extreme optimism or pessimism. We find, however, that our results from panel A of Table 3.10 remain virtually unchanged when we use the median rather than the mean long-term growth forecasts. We also compare the median of the median long-term growth forecasts of announcing and non-announcing firms. Panel B of Table 3.10 shows that an average analyst following an average announcing firm expected the firm's operating earnings to grow by 17.25% per year over the next three to five years compared with 14.50% for an average non-announcing firm. This difference in growth rates is both statistically and economically significant. Our analysis in panel B of Table 3.10 shows that our results are not driven either by extreme optimism of a few analysts or abnormal growth prospects of a few outlying firms.

In Tables 3.24 and 3.25, we show that announcing firms either severely underperform or severely overperform the market in the three years after the loan. We use the buy-and-hold return to measure abnormal performance of the borrowing firms. While BHAR captures the actual experience of an investor (Barber and Lyon, 1997), some studies argue for the use of cumulative abnormal returns (CAR). We therefore test the robustness of our results by comparing the three-year CAR of announcing firms with that of the non-announcing firms. We calculate the three-year CAR as follows:

$$CAR_i = \prod_{t=1}^{1,095} (1 + HPR_{i,t} - HPR_{Benchmark}) - 1$$

where t is the number of days after the loan start date and i represents the borrowing firm. We use the value-weighted market index as the benchmark portfolio. Table 3.28 shows that the median three-year CAR for the announcing firms was -7% and that of the non-announcing firms was -9%. The median measure for three-year CAR for our sample of borrowing firms is close to the median three-year abnormal returns of -9.70% found by BFG (2006). In Table 3.26 we show that over 20% of the firms that had three-year CAR less than -50% or higher than 100% announced their loans, but less than 17% of the firms that had three-year CAR between -50%

and 100% announced their loans. We find similar results when we divide our sample into the pre- and post-95 periods. When we use the equal-weighted market index as the benchmark portfolio, we find that 20% of the firms that had underperformed the equal-weighted market index by more than 75% announced their loans, and 32% of the firms that exceeded the equal-weighted market index by 50% or more announced their loans. In Table 3.28, we compare the mean of the absolute three-year CARs over value-weighted market for announcing firms with that of the non-announcing firms. We find that the mean absolute CAR for announcing firms is significantly higher than that of the non-announcing firms. We also perform the median test to compare the absolute three-year CAR for an average announcing firm with that of an average non-announcing firm. We find that the median absolute CAR for announcing firms is significantly higher than that of the non-announcing firms. This confirms that announcing firms either perform extremely well or extremely poorly as compared with the market, and that our results on long-term performance of borrowing firms are robust to alternative specifications.

As an additional test for robustness of the three-year abnormal returns for our sample of borrowing firms, we calculate three-year CARs over beta matched portfolios and three-year CARs over standard deviation matched portfolios. As mentioned earlier, CRSP provides daily data for beta excess return and standard deviation excess return. We calculate the three-year CARs as follows:

$$CAR_{i,\beta} = \prod_{t=1}^{1,095}(1 + HPR_{i,t,\beta-adj}) - 1$$

$$CAR_{i,\sigma} = \prod_{t=1}^{1,095}(1 + HPR_{i,t,\sigma-adj}) - 1$$

where $CAR_{i,\beta}$ is the three-year CAR over beta matched portfolio and $HPR_{i,t,\beta-adj}$ is beta excess return of the borrowing firm *i* on day *t* after the loan start date. Similarly, $CAR_{i,\sigma}$ is the three-year CAR over standard deviation matched portfolio and $HPR_{i,t,\sigma-adj}$ is the standard deviation excess return of the borrowing firm *i* on day *t* after the loan start date. In Table 3.27 we show that over 17% of the firms that underperformed their sigma-matched peers by 50% or more, or beat their peers by more than 100%, announced their loans. However, less than 13% of the firms that had three-year CAR_{σ} between -50% and 100% announced their loans. We find similar results when we divide the sample into two sets of firms based on loans made pre-95 and post-95. When we use CARs over beta matched portfolios, we again find that announcing firms were more likely to perform extremely well or extremely poorly compared with their beta matched peers. In Table 3.28, we compare the mean three-year CAR_β for announcing firms with that of the non-announcing firms. We do not find any evidence that announcing firms fared better than the non-announcing firms in the three years after the loan closing. We do not find any significant difference in the median CAR_β of announcing firms and that of non-announcing firms either. Similarly, we do not find any significant underperformance by non-announcing firms when we use standard deviation matched portfolios.

VI. Discussion

We have documented in this chapter that about 25% of the firms that take bank loans announce their loans. This raises the obvious question: Why do some firms announce loans and others not? Theoretically, a firm will announce a loan for one of two reasons. Either the closing of the bank loan is an important event and the firm is required by SEC's Regulation Fair Disclosure (commonly referred to as Reg FD) to disclose such material event, or the firm expects some net benefits from announcing the loan. After the publication of studies on positive loan announcement effects some companies may have announced their loans expecting to bring about a positive market response. Other firms might have announced for subtler reasons. For example, we have shown that small firms with little analyst following are more likely to announce their loans than firms that are followed by many analysts. Firms with little or no analyst following attract relatively little media attention, but the announcement of a bank loan offers the small firm free publicity and an opportunity to garner investor support and build consensus on future growth prospects. For a small firm that successfully raises a large loan, the loan announcement gives the firm an opportunity to re-emphasize its growth prospects to potential and existing customers, business partners, creditors, and employees—presumably increasing the firm's chance of survival and growth.

We have shown in this chapter that loan announcements engendered positive effects pre-95, but post-95 announcements did not have the same effect. There are several explanations for this change of effect. First, banks may have lost their specialness over time. Over the last decade, banks have been forced to adjust their lending practices to compete with the bond and commercial paper markets. Second, after studies were published showing the positive loan announcement effect, more firms started announcing their loans. As a result loan announcements may have lost importance, and the associated announcement effect disappeared. We have also shown that the mix of firms announcing their loans pre-95 was significantly different from the group of firms announcing their loans post-95. The information content and the importance of loan announcements could be different for different types of firms. Third, the positive announcement effect observed pre-95 could have been falsely attributed to a certification effect in the prior studies. The positive loan announcement effect pre-95 could simply have been a result of the market’s response to new and valuable information embedded in the loan announcements. When a firm announces a loan, the announcement provides the market with information regarding the availability of funds, growth prospects, and riskiness of the firm. Over time the information content of loan announcements could have changed.

