

The Real Effects of Debt Certification: Evidence from the Introduction of Bank Loan Ratings

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Abstract

I examine the introduction of syndicated bank loan ratings by Moody's and Standard & Poor's in 1995 to evaluate whether third-party rating agencies affect firm financial and investment policy. I find that the introduction of bank loan ratings leads to an increase in the use of debt by firms that obtain a rating, and in increases in firms' asset growth and cash acquisitions. A loan level analysis demonstrates that borrowers that obtain a loan rating gain increased access to the capital of less informed investors such as foreign banks and non-bank institutional investors. The effects of the loan rating are strongest among firms that are of lower credit quality and do not have an existing public debt rating before bank loan ratings are introduced. This pattern suggests that third-party debt certification expands the supply of available debt financing, which leads to real effects on firm investment policy.

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Can third-party rating agencies have real effects on firm financial and investment policy? The increasing worldwide presence of such agencies suggests that they provide a valuable service for borrowers and creditors. Moody's and Standard & Poor's (S&P) are the most visible examples in the United States, but organizations such as Dun & Bradstreet and Equifax also provide credit scores for private businesses. Djankov, McLiesh, and Shleifer (2006) provide evidence that rating agencies are common worldwide; they report that private credit bureaus exist in 71 of the 129 countries in their study.

From a theoretical perspective, it is unclear whether third-party debt certification services should have real effects on the economy. The model by Holmstrom and Tirole (1997), for example, argues that an intermediary that exerts unobservable effort in certifying a borrower must have the incentive to exert such effort. Holding capital in the borrower's project provides such an incentive. Indeed, the fundamental link between *holding a financial stake in the borrower* and *certifying the borrower* defines the modern commercial bank, and helps explain why banks typically hold at least part of the loans they originate (see Sufi, 2006a). Unlike a bank, a third-party rating agency does not have a financial stake in the borrowers they certify, and relies on reputation alone when providing certification services. The key empirical question I seek to answer in this paper is the following: can a third-party rating agency improve the allocation of credit in the economy without holding the debt they certify? Despite the increasing importance of third-party rating agencies both in the U.S. and worldwide, there is little empirical research that addresses this question.

I attempt to bridge this gap in the existing research by analyzing the introduction of syndicated bank loan ratings by Moody's and S&P in 1995. S&P states on their website that loan ratings help borrowers "... as ratings (1) help to expand a loan's initial investor base and secondary-market liquidity; and (2) facilitate purchase by institutional investors, CDOs, specialized loan funds, and other buyers that need ratings or do not have large internal credit staffs" (S&P, 2005). Loan ratings provide information to potential syndicate partners during the syndication process, and they provide information to secondary market participants after the loan is originated.

[FIGURE 1]

I focus on the introduction of loan ratings to assess the impact of third-party debt certification on financial and real outcomes of borrowers. The introduction of loan ratings offers a promising environment for two reasons. First, the scope of the program is large. Syndicated bank loan ratings are now almost as common as public debt ratings among U.S. firms. As Figure 1 demonstrates, by 2004, almost 30% of public firms that existed in 1995 had obtained a loan rating and 70% of asset-weighted public firms had obtained a loan rating. Second, loan ratings were unavailable to all firms before 1995, and immediately became available to all firms thereafter. Given that firms were restricted from obtaining loan ratings before 1995, the innovation offers promise in terms of identifying the causal effect of ratings on firm outcomes. Overall, the results suggest that loan ratings have important effects on firm outcomes. More specifically, I find evidence that firms that obtain a loan rating experience an increase in the supply of available debt financing, an increase in their equilibrium use of debt, and a permanent increase in their leverage ratio. In particular, loan ratings increase the borrower's access to less informed lenders, such as foreign banks and institutional investors. In turn, the increase in the supply of debt financing leads to economically meaningful increases in both firm asset growth and acquisitions.

The empirical analysis is motivated by a theoretical framework similar to Holmstrom and Tirole (1997). A basic assumption in their model is that firms require investigation and monitoring by an "informed" lender before "uninformed" lenders invest in the firm. I use this framework to obtain predictions on the effects of the introduction of a third-party ratings technology. I assume that loan ratings reduce the total certification cost paid by borrowers, and therefore afford borrowers greater access to funds from uninformed lenders. The resulting analysis leads to three hypotheses. First, firms with large investment projects are most likely to utilize the new technology. The intuition is simple; firms with small investment projects rely uniquely on a single informed lender both before and after the availability of the ratings technology, and thus achieve no reward for the certification skill of the third-party rating agency. Second, firms that obtain a loan rating gain access to a larger pool of creditors. Third-party certification reduces information asymmetry between borrowers and uninformed lenders; therefore, uninformed lenders are more willing to lend to firms. Third, the increase in the availability of

debt finance associated with the loan rating allows firms to increase investment. Finally, these three hypotheses should be stronger among firms where the ex ante value of certification is higher.

In the first set of empirical results, I examine which ex ante characteristics of firms determine whether the firm obtains a loan rating. Consistent with the above theoretical framework, I find that firm size has a positive effect on the probability of obtaining a loan rating. I also find that younger firms are more likely to obtain a loan rating. In addition, the positive effect of firm size and negative effect of firm age is stronger for firms that do not have a public debt rating prior to the introduction of loan ratings. In other words, for the set of firms for whom the value of certification is high, large and young firms take advantage of the technology. The results suggest that large, informational-opaque firms are the most likely to take advantage of the ratings technology.

In the second set of empirical results, I find evidence that bank loan ratings lead to an increase in the use of debt, an increase in the pool of potential creditors, an increase in asset growth, and an increase in cash acquisitions. A key question is whether these patterns reflect a causal effect of loan ratings on firm outcomes. Identifying the causal impact is difficult given that firms *choose* whether or not to obtain a loan rating. If omitted variables (such as a firm-specific technological shock or an increase in investment demand) simultaneously cause firms to obtain a loan rating and increase investment, then a positive correlation is not reflective of a causal relationship. I employ an empirical strategy with two important characteristics that helps identify the causal effect of loan ratings on outcomes. First, the identification strategy employs firm fixed effects and exploits the introduction of the technology after 1995. Therefore, identification of key parameters comes from comparing outcomes for the same firm before and after the technology is introduced. Any omitted variable that drives both the decision to obtain the rating after 1995 and outcomes would have to explain *changes* in outcomes *for the same firm* before 1995 and after 1995. The fixed effects specification also controls for observable measures of investment demand such as earnings, the market to book ratio, debt levels, and year by industry indicator variables.

Second, I exploit a direct prediction of the theoretical framework above to identify the causal impact of loan ratings on outcomes: obtaining a bank loan rating should have the largest impact on

financial and real outcomes of borrowers where the services of a certification agency have the most value. I use two measures of ex ante certification value. First, many of the borrowers that obtain a bank loan rating subsequent to 1995 already have a public bond rating before 1995. The value of certification should be lower among this group. Second, in the absence of a third-party rating agency, borrowers of lower quality would find it more difficult to raise debt finance. I use the initial loan rating obtained by the borrower as a proxy for borrower quality; junk borrowers (with a rating of BB+ or lower) should find more value in the third-party certification services.