In Table 3.23 we show that most of the positive announcement effect pre-95 reflected firms that had high interest expense in the prior year but relatively little or no operating income. These firms already had bank debt and presumably had received any certification impact from their existing lenders. Yet they experienced high announcement returns. Perhaps the high announcement returns were because the loan announcements provided new information to the market regarding availability of funds to relatively distressed firms. We have documented that low-rated firms announce their loans. Perhaps the announcement of loans by such firms provides little or no indication regarding certification of quality by the lending bank but rather information regarding availability of funds to a relatively less creditworthy firm. When a firm makes a loan announcement, the market adjusts its expectations regarding the magnitude, timing, and riskiness of the borrowing firm’s future cash flows, and this adjustment of expectations underpins the announcement effect. Since new information in the loan announcement could result in either upward or downward revision of expectations, the announcement effect could be positive or negative. We suggest that it is difficult to ascertain whether the market’s response to a loan announcement is because of lower information asymmetry regarding the borrowing firm, reflecting certification of quality by the lending bank as quasi-insider, or simply an adjustment of investor expectations in light of “latent” information embedded in the loan announcement. Perhaps studying the market’s response to loan announcements is not an appropriate method of capturing any bank “specialness”. This is an issue for future research.

VII. Conclusion

Prior studies have shown that announcing a bank loan has a positive effect on the market value of the equity of the borrowing firm. However, these studies relied on data compiled by performing keyword searches for loan announcements in news databases such as the *WSJI* and *DJ Newswire*. We show that earlier studies suffered from a major selection bias problem: borrowing firms that announce their loans are systematically different from those that do not. Small firms that take large loans, have little analyst following, and have high growth prospects are more likely to announce their loans. Announcing firms are also likely to have low debt ratings, little or negative operating earnings, but high interest expense. We also show that even though firms that announced bank loans earned positive announcement returns in the pre-95 period, the loan announcement effect has not been positive in the last ten years. This could be because the firms that announced their loans post-95 were significantly different from the firms that announced their loans pre-95. The post-95 announcing firms were small firms with high forecasted EPS growth and little analyst following, but in the pre-95 period the firms that announced their loans were relatively more mature and were followed by more analysts. This finding runs counter to the view that information asymmetries underpin any observed announcement effect.

We also document that all firms that borrow from banks do not announce their loans. The existing literature argues that bank loan announcements decrease information asymmetry problems and the banks “certify” the value of certain firms by granting them loans. If all bank loans alleviated information asymmetry problems, then all firms would have an incentive to announce their loans. Yet less than 25% of our sample firms choose to do so. We also document that most companies that announce their loans do so within a week after the loan start date.

BFG (2006) have documented underperformance by bank borrowers in three years following the announcement event, and we find similar underperformance in our study. Based on prior studies of loan announcements, BFG (2006) state that the underperformance of bank borrowers after positive announcement returns indicates reversal, which means that the market is not only initially wrong about the magnitude of the loan's effect on firm value, but it is also wrong about the direction. But in our study we show that post-95 loan announcements elicit negative announcement returns, thereby rightly predicting the future negative abnormal stock returns of borrowing firms. Also, borrowers that announced loans in the pre-95 period actually had significantly higher EPS growth rates over five years after the event than non-announcing borrowers.

We document that firms that announce their loans have a significantly higher forecasted EPS growth rate at the time of the loan than non-announcing firms. Yet announcing firms do not actually grow faster than non-announcing firms over the next five years. We also compare the three-year abnormal returns of announcing and non-announcing firms after the loan and find no significant difference between the two. However, we do find evidence that, post-loan, announcing firms have three-year abnormal returns that are either very low or very high compared with non-announcing firms. When we compare the operating performance of announcing firms with that of non-announcing firms, we find no evidence that announcing firms fare better than non-announcing firms.

In this chapter, we discuss some of several prospective explanations for our results. It is possible that banks have lost their specialness over time and, therefore, announcements of bank loans no longer mitigate information asymmetry. It is also possible that after studies were published showing the positive effect of loan announcements, more firms started announcing their bank loans, expecting positive announcement returns. As a result, loan announcements lost importance, and the associated announcement effect disappeared. Also the positive announcement effect observed earlier may not have reflected the certification role of the lending banks as quasi-insiders and accordingly did not mitigate information asymmetry. The positive announcement effect could simply have been the market's response to the news of availability of funds to meet the firm's growth needs. Perhaps studying the market's response to loan announcements is not an appropriate approach for capturing bank specialness! These are questions for future research.

Table 3.1: Survey of Literature on Bank Loan Announcement Effects

Paper	Author	Time	Source	Method	Initial sample	Final sample	Clean Sample	
Journal of Financial Economics (1986)	Mikkelson and Partch				360			
Journal of Financial Economics (1987)	James	1974 - 1983	Wall Street Journal Index	Search WSJI for all debt announcement for random sample of 300 firms		117	117	*
Journal of Financial Economics (1989)	Lummer and McConnell	1976 - 1986	Wall Street Journal Index	Search for credit agreements in the WSJ	1145	728	728	
Journal of Banking and Finance (1992)	Slovin, Johnson, and Glascock	1980 - 1986	Dow Jones News Wire	Search for credit agreements in DJ Newswire	676	273	273	
Journal of Finance (1993)	Best and Zhang	Jan 77-Dec 89	Wall Street Journal (WSJ)	Search for bank loan announcements in WSJ		491	491	
Journal of Financial Services Research (1994)	Preece and Mullineaux	Jan 80 - Dec 87	Wall Street Journal (WSJ)	Search for credit agreements in WSJ		439	439	
Applied Financial Economics (1995)	Armitage	Jan 88 - Dec 91	International Financing Review (IFR), Euroweek, Screen Insider	Keyword search for syndicated loans in *UK*	659	574	430	
Journal of Finance (1995)	Billett, Flannery and Garfinkel	1980 - 1989	Dow Jones News Retrieval Service	Keyword search for credit and loans		1468	626	
Journal of Banking and Finance (2000)	Aintablian and Roberts	1988 - 1995	Canadian Newswire, Canadian Corporate News, and Financial Post Database	keyword search for credit and loans by *Canadian* Firms		137	137	
Quarterly Review of Economics and Finance (2003)	Gasbarro, Fery, and Woodliff, and Zumwalt	Jan 83 - Dec 99	IFR Platinum Database of Thomson Financial Publishing	Search for *Australian* firms reaching credit agreements			196	
Journal of Financial Research (2004)	Gasbarro, Song-Le, and Schwebach, and Zumwalt	1995 - 2000	IFR Platinum Database and Dow Jones Interactive Index	keyword search for "Launched", "Sold", "Issued", or "Priced"		2061		**

* 207 Total financing announcements including straight debt

** This includes multiple announcements and they do not screen for contamination

Table 3.2: Descriptive Statistics – Population of Loans in LPC's Dealscan Database (1987-2004) and Randomly Selected Sample of Loans

Population

Variable	Description	N	Mean	Std Dev	Minimum	Maximum
Ratings	Senior debt rating; AAA = 9, AA =8 .. C=1	6,949	5.51	1.3	1	9
lenders	Number of Lenders	20,127	5.46	7.7	1	110
Tenor	Tenor	18,011	44.78	34	1	366
d_amt	amount of the loan deal (millions)	20,140	273	708	0.05	25,000
AIS	All-in-spread drawn	16,234	199.68	137	-14	1,490
Sales	Borrower's sale in the prior year (millions)	18,132	2,278	8,994	-	273,834
Syndicated	Dummy variable =1 for syndicated loans	20,127	0.59	0.49	0	1

Sample

Variable	Description	N	Mean	Std. Dev.	Minimum	Maximum
Ratings	Senior debt rating; AAA = 9, AA =8 .. C=1	342	5.69	1.18	3	9
lenders	Number of Lenders	800	6.15	8.83	1	108
Tenor	Tenor	715	41.46	32.72	0	361
d_amt	amount of the loan deal (millions)	800	309.6	719.85	0.2	12,000
AIS	All-in-spread drawn	676	182	129.38	6.32	980
Sales	Borrower's sale in the prior year (millions)	741	3,229	10,431	1.22	186,763
Syndicated	Dummy variable =1 for syndicated loans	800	0.63	0.48	0	1

Table 3.3: Event Day Abnormal Returns for Borrowing Firms Announcing their Bank Loans

Panel A – Full sample period

Event Day Returns	N	Mean	*t*-stat *	*t*-stat **
Holding Period Return	94	-0.06%	0.18	0.12
Market Adjusted Return	94	-0.39%	1.17	0.78
Sigma Adjusted Return	53	-0.07%	0.83	0.14
Beta Adjusted Return	55	0.05%	0.35	0.09

Panel B – Pre 95

Event Day Returns	N	Mean	*t*-stat *	*t*-stat **
Holding Period Return	21	1.32%	1.47	1.44
Market Adjusted Return	21	1.13%	1.05	1.17
Sigma Adjusted Return	11	1.16%	0.68	0.96
Beta Adjusted Return	11	1.35%	1.22	1.12

Panel C – Post 95

Event Day Returns	N	Mean	*t*-stat *	*t*-stat **
Holding Period Return	73	-0.46%	0.96	0.75
Market Adjusted Return	73	-0.82%	1.88	1.24
Sigma Adjusted Return	42	-0.39%	1.29	0.56
Beta Adjusted Return	44	-0.27%	0.80	0.39

* Assuming cross sectional independence of excess returns

****** Assuming cross sectional dependence in the security-specific excess returns

Table 3.4: Event Day and Event Period Abnormal Returns for Borrowing Firms Announcing Syndicated and Non-syndicated Loans

Non-syndicated Loans

Returns	Pre-95	Post 95	total
	(N=9)	(N=26)	(N=35)
1-day Holding Period Return	2.7%	-1.2%	-0.2%
1-day Market Adjusted Return	2.5%	-1.5%	-0.5%
3-day Holding Period Return	5.2%	0.4%	1.6%
3-day Market Adjusted Return	4.4%	-0.2%	1.0%

Syndicated Loans

Returns	Pre-95	Post 95	total
	(N=12)	(N=47)	(N=59)
1-day Holding Period Return	0.3%	0.0%	0.0%
1-day Market Adjusted Return	0.1%	-0.5%	-0.3%
3-day Holding Period Return	2.1%	-0.7%	-0.1%
3-day Market Adjusted Return	1.6%	-0.4%	0.0%

Table 3.5: Descriptive Statistics – Senior Debt Rating and Operating Profit-to-Assets Ratio of Borrowing Firms of Randomly Selected Sample of Loans

Panel A

Rating (Senior)	Total	Announced	Percent	Ann. by Company	% of total
AAA	1	0	0%	0	0%
AA	12	0	0%	0	0%
A	80	9	11%	4	5%
BBB	106	20	19%	19	18%
BB	80	32	40%	18	23%
B	55	28	51%	14	25%
CCC	8	6	75%	2	25%
Unrated	458	137	30%	111	24%
Total	800	232		168	

Panel B

EBITDA / TA	Total	Announced	Percent	Ann. by Company	% of total
<=0	107	44	41%	40	37%
0<x<.10	161	47	29%	29	18%
.10<=x.15	186	56	30%	40	22%
.15<=x<.20	162	42	26%	30	19%
x>=.20	119	26	22%	16	13%
No Data	65	17	26%	13	20%
Total	800	232		168	

Table 3.6: Descriptive Statistics – Interest-to-Operating Profit Ratio of Borrowing Firms of Randomly Selected Sample of Loans

Panel A

		Announced by		
Interest / EBITDA	Total	company	Others	Total
0<=x<.10	231	40	17	57
.10<=x<.25	222	37	21	58
.25<=x<.50	116	22	12	34
x>=.50	64	17	6	23
+ve Interest but -ve or ‘0’ income	97	38	3	41
No data	70	14	5	19
Total	800	168	64	232

Panel B

Interest / EBITDA	Announced/ Total	Company/ Total	Company/ Announced
0<=x<.10	25%	17%	70%
.10<=x<.25	26%	17%	64%
.25<=x<.50	29%	19%	65%
x>=.50	36%	27%	74%
+ve Interest but -ve or '0' income	42%	39%	93%
No data	27%	20%	74%

Table 3.7: Descriptive Statistics – Market Capitalization of Borrowing Firms of Randomly Selected Sample of Loans