Using this empirical strategy, I show evidence that the introduction of bank loan ratings increases the supply of available debt financing. Firms that obtain a bank loan rating experience both an increase in the change in debt scaled by lagged assets ratio and in their leverage ratio. The result is significantly stronger in magnitude among firms that do not have an existing public bond rating before the introduction of loan ratings. For example, unrated firms that obtain a loan rating experience an increase in their leverage ratio by 0.10 more than rated firms that obtain a loan rating, which is more than 30% at the mean. Moreover, among unrated firms that obtain loan ratings, firms of lower credit quality experience larger increases in their leverage ratio when they obtain a loan rating. In other words, firms for whom the value of debt certification is highest are precisely the firms that are able to obtain more debt financing as a result of the introduction of loan ratings. These results suggest that loan ratings increase the supply of available debt financing.

While existing research finds that public debt ratings are associated with higher leverage ratios (Faulkender and Petersen, 2006), a unique contribution of this paper is to document the exact channel through which third-party rating services increase the availability of debt finance. More specifically, I show evidence that loan ratings allow borrowers to expand the set of creditors beyond domestic commercial banks toward less informed investors such as foreign banks and non-bank institutional investors. A loan-level analysis shows that the average firm's first rated loan is 56% larger than the previous unrated loan obtained by the same firm. The increase in the loan amount is driven by an increase in the number of lenders: The first rated loan has, on average, 4.5 more lenders on the syndicate

compared to the previous unrated loan by the same firm. Most importantly, the increase in the number of lenders is driven by an increase in the number of foreign banks and non-bank institutional investors on the syndicate; these relatively less informed creditors account for almost 2/3 of the increase in the number of lenders on a firm's first rated loan. A non-bank institutional investor is 17% more likely to be a syndicate member on a firm's first rated loan relative to the firm's previous loans. The evidence suggests that loan ratings help borrowers access the capital of investors who lack specialized monitoring or screening skills.

In the next set of results, I show that the introduction of bank loan ratings has real effects. More specifically, I show that firms that obtain a loan rating experience a doubling of both asset growth and cash acquisitions relative to their respective means. Evidence on capital expenditures is suggestive of an increase, but weaker both in magnitude and statistical significance. As with debt ratios, increases in asset growth and cash acquisitions are strongest among borrowers who obtain a bank loan rating and do not have a previous public debt rating. The results are particularly strong among borrowers that do not have a previous debt rating *and* have their initial loan rated BB+ or worse. These results are consistent with a real effect of debt certification: the borrowers who have the most to gain from certification by a third-party credit rating agency are precisely the borrowers that experience the largest increases in asset growth and cash acquisitions. Alternative omitted variables, such as demand shocks, cannot explain why lower-quality unrated borrowers experience the sharpest increase in real outcomes when they obtain a bank loan rating. In the last section of the paper, I report results from a variety of robustness checks and counterfactual analyses that support the interpretation of a causal effect of loan ratings on firm acquisition behavior and asset growth.

This paper makes contributions to three areas of existing research. First, this paper contributes to a growing body of research on the syndicated loan market, which represents over \$1 trillion of debt financing in the United States. Dennis and Mullineaux (2000), Lee and Mullineaux (2004), and Sufi (2006a) find evidence that lead arrangers hold a higher percentage of syndicated loans when the borrower is informational-opaque, which suggests that lead arrangers commit to due diligence and monitoring duties by increasing risk exposure. Sufi (2006a) also shows that information asymmetry affects which

financial institutions are chosen as syndicate members. Moerman (2005) finds evidence that information asymmetry affects bid-ask spreads in the syndicated loan secondary market. Ivashina (2005) argues that information asymmetry leads to higher interest rates on syndicated loans. The paper by Mullineaux and Yi (2003) is the only existing paper, to my knowledge, that examines syndicated bank loan ratings in any context. They use an event study methodology to examine how the introduction of loan ratings and changes in loan ratings affect stock prices, and they find that decreases in the loan rating are associated with drops in equity prices.¹ This paper is the first to provide evidence that syndicated loan ratings lead to an increase in the availability of financing in the syndicated loan market; it is also the first to evaluate the effect of syndicated loans on real outcomes such as investment and asset growth.

Second, this paper contributes to an increasing body of literature that argues that the supply of debt financing is an important determinant of capital structure (Leary, 2005; Faulkender and Petersen, 2006). In particular, Faulkender and Petersen (2006) find that firms with public debt ratings have higher leverage ratios, and that firms increase leverage in the year in which they obtain a public debt rating. This paper shows a similar result in the context of bank loan ratings. The introduction of bank loan ratings leads to an increase in the use of debt by firms, and therefore has a strong impact on firm capital structure. There are two advantages to the empirical strategy used in this paper. First, it documents the precise channel through which ratings increase the supply of debt financing; loan ratings lead to an increase in the willingness to supply loans by less informed creditors, such as non-commercial bank institutional investors and foreign banks. Second, this paper analyzes the introduction of a previously unavailable ratings technology to examine the effect of ratings on the use of debt, which mitigates endogeneity and omitted variable concerns. Finally, this paper is one of the first to show that rating agencies affect firm investment and acquisition policies.

Finally, this paper is related to the literature on the importance of banks in the macroeconomy (Bernanke, 1983; Bernanke and Lown, 1991; Kashyap, Stein, and Wilcox, 1993). In the last 15 years,

¹ These findings are consistent with Hand, Holthausen, and Leftwich (1992), who find that the unexpected information in bond ratings leads to statistically significant changes in bond prices. They also find that bond rating negative information has a negative effect on stock returns.

banks have increasingly shed the credit risk of loans they originate through securitizations, credit default swaps, and syndications. This trend in disintermediation represents a departure from banks' traditional dual role of holding an originated loan and monitoring the borrower who obtains the loan. Extant research suggests that such a separation has important effects on the economy. Loutskina and Strahan (2005) find that banks' increasing ability to securitize mortgage loans dampens the effect of bank liquidity on banks' willingness to lend. Loutskina (2005) argues that the increased ability of banks to securitize loans weakens the credit channel of monetary policy. Schuermann (2004) argues that banks fared well through the 2001 recession in part due to their increased use of credit derivatives. This paper shows that the introduction of bank loan ratings has increased the ability of banks to syndicate corporate loans to non-commercial bank institutional investors and foreign banks. In other words, the results suggest that third-party ratings services may increase the disintermediation of the financial services sector. Ultimately, the disintermediation of traditional banking has important implications on economic fluctuations, credit crunches, and the health of the banking sector.

The rest of this paper is outlined as follows. Section I provides background on loan ratings and details the data used in the empirical analysis. Section II presents the theoretical framework. Section III examines which firms obtain loan ratings. Section IV examines the effect of loan ratings on leverage, asset growth, capital expenditures, and cash acquisitions. The end of Section IV contains robustness tests and extensions. Finally, Section V concludes.

I. Loan ratings: Background and data

A. Background

In 1995, Moody's and S&P began rating syndicated bank loans. Before describing the introduction of loan ratings and the rating process, I first provide a brief description of the syndicated loan market.² The syndicated loan market is one of the largest sources of corporate finance worldwide, with over \$1 trillion of syndicated loans originated annually on behalf of U.S. business. A syndicated loan is a

² For a more comprehensive description of the syndicated loan market, see Dennis and Mullineaux (2000) and Sufi (2006a).

loan made to a firm jointly by more than one financial institution; a key feature of a syndicated loan is that the terms and conditions are similar for each lender (Hitchings, 1994). The lead bank in the syndicate begins the loan origination by signing a preliminary loan agreement (“mandate”) with the borrowing firm that specifies covenants, fees, and collateral. The preliminary loan agreement also specifies a loan amount, and a range for the interest rate. Once the preliminary loan agreement is signed, the lead arranger then turns to potential participant lenders to fund part of the loan. The lead arranger provides potential participants with an information memorandum on the borrowing firm. Once the participants agree to fund part of the loan, the loan agreement is signed by all parties. During the life of the loan, the lead arranger typically also acts as the “agent” bank that monitors the firm, governs the terms of the loan, administers the drawdown of funds, calculates interest payments, and enforces financial covenants (Sufi, 2006a). Pieces of the loan may trade in the secondary loan market; Moerman (2005) provides an excellent description of the secondary loan market.

Moody’s and S&P began offering syndicated loan ratings to help expand the initial base of investors during the syndication process and to encourage secondary market liquidity. Anecdotal evidence suggests that the introduction of loan ratings was driven primarily by the desire of non-bank institutional investors to participate in the market. As Bavaria (2002) notes:

“These [non-bank institutional] investors, made up primarily of retail mutual funds (primarily so-called “prime rate” funds), specialized loan investment vehicles (CDOs and similar entities), and traditional institutional investors like insurance companies, and other money managers who have discovered the loan asset class, are accustomed to, and take for granted, the existence of the traditional securities market infrastructure. They must have third-party research ... This has provided a powerful demand for ratings on syndicated loans that are targeted for distribution to these entities.”

The fact that non-bank institutional investors spurred the creation of syndicated loan ratings helps support the notion loan ratings increased the supply of debt financing available to certain firms. In other words,

there is little evidence that stronger investment demand by borrowers uniquely led to the introduction of loan ratings.

Less informed investors demand certification of a third-party rating agency in the syndicated loan market given the importance of information asymmetry between the lead arranger and participant lenders in the original syndication, and between banks and institutional investors in the secondary market. Dennis and Mullineaux (2000), Lee and Mullineaux (2004), and Sufi (2006a) show that information asymmetry impacts syndicate structure and the choice of participant lenders, and thus is an important element in the syndicated loan market. Ivashina (2005) argues that interest rate spreads on syndicated loans reflect information asymmetry. Moerman (2005) analyzes bid-ask spreads and shows that information asymmetry is an important element of the secondary loan market. The rating agencies claim that a loan rating can help to reduce these problems. As S&P (2004) notes, “[Ratings] are most useful when obtained before the loan is syndicated, to allow syndicators and investors to incorporate our rating and analysis into their pricing, distribution, and due-diligence decisions.”

The certification role of bank loan ratings is evident from the loan rating process. While the rating process for loans is similar to the bond rating process, Mullineaux and Yi (2003) point to important differences. Overall, the due diligence involved in rating loans is more aggressive. For example, representatives of the rating agency typically meet directly with management of the firm. In addition, the complexities of collateral and covenants typical of a bank loan require a greater degree of analysis of the actual contract and estimation of default and recovery. Finally, “rating agencies have access to the same kind of ‘inside’ information as banks” (Mullineaux and Yi, 2003). Mullineaux and Yi (2003) find evidence that bank loan ratings contain valuable information used to price equity securities beyond other factors reflecting default risk; their evidence is consistent with the notion that loan ratings provide important information to market participants.

A borrower without a previous security rated by the rating agency goes through a two-step rating process.³ First, a borrower is assigned a *corporate credit rating*, which measures the pure risk of default, and focuses solely on the overall creditworthiness of the issuer. Second, the *loan rating* focuses both on the risk of default and the likelihood of ultimate recovery in the event of default. The loan rating contains information about the loan terms that is not revealed in the corporate credit rating; as Bavaria (2005) notes, “in assigning a loan rating, Standard & Poor’s credit analysts look to see whether there is collateral security or other enhancement that would enable investors to achieve ultimate recovery if the loan defaults.” A loan rating can be “notched” up—that is, given a higher rating than the corporate credit rating—if holders of the syndicated loan can expect 100% recovery rates in case of default.⁴

The borrower decides whether or not to obtain a syndicated loan rating during the syndication process; an important element in understanding whether a firm obtains a loan rating is the fee schedule. The fee schedule for Moody’s and S&P is quite similar; I describe the S&P fee schedule for brevity. S&P charges a transaction fee of 2.9 basis points for the first \$1 billion of a loan with maturity of 1 year or more, and 1.45 basis points for the amount above \$1 billion. For short term facilities of 364 days or less, the transaction fee is 1 basis points for the first \$1 billion, and 0.5 basis points thereafter. In addition, a borrower with no previous corporate credit rating from S&P must pay an initial \$50,000 corporate credit rating fee. Finally, any borrower with a corporate credit rating must pay a \$39,000 annual fee to maintain the corporate credit rating. The fee schedule implies that the total cost per dollar declines in the size of the loan, and is considerably lower for firms that already have a corporate credit rating. For example, a firm that obtains a \$1.5 billion term loan that already has a corporate credit rating pays $(\$1000M \cdot 0.00029 + \$500M \cdot 0.000145 =)$ \$362,500, which is about 2.4 basis points per dollar. A firm that obtains a \$500 million term loan that does not already have a corporate credit rating pays $(\$500M \cdot 0.00029 + 0.05M + 0.039M =)$ \$234,000, which is about 4.7 basis points per dollar. This

³ This process describes S&P’s rating procedure. Moody’s procedure is similar.

⁴ Beginning in December, 2003, S&P introduced *recovery ratings*, which are on a scale of 1 to 6, that measure default recovery when it is less than 100%. An analysis of the introduction of recovery ratings is material for future research.

comparison does not include the discounted value of future annual corporate credit rating fees, which would further increase the gap between the rated and unrated firm.⁵

B. Data and summary statistics

1. Data

The main data set used in this paper is drawn from S&P's *Compustat*; it includes the universe of *Compustat* firms that exist immediately before and immediately after the introduction of bank loan ratings in 1995. I supplement the *Compustat* data with data on the universe of initial syndicated bank loan ratings; these data have been graciously provided to me directly by Moody's and S&P. The final data set covers 3,459 firms from 1990 through 2004, for a total of 39,608 firm-year observations. Over 20% of firms in the sample obtain a loan rating at some point after the inception of the program in 1995.

In the rest of this section, I provide additional detail on the sample construction. Using *Compustat*, I begin with the universe of publicly-traded non-financial U.S. businesses with strictly positive assets in existence between 1990 and 2004. I eliminate the initial firm-year after a given firm's initial public offering (proxied by the first year that *item 25* and *item 199* are both available for the firm). I eliminate these firm-years given the fact that 1-year lagged values of key financial items for these observations represent values for the firms while they are privately-held.⁶ The resulting sample includes 8,622 firms (66,810 firm-year observations). I then require that key financial variables are available for the firm in 1994, 1995, and 1996. More specifically, I only include in the sample firms that have *Compustat items 1, 8, 12, 25, 181, 199, 10, 35, 79, 13, 9, 34, and 60* available for fiscal years 1994, 1995, and 1996. These data items are necessary for the construction of key financial statistics which I describe below. I focus only on firms that are in existence immediately before and immediately after the

⁵ The rated firm already pays the corporate credit rating fee before obtaining the rating, whereas the unrated firm begins paying annual fee after obtaining a syndicated loan rating.

⁶ *Compustat* contains information for the borrower before it is public given that these historical data are reported on the initial annual 10-K SEC filing of a firm (see Sufi, 2006b). For example, if one includes the year of the IPO in the analysis, then asset growth and capital expenditures divided by lagged assets for firms in the year of the IPO will be very high. I made this restriction to ensure that firms obtaining a loan rating and going public the same year were not generating artificial effects of loan ratings on outcomes. All results are robust to the inclusion of the year of the IPO.

introduction of bank loan ratings to abstract from (potentially important) effects of loan ratings on firms' decisions to go public or stay private. The resulting sample after these eliminations contains 3,459 firms, and I include all firm-years for these firms with available data from 1990 to 2004 (39,608 firm-years).