Panel A

		Announced by		
Market Cap	Total	Company	Others	Total
<=100M	168	51	8	59
100M<x<=300M	127	41	11	52
300M<x<=1B	149	39	16	55
1B<x<=10B	185	20	18	38
x>10B	67	1	4	5
No price	104	16	7	23
Total	800	168	64	232

Panel B

As a percent	Announced/ Total	Company/ Total	Company/ Announced
<=100M	35%	30%	86%
100M<x<=300M	41%	32%	79%
300M<x<=1B	37%	26%	71%
1B<x<=10B	21%	10%	53%
x>10B	7%	1%	20%
No price	22%	15%	70%

Table 3.8: Descriptive Statistics – Loan size-to-Total Assets Ratio for Randomly Selected Sample of Loans

Panel A

		Announced		
Loan-to-assets Ratio	Total	Company	Others	Total
X<=0.05	111	5	4	9
0.05<x<=0.1	100	11	8	19
0.1<x<=0.25	232	44	18	62
0.25<x<=0.5	158	48	13	61
x>0.5	134	47	17	64
No data	65	13	4	17
Total	800	168	64	232

Panel B

Loan-to-assets Ratio	Announced/ Total	Company/ Total	Company/ Announced
x<=0.05	8%	5%	56%
0.05<x<=0.1	19%	11%	58%
0.1<x<=0.25	27%	19%	71%
0.25<x<=0.5	39%	30%	79%
x>0.5	48%	35%	73%
No data	26%	20%	76%

Table 3.9: Descriptive Statistics – Number of Analysts Following the borrowing company

	Announcement by company			
Full Sample	unannounced	announced	Total	% ann
1 to 4	158	68	226	30%
5 to 8	104	39	143	27%
9 to 15	117	16	133	12%
16 to 41	127	7	134	5%
No data (implies 0)	117	37	154	24%
Total	623	167	790	21%
Post 95				
1 to 4	114	56	170	33%
5 to 8	89	36	125	29%
9 to 15	98	15	113	13%
16 to 41	104	5	109	5%
No data (implies 0)	66	28	94	30%
Total	471	140	611	23%
Pre 95				
1 to 4	44	12	56	21%
5 to 8	15	3	18	17%
9 to 15	19	1	20	5%
16 to 41	23	2	25	8%
No data (implies 0)	51	9	60	15%
Total	152	27	179	15%

Table 3.10: Analysts' Forecast of Long-term growth (LTG) of the Borrowing Firms of Randomly Selected Sample of Loans

Panel A

Mean of the Forecasted Long Term Growth Estimates for the Company

	Announcement by Company		*t-stat*
Full Sample	unannounced	announced	Diff. of means
Mean	15.88	19.72	3.80*
n	460	98	
Std. Dev.	8.15	9.28	
Pre 95			
Mean	17.12	15.58	-0.76
n	87	10	
Std. Dev.	8.14	5.79	
Post 95			
Mean	15.58	20.19	4.20*
n	373	88	
Std. Dev.	8.14	9.50	

Panel B

Median of the Forecasted Long Term Growth Estimates for the Company

	Announcement by Company		*t-stat*
Full Sample	unannounced	announced	Diff. of means
Mean	15.73	19.20	3.68*
N	460	98	
Std. Dev.	8.14	8.55	
Pre 95			
Mean	17.00	15.50	-0.75
n	87	10	
Std. Dev.	8.23	5.68	
Post 95			
Mean	15.43	19.62	4.10*
n	373	88	
Std. Dev.	8.10	8.74	
Medians			
full sample	14.50	17.25	4.25*
pre 95	15.00	13.50	-0.35
post 95	14.00	17.75	4.77*

* Significant at 5% level

Table 3.11: Descriptive Statistics – Coefficient of Variation (CV) of EPS estimates for Borrowing Firms

CV	Announcement by company			
	unannounced	announced	Total	Proportion
<.05	255	55	310	17.7%
.05<=x<.1	83	16	99	16.2%
<.1<=x<.25	70	14	84	16.7%
.25<=x<.5	29	8	37	21.6%
>=.5	18	9	27	33.3%
Grand Total	455	102	557	18.3%

Difference of proportions Test				
<.25	408	85	493	17.2%
>=.25	47	17	64	26.6%
t-stat				1.81*

* Significant at 5% level

Table 3.12: Analyst Following and Dispersion of Opinion

Panel A

Number of Analysts

	Announcement by Company		*t-stat*
Full Sample	unannounced	announced	diff of means
Mean of # of analysts	8.64	4.32	8.34
n	623	167	
Std. Dev	8.78	4.91	
Pre 95			
Mean of # of analysts	6.18	3.59	2.08
n	152	27	
Std. Dev	8.19	5.46	
Post 95			
Mean of # of analysts	9.44	4.46	8.65
n	471	140	
Std. Dev	8.82	4.81	

Panel B

Coefficient of Variation (CV) of EPS Estimates

	Announcement by Company		*t-stat*
Full Sample	Unannounced	announced	diff of means
Mean of CV	0.16	0.26	0.98
n	455	102	
Std Dev	0.59	0.96	
Pre 95			
Mean of CV	0.24	0.14	-1.17
n	87	13	
Std Dev	0.64	0.20	
Post 95			
Mean of CV	0.14	0.28	1.18
n	368	89	
Std Dev	0.58	1.03	

Table 3.13: Actual Annualized 5-Year EPS Growth Rate of the Borrowing Firm at the Time of Loan

	Announcement by company		*t-stat*
Full Sample	unannounced	announced	Diff. of means
Mean	10.78	12.58	0.54
N	415	104	
Std. Dev.	25.79	31.64	
Pre 95			
Mean	15.93	19.55	0.31
N	66	11	
Std. Dev.	30.35	36.17	
Post 95			
Mean	9.80	11.76	0.56
N	349	93	
Std. Dev.	24.76	31.18	

Medians			
Full sample	9.00	9.28	0.24
Pre 95	10.49	9.20	-0.27
Post 95	8.71	9.36	0.11

Table 3.14: Descriptive Statistics – Characteristics of Borrowing Firms of Randomly Selected Sample of Loans