I use the bank loan rating data provided by Moody's and S&P to determine which firms obtained a bank loan rating subsequent to 1995 and when they first obtained the rating. The only potential matching variable in the data provided by Moody's and S&P is the borrower name. I use a name-matching algorithm as a first pass through the bank loan rating data, where the historical names of Compustat firms come from names from the CRSP database. I then manually attempt to match all remaining borrowers in the bank loan rating datasets to firms in the Compustat universe. Using this procedure, I am able to match approximately 1,200 borrowers to a Compustat firm. For my specific sample of Compustat firms described above, I am able to match 811 borrowers that obtain a bank loan rating from Moody's or S&P or both between 1995 and 2004.⁷ Out of these 811 borrowers, 57 borrowers obtained a loan rating after ceasing to be a publicly-traded corporation. I investigate these borrowers, and find that the grand majority either obtained a loan rating after being acquired by a private equity firm or after emerging as a private company following a bankruptcy.

The data from Moody's and S&P also contains information describing the initial loan. More specifically, the data record the amount of the total loan deal, the number of tranches in the loan deal, and the loan rating itself. The loan rating scale is similar to public debt ratings, with the best rated loans earning AAA (Aaa), and the worst being rated CCC (Caa) or lower.

Core financial variables are calculated from Compustat and are defined as follows. The book debt to assets ratio is short term debt plus long term debt (*item 34 + item 9*), all divided by total assets (*item 6*). The market to book ratio is defined as total assets less the book value of equity plus the market value of equity, all divided by total assets. The book value of equity is defined as the book value of assets

⁷ There are almost 400 borrowers that receive loan ratings that I am able to match to Compustat but are not included in the analysis. All of these borrowers were not public in 1994, which is why they are not included. The majority of these borrowers received their initial bank loan rating before going public (and thus, before they appear in Compustat). I have conducted the empirical analysis including these 400 borrowers with almost exactly identical results.

(*item 6*) less the book value of total liabilities (*item 181*) and preferred stock (*item 10*) plus deferred taxes (*item 35*). The market value of equity is defined as common shares outstanding (*item 25*) multiplied by share price (*item 199*). The market to book ratio also represents *Tobin's Q*. A measure of asset tangibility is defined as tangible assets (*item 8*) divided by total assets. A measure of firm profitability is EBITDA (*item 13*), divided by total assets. Following the investment-cash flow literature (see Fazzari, Hubbard, and Petersen, 1987; Kaplan and Zingales, 1997; and Rauh, 2006), I define cash flow as income before extraordinary items plus depreciation and amortization [$(\textit{item 14} + \textit{item 18})/\textit{data6}$]. Finally, in the investment regressions, capital expenditures (*item 128*) and cash acquisitions (*item 129*) are scaled by lagged total assets. In order to reduce the influence of outliers, I follow the literature and Winsorize Compustat variables at the 1st and 99th percentile.

While the majority of the data analysis employs the Compustat data, the analysis presented in Section IV. B. 2 uses data from Loan Pricing Corporation's *Dealscan*. In order to find loans by firms in the sample, I begin with the sample of 344 borrowers that did not have a credit rating as of 1994 and subsequently obtained a loan rating. For these borrowers, I examine annual 10-K SEC filings in the fiscal year before and after the day on which the borrower in question obtained a loan rating. I examine the 10-Ks in order to assess whether I can identify, for a given firm, a new loan or an amendment to an existing loan that increased the amount in the same fiscal year that the loan rating is obtained. An examination of the 10-K filings reveals that 213 of the 344 borrowers obtain an identifiable new loan or an increase in the existing loan in the same fiscal year as the loan rating is obtained. I then search for all loans by these borrowers in Dealscan from 1993 up to and including the loan signed in the year the loan rating is obtained. I am able to find loans for 169 of the 213 borrowers; I find a total of 580 loan deals for these 169 borrowers.

2. Summary statistics

Figure 1 plots the increase in the fraction of firms in my sample that obtain a bank loan rating. The rise in the fraction of firms obtaining a bank loan rating is most dramatic from 1995 through 1999, when the fraction of firms rises from 0 to 20%. By the end of the sample period, almost 30% of firms in

my sample have obtained a bank loan rating. The rise in the asset-weighted fraction of firms with a bank loan rating is even more dramatic. From 1995 to 1999, the asset-weighted fraction of firms that obtained a bank loan rating went from 0 to almost 60%. By the end of the sample period, over 70% of the assets of public firms in my sample obtained a bank loan rating. Figure 1 demonstrates that bank loan ratings are an important element in the corporate finance decisions of a large number of U.S. firms. In addition, the sharp increase in the number of firms obtaining loan ratings shortly after their introduction is promising in order to identify the causal effect of loan ratings on firm outcomes.

[FIGURE 2]

Figure 2 plots the number of firms that obtained their initial bank loan rating, by year. It also splits firms by their corporate credit rating status as of 1994, which is measured using whether Compustat *item 280* is available in 1994 for the firm. The evidence suggests a sharp rise in the number of firms adopting the bank loan rating technology in 1995 through 1997. Interestingly, both firms with and without an existing credit rating obtain a loan rating with almost equal proportion. I explore this result further in Section III. By 1998 and 1999, fewer firms obtained an initial bank loan rating, and even fewer firms obtained a rating each year after 1999. Like Figure 1, Figure 2 suggests that the main impact of bank loan ratings is realized in a short period after their introduction by Moody's and S&P in 1995.

[TABLE 1]

Table 1 presents summary statistics for the unbalanced panel of 3,459 firms from 1990 to 2004 (39,608 firm-year observations). Overall, 22% of the firms in my sample obtain a bank loan rating from Moody's, S&P, or both. Slightly more firms obtained their initial bank loan rating from Moody's than S&P (9.1% versus 7.9%). About 5% of firms obtained initial bank loan ratings from both Moody's and S&P in the same quarter. The majority of firms obtained their initial bank loan rating from either Moody's or S&P, which underscores the importance of using data from both of the rating agencies to determine the date in which a firm first obtained a bank loan rating. Of the firms that obtain a loan rating at some point after 1994, almost half (9.9/21.6) have no credit rating in 1994. Over half of firms that obtain a loan rating have their original loan rated BB+ or worse ("junk"). A key treatment group in the

empirical analysis is the set of firms that are both unrated in 1994 and subsequently obtain a loan that is rated BB+ or lower: these firms represent almost a third (6.7/21.6) of firms that obtain a loan rating.

Table 1 also presents summary statistics for the initial loans rated by Moody's and S&P. The average (median) loan is almost \$700 million (\$325 million) and represents 27% (20%) of the firm's total assets. The median loan has a numerical rating of 5, which translates to BB (S&P) or Ba (Moody's). Overall, 52% of the firms that receive a loan rating obtain an initial rating of BB+ or worse. As a comparison group, only 35% of firms that have public debt ratings in 1994 have a public debt rating of BB+ or worse. The evidence suggests that bank loan ratings are more concentrated among borrowers with higher probabilities of default than public debt ratings; bank loan ratings appear to be particularly valuable for borrowers closer to distress.

In terms of the Compustat variables, the average (median) firm in the sample has \$2 billion (\$174 million) in assets and \$1.75 billion (\$187 million) in sales. The average age of a firm, calculated as the years since initial public offering, is 18. The average book debt to assets ratio is 0.245, and average EBITDA scaled by assets is 0.076. In terms of real outcomes, the three main variables I examine are asset growth, capital expenditures, and cash acquisitions, all scaled by lagged assets. The averages of these 3 variables are 0.141, 0.073, and 0.028, respectively.