Variable	Description	N	Mean	Std Dev	Minimum	Maximum
announce	1 if loan was announced; otherwise 0	800	0.29	0.45	-	1.00
synd	1 if loan was syndicated; otherwise 0	800	0.63	0.48	-	1.00
company	1 if the company announced loan; otherwise 0	800	0.21	0.41	-	1.00
loan_Asset	Ratio of Loan size to Total Assets	735	0.33	0.46	0.00	7.11
cap	Market capitalization of the borrowing firm	696	4,704,468,145	15,296,830,057	1,179,900	162,418,904,250
pre95	1 if loan made in 1995 or before; otherwise 0	800	0.23	0.42	-	1.00
analysts	# of analysts following borrowing company	790	7.73	8.30	-	41.00
ltg	Mean analyst forecast of long term growth	558	16.55	8.48	-	75.00
abscv	abs(std. dev of EPS estimates / mean estimate)	557	0.18	0.68	-	9.00
ebitda_ta	Ratio of EBITDA to Total Assets	735	0.11	0.13	-0.97	0.58
L_la	Log (1+ loan size / Total Assets)	735	0.25	0.24	0.00	2.09
L_abscv	Log (1+ abs(std. dev / mean))	557	0.11	0.25	-	2.30
distress	1 if EBITDA <=0; otherwise 0	735	0.15	0.35	-	1.00
invest	1 if firm rated A or higher; otherwise 0	342	0.27	0.45	-	1.00
L_ltg	log (1+ mean analyst forecast of LTG)	558	2.76	0.45	-	4.33
big	1 if market cap > $1 billion; otherwise 0	696	0.36	0.48	-	1.00
follow	1 if followed by more than 8 analysts; otherwise 0	790	0.34	0.47	-	1.00

Table 3.15: Logistic Regression to Predict Probability of a Loan Being Announced in the Media

Variable	Description	Estimate	Std. Err.	Chi-Square	Pr > ChiSq
Intercept		-3.48720	0.86670	16.18840	<.0001
synd	1 if the loan had two or more lenders; otherwise 0	0.7124	0.2908	6.0029	0.0143
l_ltg	log (1+ mean analyst estimate of long term growth)	0.5167	0.2827	3.3410	0.0676
distress	1 if EBITDA <= 0; otherwise 0	0.0210	0.5210	0.0016	0.9679
l_absCV	log (1 + abs(std. dev. Of EPS est. / mean EPS))	1.0836	0.4562	5.6415	0.0175
follow	1 if followed by more than 8 analysts; otherwise 0	-0.6670	0.2869	5.4062	0.0201
big	1 if market cap > $ 1 billion; otherwise 0	-0.0401	0.3068	0.0171	0.8959
l_la	log (1 + loans size / total assets)	2.8225	0.6138	21.1427	<.0001
pre95	1 if loan made in 1995 or before; otherwise 0;	-0.0866	0.3152	0.0754	0.7836
N = 495	Likelihood Ratio = 81.2195				Wald Stats. = 64.5379

Table 3.16: Marginal Probability of Announcement in the Media

	Base Value	Change to	New Probability	Change in Prob
Syndicated Loan dummy	0	1	36.97%	14.63%
Long-term EPS growth estimate (%)	10	20	28.67%	6.32%
Negative or Zero EBITDA dummy	0	1	22.71%	0.37%
Coefficient of Variation of EPS Estimates	0.20	0.40	25.38%	3.03%
Followed by More than 8 Analysts dummy	0	1	12.87%	-9.48%
Market Cap of Over $1 billion dummy	0	1	21.66%	-0.69%
Loan-to-Assets Ratio	0.33	0.66	34.97%	12.63%
Pre 95 dummy	0	1	20.88%	-1.47%
Probability of announcement at base value	22.34%			

Table 3.17: Logistic Regression to Predict Probability of a Loan Being Announced in the Media

Variable	Description	Estimate	Std. Err.	Chi-Square	Pr > ChiSq
Intercept		-3.81340	0.96420	15.64270	<.0001
synd	1 if the loan had two or more lenders; otherwise 0	0.7170	0.2928	5.9958	0.0143
l_ltg	log (1+ mean analyst estimate of long term growth)	0.6646	0.3207	4.2951	0.0382
distress	1 if EBITDA <= 0; otherwise 0	-0.0893	0.5316	0.0282	0.8667
l_absCV	log (1 + abs(std. dev. Of EPS est. / mean EPS))	1.1731	0.4876	5.7889	0.0161
follow	1 if followed by more than 8 analysts; otherwise 0	-0.8976	0.3094	8.4192	0.0037
big	1 if market cap > $ 1 billion; otherwise 0	-0.0269	0.3053	0.0078	0.9297
l_la	log (1 + loans size / total assets)	2.7774	0.6677	17.3033	<.0001
pre95	1 if loan made in 1995 or before; otherwise 0;	1.1455	1.9433	0.3475	0.5556
p_l_ltg	interaction of Pre95 and l_ltg	-0.5609	0.6782	0.6841	0.4082
p_l_la	interaction of Pre95 and l_la	-0.3819	1.6708	0.0522	0.8192
p_follow	interaction of Pre95 and follow	1.1916	0.6334	3.5385	0.0600
p_l_abscv	interaction of Pre95 and l_absCV	-1.0633	1.5618	0.4635	0.4960
N = 495	Likelihood Ratio = 87.1828			Wald Stats. = 68.9307	

Table 3.18: Marginal Probability of Announcement in the Media – Pre- and Post-95

	Post 95				Pre 95			
	Base Value	Change to	New Probability	Change in Probability	Base Value	Change to	New Probability	Change in Probability
Syndicated Loan dummy	0	1	37.83%	14.93%	0	1	26.91%	11.67%
Long-term EPS growth estimate (%)	10	20	31.34%	8.44%	10	20	16.12%	0.88%
Negative or Zero EBITDA dummy	0	1	21.36%	-1.54%	0	1	14.12%	-1.12%
Coefficient of Variation of EPS Estimates	0.20	0.40	26.25%	3.35%	0.20	0.40	15.46%	0.22%
Followed by More than 8 Analysts dummy	0	1	10.80%	-12.10%	0	1	19.43%	4.19%
Market Cap of Over $1 billion dummy	0	1	22.43%	-0.47%	0	1	14.89%	-0.35%
Loan-to-Assets Ratio	0.33	0.66	35.47%	12.57%	0.33	0.66	23.41%	8.17%
Pre 95 dummy	0	1	15.24%	-7.66%	0	1		
Probability of announcement at base value	22.90%				15.24%			