II. Theoretical framework

How should the introduction of bank loan ratings affect firms? In order to answer this question, I develop a theoretical framework that is motivated by the model of Holmstrom and Tirole (1997). In their framework, there are three participants in debt markets: firms, informed lenders, and uninformed lenders. There is a moral hazard problem at the firm given the existence of a project with large private benefits (the "bad" project). In the absence of a monitor that can prevent the firm from taking on the bad project, uninformed lenders will not lend to the borrower. Informed lenders exert monitoring effort which enables them to prevent firms from taking on the bad project. However, effort exerted by the informed lender is costly and unobservable. The unobservability of informed lender effort is a crucial feature of the model. Given that effort of the informed lender cannot be contracted upon, informed lenders are forced to

commit their own capital to the project. Only a lender with a stake in the firm's project can credibly commit to exerting the necessary monitoring effort.⁸ Uninformed lenders commit funds to firms only after an informed lender has made the commitment to monitor by investing in the project. Informed lender capital is therefore a crucial element of the ability of firms to invest. As Holmstrom and Tirole (1997) note: "Moral hazard forces intermediaries to inject some of their own capital into firms that they monitor, making the aggregate amount of intermediary (or 'informed') capital ... one of the important constraints on aggregate investment" (page 669).

I extend this framework to analyze how the introduction of a third-party ratings technology affects borrowers. I keep this section informal, given that the extension is simple and direct. First, I assume that the duties of the informed lender can be split into two different functions, both of which involve costs. First, there is a *certification* function. The certification function involves certifying the reputation of the borrower and evaluating the project being undertaken. In the context of a syndicated loan, certification also involves evaluating collateral, relaying the existing debt structure of the firm to potential participants, and determining the interest rate and fees. Certification can take place both before the loan is originated and afterwards through updating information on default risk. Second, there is a *monitoring* function. The monitoring function involves more direct management of the firm's project. Examples include deciding whether to enforce or waive a violation of a financial covenant, seizing or changing collateral, or disallowing continuation of projects going badly. The analysis of Holmstrom and Tirole (1997) is consistent with such a separation of functions. In the most literal sense, monitoring in their model restricts the firm from undertaking a bad project, which is more consistent with the monitoring function interpretation. However, they argue that informed lenders in their model can also "resemble a venture capitalist, lead investment bank, or any other sophisticated investor whose stake in

⁸ Diamond (1984) suggests that, in general, banks do not have to commit their own capital if the number of uninformed lenders is large and firm project outcomes are not perfectly correlated. However, the empirical research on syndicated loans (Sufi, 2006a; Dennis and Mullineaux, 2000) suggests that lead arrangers must commit their own capital to obtain funds from participant lenders. Anecdotal evidence suggests that other banks were "fuming" when Goldman Sachs, after arranging a syndicated loan for AT&T, reduced their exposure by selling their position (Wall Street Journal, 2002).

the borrower *certifies* that the borrower is sound, allowing the firm to go to less informed investors for additional capital” (page 675).

I assume that the introduction of a third-party ratings technology reduces the total cost of certification borne by the borrower. In other words, a loan rating by Moody’s and S&P provides certification for the borrower at a cheaper cost than certification by the lead arranger in a syndicated loan. Moody’s and S&P may provide lower certification costs for two reasons: first, Moody’s and S&P specialize in certification functions across many different types of securities for many different firms. If learning by doing is an important element of certification, Moody’s and S&P will provide this service at a lower cost than any given bank. Second, a lead arranger in a syndicated loan has obvious incentive problems when relaying information to participant lenders and secondary market investors. Lead arrangers receive a fee for originating the loan and typically want to hold as little of the loan as possible, which leads to adverse selection problems. Of course, participant lenders and secondary market investors understand these problems, and either force the lead arranger to hold a higher fraction of the loan or compensate them with higher fees. Ultimately, the certification costs for the borrower are higher. A third-party rating agency, which relies uniquely on reputation capital, mitigates these agency problems and certifies the borrower at a lower cost.

The assumption that third-party ratings institutions provide certification at lower cost than the lead arranger is consistent with the anecdotal evidence that certain institutional investors will not, under any circumstances, provide financing for a syndicated loan that is unrated. S&P (2005) specifically pitches their product as important to investors that “need ratings or do not have large internal credit staffs.” Bavaria (2002) argues that non-bank institutional investors “must have ratings” in order to participate in the syndicated loan market.

A reduction in the cost of certification has a direct effect on real outcomes in the Holmstrom and Tirole (1997) framework. The total income that a borrower can pledge to uninformed lenders is decreasing in the certification cost. The more income that a borrower can pledge to uninformed investors, the more investment it can undertake. The intuition is straight-forward. Informed lender capital is

necessary to reduce moral hazard, but expensive relative to uninformed capital given monitoring and certification costs. By relying on a third-party rating agency which certifies the borrower at lower cost, the borrower relies less on informed lender capital.⁹ This leads to a lower total certification cost allowing more capital from uninformed investors and thus a higher investment rate. This result is evident in two sections of Holmstrom and Tirole (1997): in the first section where investment scale is fixed, a reduction in the cost of certification increases the fraction of firms that are able to undertake the project. In the second section where investment scale is variable, a reduction in the cost of certification increases the size of the investment that a given firm undertakes.

An additional hypothesis concerns the channel through which a loan rating makes additional investment possible. The framework suggests that certification by a third-party rating agency allows the borrower to access additional debt financing from uninformed lenders. In the context of syndicated loans, institutional investors without specialized monitoring skills should be more willing to serve as syndicate members when a loan is rated.

Two additional hypotheses from the Holmstrom and Tirole (1997) framework concern the type of firm that benefits most from introduction of loan ratings. First, firms with investment projects smaller than a certain threshold do not benefit from loan ratings. Firms with small investment projects uniquely loan from informed lenders both before and after the introduction of loan ratings. In this case, there is no need for the informed lender to certify the borrower; the informed lender only provides monitoring services. This is analogous to a small firm that obtains a sole lender loan, as opposed to a syndicated loan. Second, the innovation of the ratings technology affects investment less among firms that already have certification from a third-party rating agency. In the context of bank loan ratings, borrowers with an existing corporate credit rating by Moody's or S&P should experience less of an increase in investment than firms without an existing credit rating.

⁹ A third-party rating agency cannot completely eliminate the need for informed capital given that it cannot undertake *monitoring* duties; that is, a third-party rating agency can relay information *ex-post* through updates of the credit rating, but cannot dictate whether firms continue or discontinue a project. As Diamond (1991) hypothesizes, only reputable firms can obtain debt without any degree of monitoring.

III. Who obtains a bank loan rating?

In this section, I empirically examine which firms obtain bank loan ratings. More specifically, I examine how firm characteristics before the introduction of bank loan ratings in 1995 affect the probability of subsequently obtaining a rating.