Table 3.19: Logistic Regression to Predict Probability of a Company Announcing its Bank Loan

Variable	Description	Estimate	Std. Err.	Chi-Square	Pr > ChiSq
Intercept		-3.77150	0.95520	15.58830	<.0001
l_ltg	log (1+ mean analyst estimate of long term growth)	0.7231	0.3259	4.9238	0.0265
distress	1 if EBITDA <= 0; otherwise 0	0.1974	0.5477	0.1299	0.7186
l_absCV	log (1 + abs(std. dev. Of EPS est. / mean EPS))	0.4887	0.4408	1.2292	0.2676
follow	1 if followed by more than 8 analysts; otherwise 0	-0.6083	0.3414	3.1752	0.0748
big	1 if market cap > $ 1 billion; otherwise 0	-0.4377	0.3646	1.4412	0.2299
l_la	log (1 + loans size / total assets)	2.3690	0.6209	14.5567	0.0001
pre95	1 if loan made in 1995 or before; otherwise 0	-0.8798	0.4202	4.3835	0.0363
N = 495	Likelihood Ratio = 69.3937				Wald Stats. = 56.85

Table 3.20: Marginal Probability of Announcement of a Bank Loan by the Borrowing Company

Variable	Base Value	Change to	New Probability	Change in Probability
Long-term EPS growth estimate (%)	10	20	30.89%	9.01%
Negative or Zero EBITDA dummy	0	1	25.44%	3.56%
Coefficient of Variation of EPS Estimates	0.20	0.40	23.19%	1.31%
Followed by More than 8 Analysts dummy	0	1	13.23%	-8.65%
Market Cap of Over $1 billion dummy	0	1	15.31%	-6.57%
Loan-to-Assets Ratio	0.33	0.66	32.13%	10.25%
Pre 95 dummy	0	1	10.41%	-11.47%
Probability of ann. by company at base value	21.88%			

Table 3.21: Logistic Regression to Predict Probability of a Company Announcing its Loan

Variable	Description	Estimate	Std. Err.	Chi-Square	Pr > ChiSq
Intercept		-4.71540	1.06330	19.66500	<.0001
l_ltg	log (1+ mean analyst estimate of long term growth)	1.0370	0.3615	8.2282	0.0041
distress	1 if EBITDA <= 0; otherwise 0	0.0487	0.5546	0.0077	0.9300
l_absCV	log (1 + abs(std. dev. Of EPS est. / mean EPS))	0.5919	0.4397	1.8118	0.1783
follow	1 if followed by more than 8 analysts; otherwise 0	-0.7073	0.3624	3.8089	0.0510
big	1 if market cap > $ 1 billion; otherwise 0	-0.3585	0.3668	0.9551	0.3284
l_la	log (1 + loans size / total assets)	2.5130	0.6725	13.9654	0.0002
pre95	1 if loan made in 1995 or before; otherwise 0;	3.7721	1.9955	3.5731	0.0587
p_l_ltg	interaction of Pre95 and l_ltg	-1.5307	0.7316	4.3772	0.0364
p_l_la	interaction of Pre95 and l_la	-1.5614	2.0687	0.5697	0.4504
p_follow	interaction of Pre95 and follow	0.3664	0.8626	0.1805	0.6710
N=495	Likelihood Ratio = 75.4761				Wald Stats.= 61.60

Table 3.22: Marginal Probability of Announcement by Company – Pre- and Post-95

	Post 95				Pre 95			
Variable	Base Value	Change to	New Probability	Change in Probability	Base Value	Change to	New Probability	Change in Probability
Long-term EPS growth estimate (%)	10	20	32.44%	12.72%	10%	20%	11.23%	-3.60%
Negative or Zero EBITDA dummy	0	1	20.50%	0.78%	0	1	15.46%	0.63%
Coefficient of Variation of EPS Estimates	0.20	0.40	21.20%	1.48%	0.2	0.4	16.02%	1.19%
Followed by More than 8 Analysts dummy	0	1	10.80%	-8.92%	0	1	11.02%	-3.81%
Market Cap of Over $1 billion dummy	0	1	14.65%	-5.07%	0	1	10.85%	-3.98%
Loan-to-Assets Ratio	0.33	0.66	30.00%	10.29%	0.33	0.66	17.70%	2.87%
Pre 95 dummy	0	1	14.83%	-4.88%	1			
Probability of ann. by company at base value	19.71%				14.83%			

Table 3.23: Abnormal Returns and Interest Expense-to-Operating Profit Ratio of Borrowing Firms Announcing their Bank Loans

Pre 95

Returns	Interest Expense-to-EBITDA ratio			
	positive but less than equal to 0.5		negative or greater than 0.5	
	N	Mean	N	Mean
3-day Holding Period	15	2.39%	5	6.13%
3-day Market Adjusted	15	1.86%	5	5.22%
1-day Holding Period	15	0.47%	5	4.04%
1-day Market Adjusted	15	0.35%	5	3.68%

Post 95

Returns	Interest Expense-to- EBITDA ratio			
	positive but less than equal to 0.5		negative or greater than 0.5	
	N	Mean	N	Mean
3-day Holding Period	45	-0.97%	25	0.81%
3-day Market Adjusted	45	-1.02%	25	1.05%
1-day Holding Period	45	-0.09%	25	-0.89%
1-day Market Adjusted	45	-0.55%	25	-1.07%

Table 3.24: Descriptive Statistics – 3-Year Buy and Hold Abnormal Returns of Bank Loan Borrowers

3 Year BHAR over value weighted market	Announcement by company			
	unannounced	announced	Total	Ann as % of total
<-1	55	19	74	26%
-1<=x<-0.3	116	17	133	13%
-0.3<=x<0.3	98	16	114	14%
0.3<=x<1	91	16	107	15%
>=1	56	22	78	28%
Total	416	90	506	18%
Post 95				
<-1	41	14	55	25%
-1<=x<-0.3	75	14	89	16%
-0.3<=x<0.3	79	13	92	14%
0.3<=x<1	80	16	96	17%
>=1	45	18	63	29%
Total	320	75	395	19%
Pre 95				
<-1	14	5	19	26%
-1<=x<-0.3	41	3	44	7%
-0.3<=x<0.3	19	3	22	14%
0.3<=x<1	11	0	11	0%
>=1	11	4	15	27%
Total	96	15	111	14%

3 Year BHAR over equal weighted market	Announcement by company			
	unannounced	Announced	Total	Ann as % of total
<-1.5	82	20	102	20%
-1.5<=x<-1	94	13	107	12%
-1<=x<0	165	33	198	17%
0<=x<1	55	14	69	20%
>=1	20	10	30	33%
Total	416	90	506	18%
Post 95				
<-1.5	48	13	61	21%
-1.5<=x<-1	72	12	84	14%
-1<=x<0	137	30	167	18%
0<=x<1	47	13	60	22%
>=1	16	7	23	30%
Total	320	75	395	19%
Pre 95				
<-1.5	34	7	41	17%
-1.5<=x<-1	22	1	23	4%
-1<=x<0	28	3	31	10%
0<=x<1	8	1	9	11%
>=1	4	3	7	43%
Total	96	15	111	14%

Table 3.25: 3-Year Buy and Hold Abnormal Returns (BHAR) of Borrowing Firms – Difference of Means Test and Median Test

Mean	n	BHAR over value weighted market return	Absolute value of value weighted BHAR
unannounced	416	0.11	0.87
Announced by company	90	0.77	1.64
t-stat (Difference of Means)			2.17*
Median			
unannounced	470	-0.09	0.66
Announced by company	103	-0.04	0.90
t-stat (Median Test)		0.46	2.09*
Pre95			
unannounced	96	0.10	1.09
Announced by company	15	1.79	2.98
t-stat (Difference of Means)			1.37
Post 95			
unannounced	320	0.11	0.80
Announced by company	75	0.57	1.37
t-stat (Difference of Means)			1.78*

* Significant at 5% level

Table 3.26: Descriptive Statistics – 3-Year Cumulative Abnormal Returns of Bank Loan Borrowers

3-Year CAR over value weighted market	Announcement by company			
	unannounced	Announced	Total	Ann as % of total
<-0.5	105	26	131	20%
-0.5<=x<-0.2	82	10	92	11%
-0.2<=x<0.2	81	16	97	16%
0.2<=x<1	93	19	112	17%
>=1	55	19	74	26%
Total	416	90	506	18%
Post 95				
<-0.5	74	19	93	20%
-0.5<=x<-0.2	60	9	69	13%
-0.2<=x<0.2	59	13	72	18%
0.2<=x<1	79	19	98	19%
>=1	48	15	63	24%
Total	320	75	395	19%
Pre 95				
<-0.5	31	7	38	18%
-0.5<=x<-0.2	22	1	23	4%
-0.2<=x<0.2	22	3	25	12%
0.2<=x<1	14		14	0%
>=1	7	4	11	36%
Total	96	15	111	14%

3-Year CAR over equal weighted market	Announcement by company			
	unannounced	announced	Total	Ann as % of total
<-0.75	73	18	91	20%
-0.75<=x<-0.4	142	20	162	12%
-0.4<=x<0	125	30	155	19%
0<=x<0.5	55	12	67	18%
>=0.5	21	10	31	32%
Total	416	90	506	18%
Post 95				
<-0.75	52	14	66	21%
-0.75<=x<-0.4	106	16	122	13%
-0.4<=x<0	98	27	125	22%
0<=x<0.5	47	11	58	19%
>=0.5	17	7	24	29%
Total	320	75	395	19%
Pre 95				
<-0.75	21	4	25	16%
-0.75<=x<-0.4	36	4	40	10%
-0.4<=x<0	27	3	30	10%
0<=x<0.5	8	1	9	11%
>=0.5	4	3	7	43%
Total	96	15	111	14%

Table 3.27: Descriptive Statistics – 3-Year Cumulative Abnormal Returns over Standard Deviation Matched and Beta Matched Portfolios

3-Year CAR over SD matched portfolio	Announcement by company		Total	Ann as % of total
	unannounced	announced		
<-0.5	78	16	94	17%
-0.5<=x<-0.2	74	7	81	9%
-0.2<=x<0.2	100	15	115	13%
0.2<=x<1	44	5	49	10%
>=1	46	14	60	23%
Total	342	57	399	14%
Post 95				
<-0.5	62	14	76	18%
-0.5<=x<-0.2	65	7	72	10%
-0.2<=x<0.2	80	13	93	14%
0.2<=x<1	34	5	39	13%
>=1	40	13	53	25%
Total	281	52	333	16%
Pre 95				
<-0.5	16	2	18	11%
-0.5<=x<-0.2	9		9	0%
-0.2<=x<0.2	20	2	22	9%
0.2<=x<1	10		10	0%
>=1	6	1	7	14%
Total	61	5	66	8%

3-Year CAR over beta matched portfolio	Announcement by company		Total	Ann as % of total
	unannounced	announced		
<-0.5	81	14	95	15%
-0.5<=x<-0.2	79	8	87	9%
-0.2<=x<0.2	111	15	126	12%
0.2<=x<1	40	11	51	22%
>=1	28	9	37	24%
Total	339	57	396	14%
Post 95				
<-0.5	65	12	77	16%
-0.5<=x<-0.2	67	8	75	11%
-0.2<=x<0.2	90	13	103	13%
0.2<=x<1	33	11	44	25%
>=1	25	8	33	24%
Total	280	52	332	16%
Pre 95				
<-0.5	16	2	18	11%
-0.5<=x<-0.2	12		12	0%
-0.2<=x<0.2	21	2	23	9%
0.2<=x<1	7		7	0%
>=1	3	1	4	25%
Total	59	5	64	8%

Table 3.28: 3-Year Cumulative Abnormal Return (CAR) of Bank Loan Borrowers – Difference of Means Test and Median Test

Mean	CAR over value weighted market return	Absolute value of value weighted CAR	CAR over standard deviation matched portfolio	CAR over beta matched portfolio
Unannounced	0.19	0.72	-0.07	-0.13
Announced by company	0.82	1.39	0.15	0.12
t-stat (Difference of means)		1.98*	1.21	1.29

Median				
Unannounced	-0.09	0.51	-0.12	-0.18
Announced by company	-0.07	0.67	0.02	-.06
t-stat (Median test)	0.46	2.32*	1.02	1.57

* Significant at 5% level

Table 3.29: Median Annual Growth Rate of Operating Efficiency Measures for Borrowing Firms Each Year after the Loan Closing