A. Empirical methodology

The goal of the empirical methodology is to explain which characteristics of firms before the introduction of bank loan ratings determine whether a firm subsequently obtains a bank loan rating. In the first set of estimations, I use maximum likelihood probit models in which a $\{0,1\}$ dependent variable representing whether the firm, subsequent to 1995, obtains a bank loan rating is regressed on firm characteristics as of 1994. More formally, for firm i , I estimate:

$$\Pr(\text{ObtainBankRating}_{i,1995-2004} = 1) = F(x_{i,1994}, \beta) \quad (1)$$

where $F(\cdot)$ is the normal distribution:

$$F(x_{i,1994}, \beta) = \Phi(\beta' x_{i,1994}) \quad (2)$$

There are a number of variables of interest in the matrix $x_{i,1994}$. First, I include the natural logarithm of assets to proxy for firm size; as the theoretical framework suggests above, larger firms should benefit more from the certification offered by the third-party rating institution, and should therefore be more likely to obtain a bank loan rating. I also include firm age in the matrix $x_{i,1994}$, with the assumption that the certification effect of the bank loan rating should be more valuable for younger firms. In addition, I include interactions of these two variables with an indicator variable that measures whether a firm has a corporate credit rating before the introduction of bank loan ratings. If the theoretical framework above is correct, the reduction in certification costs should be smaller for firms that already have a corporate credit rating in 1994. The effect of firm size and firm age should therefore be most pronounced among firms that do not have an existing credit rating in 1994. The primary measure of investment demand is *Tobin's Q*, or the market to book ratio. I also include controls that proxy for a firm's preference for debt

financing. Following Rajan and Zingales (1995), I include in the matrix $x_{i,1994}$ the tangible assets to total assets ratio, the EBITDA to assets ratio, and the book debt to assets ratio.

One disadvantage of the empirical methodology in (1) and (2) is that firms that obtain a bank loan rating are treated equally regardless of when they obtain the rating. An alternative empirical methodology is a duration model. A duration model estimates the impact of covariates in 1994 on the amount of time until a firm obtains the rating. It therefore takes into account the differential impact of covariates on the year in which the firm obtains the rating, and weights more heavily covariates that predict the firm obtaining a bank loan rating earlier rather than later. Similar to Hale and Santos (2004), I utilize Cox's (1972) proportional hazard model with time invariant covariates. Time until "failure" is defined as time until the firm obtains a bank loan rating. There are two reasons I use Cox's proportional hazards model. First, it is relatively transparent estimation technique. Second, it does not require me to specify a functional form for the hazard rate (such as exponential, Weibull, etc.). More formally, Cox's (1972) model specifies:

$$\lambda(t_i) = e^{-\beta'x_{i,1994}} \bar{\lambda}(t_i) \quad (3)$$

The function $\lambda(\cdot)$ represents the hazard rate at time t , and Cox's partial likelihood estimation of β provides a method for estimating β without estimation of the baseline hazard (see Greene, 2000, 948-950). The assumption behind the proportional hazard model is that covariates in $x_{i,1994}$ shift the baseline hazard for observation i and therefore help predict t , or the time until a given firm obtains a bank loan rating. In the context of bank loan ratings, the coefficient estimate of vector β describes how covariates of firm i in 1994 shift the baseline hazard and therefore lead to a quicker adoption of bank loan ratings. The matrix $x_{i,1994}$ contains identical covariates as covariates described above in the probit specification.

B. Results

[TABLE 2]

Table 2 reports results from the maximum likelihood probit specification where coefficient estimates represent marginal changes at the mean for continuous independent variables, and the effect of

going from 0 to 1 for independent indicator variables. The coefficient estimates in column (1) show that firm size in 1994 is positively related to the firm obtaining a bank loan rating, and firm age is negatively related. In the estimation reported in column (2), I include the interaction of both size and firm age with whether the firm has a corporate credit rating in 1994. The effect of size is much stronger in the sample of unrated firms. The coefficient estimates on the $\ln(\text{total assets})$ imply a semi-elasticity of the probability of obtaining a bank loan rating with respect to total assets of 0.024 for rated firms, and $(0.024+0.071=)$ 0.095 for unrated firms. In other words, the semi-elasticity of obtaining a bank loan rating with respect to total assets is almost 4 times as large among unrated firms. The coefficients in column (2) also imply that firm age has no discernable effect on the probability of obtaining a bank loan rating among rated firms, but has a negative semi-elasticity of $(0.019-0.055=)$ 0.036 for unrated firms. In other words, larger firms and younger firms are more likely to obtain bank loan ratings, and these results are especially true among firms that do not have a corporate credit rating at the time of the introduction of bank loan ratings.

These results are consistent with the theoretical framework outlined above. Bank loan ratings primarily affect firms with large projects that require financing from uninformed lenders. Smaller firms rely on sole lender loans both before and after the introduction of loan ratings, and therefore do not need certification of a third-party rating agency. The evidence is consistent with Dennis and Mullineaux (2000) who find that size is a strong determinant of whether a firm obtains a syndicated versus a sole lender loan. Consistent with their finding, my results imply that smaller borrowers have lower demand for services that reduce the certification cost associated with a syndicated loan. This result is stronger among unrated firms, which further supports this interpretation. When a large borrower is already rated by a third-party rating institution, it has less of a demand for a loan rating relative to an unrated large borrower. The results are similar for firm age. Younger firms have a shorter history of public filings available. Uninformed lenders therefore rely more heavily on certification by a third-party ratings institution. Consistent with this framework, I find that younger firms are more likely to obtain a bank loan rating, and this result is uniquely true among unrated firms. There is no statistically significant effect

of firm age on the probability of obtaining a bank loan rating among rated firms; young rated firms have a lower demand for a loan rating when they already have a third-party credit rating.

One finding that is inconsistent with the theoretical framework above is the strong negative effect of being unrated in 1994 on the probability of subsequently obtaining a bank loan rating. Firms that do not have an existing a corporate credit rating in 1994 should value the additional bank loan rating more, but I find that they are less likely to obtain a bank loan rating. There are two explanations for this discrepancy. First, the grand majority of unrated firms are quite small relative to rated firms; the indicator variable on whether a firm is unrated may be a further proxy for size, and the theoretical framework hypothesizes that smaller firms are less likely to obtain a bank loan rating. Consistent with this finding, there is no statistically significant effect of being unrated on the probability of obtaining a bank loan rating when I isolate the sample to firms in the top quintile based on total assets in 1994. Second, as detailed in Section I, the fees associated with obtaining a rating are substantially lower when the borrower has an existing credit rating. In the case of an S&P loan rating, an unrated borrower pays an initial fee of \$50,000 to obtain a corporate credit rating and initiates an annual \$39,000 fee for maintenance of the corporate credit rating. A rated borrower does not pay these costs. Although rated firms may value the bank loan rating less, they pay less to obtain a loan rating.

In terms investment demand, the coefficient estimates in columns (1) and (2) show that the market to book ratio has no statistically significant effect on the probability of obtaining a loan rating. This result suggests that investment demand is not a main motivation for firms obtaining a loan rating; in the next section, I address demand side concerns more directly and comprehensively.

In columns (4) and (5), I report the coefficient estimates from the duration model that uses Cox partial likelihood estimation (1972). All core results are broadly consistent with the maximum likelihood probit specification. Larger firms and younger firms obtain a bank loan rating more quickly, and these results are uniquely true among firms that are unrated in 1994. The consistency between the duration model and probit model coefficient estimates is important; it shows that the effect of covariates in the probit estimation are not driven uniquely by firms that obtain a bank loan rating late in sample period.

IV. Bank loan ratings, leverage, and investment

A. Empirical methodology

The theoretical framework hypothesizes that the introduction of bank loan ratings reduces the cost of debt certification and increases the pool of investors willing to provide financing to borrowers. As a result, firms are able to raise additional debt financing and increase investment. The empirical methodology in this section seeks to identify the causal impact of bank loan ratings on the use of debt financing and on investment.