Years after loan	Announcement by Company	n	EBITDA/TA	NI/SALES	NI/ASSETS	EBITDA/#EMP	ASSETS/#EMP
0	Unannounced	577	-4%	-15%	-18%	3%	6%
	Announced	152	-9%	-25%	-33%	0%	4%
1	Unannounced	560	-3%	-10%	-12%	2%*	4%
	Announced	144	0%	-12%	-19%	6%	6%
2	Unannounced	539	0%	-4%	-3%	5%	5%
	Announced	128	0%	-8%	-9%	1%	3%
3	Unannounced	488	-1%	-5%	-6%	2%	4%
	Announced	107	0%	-11%	-17%	2%	3%
4	Unannounced	420	0%	-7%	-9%	4%	4%
	Announced	83	0%	-13%	-10%	4%	5%
5	Unannounced	356	1%	-2%	-4%	5%	4%
	Announced	70	1%	0%	-5%	-2%	2%

*Significant at 5% level

Table 3.30: Median of the Annual Growth Rate in Operating Performance of Borrowing Firms over the Period

Years after loan	Announcement by company	EBITDA/TA	NI/SALES	NI/ASSETS	EBITDA/#EMP	ASSETS/#EMP
1-3	Unannounced	1%	-1%	0%	6%	6%
	Announced	3%	0%	1%	7%	5%
	t-stat	0.40	0.28	0.20	0.20	-0.46
0-3	Unannounced	-1%	-2%	-3%	6%	7%
	Announced	-2%	-7%	-9%	4%	6%
	t-stat	-0.86	-1.10	-0.70	-0.67	-0.53
1-5	Unannounced	1%	-1%	0%	7%	6%
	Announced	2%	-1%	1%	8%	5%
	t-stat	0.20	-0.09	0.20	0.42	-0.47

Table 3.31: Actual Annualized 5-Year EPS Growth Rate of the Borrowing Firms after Loan Closing

	Announcement by Company		*t-stat*
Full Sample	unannounced	announced	Diff. of means
Mean	10.95	13.28	0.57
N	351	70	
Std. Dev.	27.11	32.07	
Pre 95			
Mean	8.68	26.60	1.29
N	95	15	
Std. Dev.	25.52	52.76	
Post 95			
Mean	11.80	9.64	-0.61
N	256	55	
Std. Dev.	27.67	23.02	

Median	unannounced	announced	*t*-stat
Full sample	10.25	10.51	1.32
Pre 95	5.36	11.95	1.93*
Post 95	10.10	10.41	0.17

* Significant at 5% level

Figure 3.1

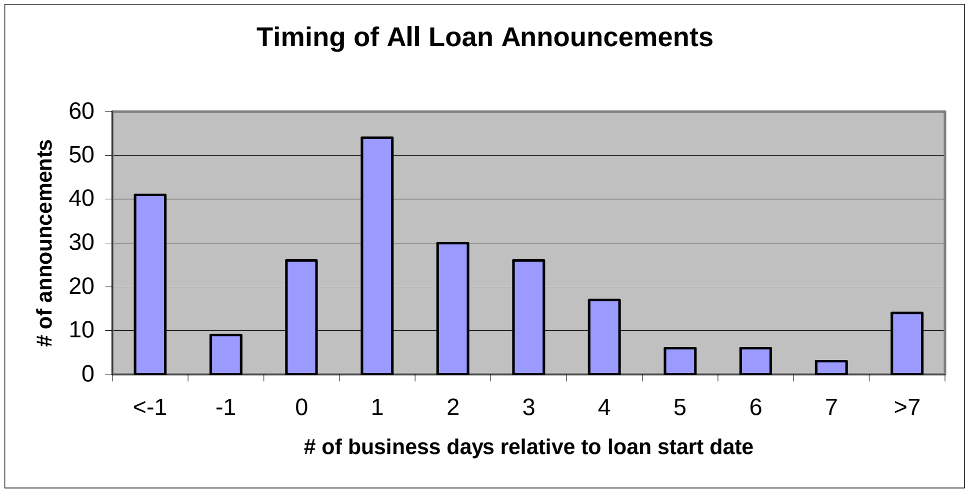
Timing of All Loan Announcements
# of announcements
0
10
20
30
40
50
60
<-1
-1
0
1
2
3
4
5
6
7
>7
# of business days relative to loan start date

Figure 3.2


Timing of Loan Announcements Made by the Borrowing Company
# of announcements
60
50
40
30
20
10
0
<-1
-1
0
1
2
3
4
5
6
7
>7
# of business days after loan start date

Appendix A1: Calculation of t-statistics Assuming Cross-sectional Independence

Assuming cross-sectional independence of excess returns, we calculate our test statistics as follows: Each excess return $A_{i,t}$ is first divided by its estimated standard deviation to yield a standardized excess return, $A'_{i,t}$:

$$A'_{i,t} = A_{i,t} / \hat{S}(A_{i,t}),$$

Where

$$\hat{S}(A_{i,t}) = \sqrt{\left(\sum_{t=-282}^{t=-31} (A_{i,t} - A_i^*)^2 \right) \Big/ 251}$$

$$A_i^* = \frac{1}{252} \sum_{t=-282}^{t=-31} A_{i,t}$$

The test statistics for t=0 is given by

$$\left(\sum_{i=1}^{N_t} A'_{i,t} \right) . (N_t)^{-\frac{1}{2}}$$

N_t is the number of sample securities at day t where t represents trading day.

Appendix A2: Calculation of t-statistics Assuming Cross-sectional Dependence

By using the time-series of average excess returns (i.e., "portfolio" excess return), the test statistics calculated as follows takes into account cross sectional dependence in the security-specific excess returns (Brown & Warner, 1985). The test-statistics is equal to

$\overline{A} / \hat{S}(\overline{A_t})$,

where,

$$A_{i,t} = R_{i,t} - E(R_{i,t})$$

$$\overline{A_t} = \frac{1}{N_t} \sum_{i=1}^{N_t} A_{i,t} \ ,$$

$$\hat{S}(A_t) = \sqrt{\left(\sum_{t=-395}^{t=-31} \left(\overline{A_t} - \overline{\overline{A}} \right)^2 \right) \Big/ 364}$$

$$\overline{\overline{A}} = \frac{1}{365} \sum_{t=-395}^{t=-31} \overline{A_t}$$

N_t is the number of sample securities in the portfolio at day t where t represents calendar day.

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