In order to describe the empirical methodology used in this section, I begin by describing the ideal experimental environment. The ideal experimental environment involves random assignment of bank loan ratings to firms. If loan ratings are randomly assigned to firms, then the specification that estimates the causal effect of bank loan ratings on outcome y for a firm i is a basic linear regression:

$$y_i = \alpha + \beta * LoanRate_i + \varepsilon_i \quad (4)$$

With random assignment, the coefficient estimate of β represents the causal effect of the loan rating on outcome y . Control variables are not necessary, and the standard orthogonality condition is satisfied:

$$E[\varepsilon_i | LoanRate_i] = 0.$$

In the empirical setting of the 1990s, bank loan ratings are not randomly assigned. Instead, firms choose whether or not to obtain a loan rating. The fact that loan ratings are unavailable before 1995 is an advantage, but firms still choose whether or not to obtain a bank loan rating subsequent to 1995. It is this choice that presents an identification problem. If the same factors leading firms to choose a bank loan rating are also influencing outcomes, then the coefficient estimate of β does not capture a causal impact of the loan rating on the firm outcome. Perhaps the most worrisome omitted variables are those related to investment demand. If investment demand at a given firm increases and the firm incidentally obtains a loan rating, then the firm may have increased investment even if bank loan ratings did not exist.

There are three elements of the identification strategy that mitigate omitted variable concerns, and, in particular, concerns of unobservable investment demand shifts. First, the empirical methodology

relies on firm fixed effects regressions and exploits the fact that bank loan ratings are unavailable for all firms before 1995. More specifically, for a sample in which firm i is observed annually at t , I estimate:

$$y_{it} = \sum_{t=1991}^{t=2004} \alpha_t * SIC_i + \sum_{i=1}^N \alpha_i + \beta * LoanRate_{it} + \delta' X_{it} + \varepsilon_{it} \quad (5)$$

The fixed effects specification exploits within-firm variation in the existence of a bank loan rating, where firms are unable to obtain a rating before 1995. In this specification, β represents the effect on y of a given firm obtaining a loan rating relative to the period when the same firm did not have a loan rating.

The fixed effects specification removes all firm-specific time-invariant omitted variables. The specification in (5) is similar to a differences-in-differences specification, but is more flexible given the ability to control for covariates (X) at finer time intervals.¹⁰

Although a fixed effects specification eliminates firm specific time-invariant omitted variables, a remaining concern is that time-varying within-firm omitted variables are simultaneously leading firms to choose to obtain a bank loan rating and driving outcomes. For example, if a given firm receives a technology shock in a given year and I cannot properly measure the shock, then the firm may expand production and simultaneously obtain a loan rating. This problem can be viewed in terms of the counterfactual: Would leverage, acquisitions, and asset growth have increased for a given firm in the year it obtains a loan rating even if loan ratings did not exist? The second and third elements of the identification strategy help assure that increases in outcomes are uniquely the result of loan ratings. The second element is the inclusion of a comprehensive set of control variables that partial out the effect of investment demand. More specifically, I include in the matrix X_{it} cash flow, lagged cash flow, and *Tobin's Q*. In addition, I include 1-digit industry by year indicator variables. These interaction terms capture industry-wide investment demand shifts over time. Given the presence of these interaction terms, the coefficient estimate of β represents the change in outcome y for a given firm i that obtains a loan rating in year t , relative to the average change of all firms in the same industry in the same year.

¹⁰ I also estimate first difference specifications in order to assess whether a bank loan rating leads to increases in firm outcomes relative to the year before the loan rating is obtained. The results, which are unreported, are similar to the firm fixed effects estimates.

Finally, I rely on the cross-section characteristics of firms that obtain loan ratings to show that the results appear uniquely consistent with the theoretical framework outlined in Section II. The idea is straightforward: among the set of firms that obtain a loan rating, certain firms should value the certification of Moody's or S&P more than others. I use two measures of the certification value. First, the theoretical framework suggests that the effect of a loan rating on investment and leverage should be lower for firms that have an existing credit rating. I show below that the empirical findings match this theoretical prediction: the effect of obtaining a loan rating on borrower leverage, asset growth, and cash acquisitions is statistically significantly stronger among firms without a previous credit rating. Second, firms of lower credit quality would have a more difficult time raising debt financing in the absence of a third-party ratings institution. Firms of lower credit quality should therefore place a higher value on certification by Moody's and S&P. I use the initial loan rating as a measure of credit quality.

As the results below demonstrate, I find that the effect on leverage, asset growth, and cash acquisitions is strongest among borrowers without credit ratings before 1995 and borrowers who have initial loan ratings of BB+ or lower. These results appear uniquely consistent with the theoretical framework outlined in Section II. Alternative omitted variables, such as demand shifts, cannot explain why the positive effect of loan ratings is strongest among firms with an ex ante higher value of certification.

B. Bank loan ratings and debt financing

1. Loan ratings and debt

[TABLE 3]

Table 3 presents coefficient estimates where outcomes are measures of debt used by the firm. For firms that obtain a loan rating, the sample for the regressions in Table 3 includes only the observations up to and including the year that the loan rating is obtained. (I explore the effects of a loan rating after the year of initial rating in Table 8.) The coefficient estimates in column (1) show that firms that obtain a bank loan rating experience statistically significant increases in the use of debt. In terms of magnitudes, a firm with a credit rating in 1994 experiences an increase in the change in debt scaled by lagged assets of

0.048 and a firm without a credit rating in 1994 experiences an increase of $(0.048+0.156=)$ 0.204. The latter coefficient estimate implies that firms without a previous debt rating that obtain a loan rating experience a $(100*0.204/0.097=)$ 212% increase in the annual change in debt scaled by lagged assets at the mean of the left hand side variable. The specification reported in column (2) includes control variables that Rajan and Zingales (1995) show are correlated with the use of debt by firms. The coefficient estimates when the control variables are included are almost identical. In column (3), I report a specification in which the bank loan indicator variables are interacted with an “initial loan rated junk” indicator variable. Firms with an existing credit rating that have a junk rating on their initial loan experience no distinct change in debt from other firms with an existing credit rating (row 2). However, among the set of firms that are unrated before the introduction of bank loan ratings, firms that are of lower credit quality experience a larger increase in the use of debt. In other words, among firms that are both unrated and of lower credit quality, there is a larger increase in the use of debt when the firm obtains a loan rating.

Columns (4) through (6) present the estimates where the dependent variable is the book debt to book assets ratio.¹¹ Firms that are rated before the introduction of bank loan ratings experience no change in leverage ratios when obtaining a loan rating, whereas firms that are unrated before the introduction of bank loan ratings experience a statistically significant increase. In terms of magnitudes, the coefficient estimate in column (4) implies an increase of 0.11 in the leverage ratio of these firms, which is $(100*0.11/0.29=)$ 38% among these firms. Column (6) shows evidence consistent with column (3); firms that are unrated before the introduction of loan ratings and of lower credit quality experience the largest increase in leverage ratios when they obtain a loan rating.

The results in Table 3 suggest that firms are able to raise significantly more debt in the year they obtain a loan rating relative to the period in which loan ratings are not available. This is consistent with

¹¹ In unreported results, I replicate all leverage specifications replacing the book debt to book assets ratio (“book leverage ratio”) with the book debt to market value of assets ratio (“market leverage ratio”). The results are almost identical, with the coefficient estimates slightly smaller given that market leverage ratios are on average smaller than book leverage ratios. I report the book leverage ratio specification given that it is more common in the literature (Faulkender and Petersen (2006) is an exception).

the theoretical framework in Section III which suggests that a reduction in certification costs provides greater access to external finance. The fact that the result is uniquely strong among firms that are unrated before the introduction of bank loan ratings and are of lower credit quality mitigates concerns with omitted variables such as borrower quality or demand shifts. The value of third-party certification is highest among this set of firms, and it is precisely these firms that raise the most debt when they obtain a loan rating. Overall, these results suggest that loan ratings have important effects on capital structure. The introduction of bank loan ratings reduces the cost of certification in debt markets, and therefore increases the supply of debt that investors are willing to provide to the firm.

2. Loan ratings, loan characteristics, and syndicate composition

[TABLE 4]

The section above demonstrates that borrowers that obtain loan ratings significantly increase their use of debt. In this section, I document the channel through which the expansion of debt financing occurs. Table 4 presents summary statistics for the sample of 580 loan deals by 169 borrowers. These are borrowers that are unrated in 1994 and subsequently obtain a loan rating, and the sample includes all loans by these firms from 1993 up to and including their first rated loan. The average (median) loan deal amount is \$270 million (\$150 million), and the average (median) interest rate spread is 163 (138) basis points above LIBOR. The average loan deal contains 1.63 loan tranches. All loan tranches are either term loans or lines of credit, and the average number of term tranches is 0.55.

In terms of the syndicate size and composition, there is an average (median) of 7.6 (5) lenders providing funds on deals. Overall, there are 449 lenders in the sample of loans. For these 449 lenders, I classify each lender into one of five groups: domestic commercial banks, foreign commercial banks, investment banks, finance companies, and non-bank institutional investors. I include domestic commercial banks, investment banks, and finance companies into one group labeled “domestic banks.” These banks are considered informed lenders—lenders that have specialized screening and monitoring skills. A few foreign banks with a large presence in the United States through subsidiaries are classified as domestic banks (ABN-AMRO, for example). Given that the classification is not based on SIC codes

(which are unavailable in *Dealscan*), I include in an Appendix Table a sample of financial institutions and the groups in which they are classified.

As Table 4 shows, domestic banks are the most common type of lenders in this market, with an average of 4.7 domestic banks (out of 7.6 total lenders) on the syndicate. Foreign banks represent on average 2.4 lenders on syndicates, and non-bank institutional investors represent only 0.5 lenders. These averages demonstrate that the syndicated loan market is primarily a market in which banks with specialized monitoring and screening skills participate.

[TABLE 5]

How does the initial loan rated by Moody's or S&P compare to previous loans by the same firm? Table 5 presents evidence to answer this question. Each cell in Table 5 reports a coefficient estimate from a separate regression; more specifically, each cell provides the coefficient estimate on an indicator variable that is equal to one if the loan is rated. Column (1) reports firm fixed effects regressions and column (2) reports first difference specifications. All specifications include year indicator variables. As the first row demonstrates, there is a large increase in the loan amount when the borrower obtains a loan rating. The fixed effects estimate implies a 76% increase in the size of the loan, and the first difference estimate implies a 56% increase. This finding is consistent with evidence presented in the previous section that borrowers experience large increases in debt in the year they obtain a loan rating. The increase in the size of the loan is driven in part by an increase in the number of loan tranches on a given deal. In particular, there is a significant increase in the presence of term loan tranches on a firm's first rated loan. The increase in the number of term loan tranches is economically meaningful: The mean number of term loan tranches is 0.55 and the first difference specification implies an increase in the number of term loan tranches of 0.45, which is more than 80% of the mean. Although the loan size increases by almost 76%, the interest rate spread does not show a statistically significant change. Overall, the introduction of loan ratings leads to substantial increases in loan amounts but no statistically significant change in the interest rate spread.

Rows (5) through (11) provide evidence that the syndicate composition shifts toward less informed lenders when firms obtain loan ratings. In row (5), the coefficient estimate of the effect of a rating on the number of lenders is 5.9 in the fixed effects specification, and 4.5 in the first difference specification. Moreover, rows (7) and (8) show that almost 60% of the increase in the number of lenders represents increases in foreign bank and non-bank institutional investor participation. The fixed effects estimate in row (8) suggests that there are 1.2 more non-bank institutional investors on the first rated loan relative to previous loans by the same firm. The economic significance of this result is large given that the average number of non-bank institutional investors is only 0.5. The coefficient estimates in rows (10) and (11) imply that a foreign bank or non-bank institutional investors is 24% and 17% more likely to be on the first rated loan syndicate, relative to previous loans by the same firm.

The evidence in Table 5 suggests that loan ratings increase the pool of investors that are willing to hold part of the syndicated loan. In particular, the results suggest that borrowers gain increased access to less informed investors such as foreign banks and non-bank institutional investors. The evidence is consistent with the theoretical framework outlined in Section 2. Bank loan ratings decrease the cost of informed lender certification and make uninformed lenders more willing to accept a piece of the credit. The evidence in Table 5 documents a channel by which third-party ratings can increase the supply of debt financing and increase firm leverage ratios: foreign banks and non-bank institutional investors are more willing to lend when the loan is rated by Moody's or S&P.¹²

C. Bank loan ratings and real outcomes

[TABLE 6]

The results presented in Tables 3 through 5 suggest that loan ratings increase the availability and use of debt financing. In Table 6, I examine whether firms increase investment as a result. More specifically, I examine the impact of the availability of bank loan ratings on asset growth, capital

¹² Table 5 also implies a simultaneous increase in the number of term loan tranches and the number of non-bank institutional investors when a loan is rated. This evidence supports the model by Kashyap, Rajan, and Stein (2002), which hypothesizes that commercial banks funded by deposits will specialize in lending via lines of credit. After the firm obtains a loan rating and non-bank intermediaries are willing to lend, they usually participate on term tranches.

expenditures, and cash acquisitions of borrowers. The coefficient estimates in column (1) show that firms with a credit rating before the introduction of loan ratings experience an increase in asset growth of 0.089 when they obtain a loan rating. Unrated firms experience a statistically significantly larger increase in asset growth of $(0.089+0.178=)$ 0.267. This increase in asset growth for unrated firms is economically meaningful; average asset growth among unrated firms that obtain a bank loan rating is 0.286, which implies that a firm experiences almost a 100% increase in asset growth at the mean when they obtain a bank loan rating. Coefficient estimates from regressions using capital expenditures and cash acquisitions are presented in column (4) and column (7), respectively. The coefficient estimates on bank loan ratings suggest a similar pattern for capital expenditures, but the coefficients are not statistically distinct from 0 at a reasonable confidence interval. However, unrated firms that obtain a bank loan rating experience an increase in capital expenditures relative to firms that never obtain a bank loan rating that is significant at the 6% level.¹³ Unrated firms that obtain a bank loan rating experience an increase in cash acquisitions of $(0.015+0.070=)$ 0.085, which is higher than the mean of cash acquisitions among this sample (0.067). The effect of obtaining a bank loan rating is significantly stronger, both in a statistical sense and in terms of economic significance, among firms that do not have a credit rating before bank loan ratings became available.

In columns (2), (5), and (8), I present coefficient estimates from regressions that include a variety of investment opportunity control variables. The addition of these variables does not significantly change the coefficient estimates on bank loan ratings; in fact, the coefficient estimates are almost identical. These results suggest that unobservable investment opportunities are not driving the results. More formally, the fact that coefficient estimates on bank loan ratings do not change when adding observable measures of investment opportunities suggests that loan ratings are not correlated with unobservable investment opportunities (assuming, of course, that observable and unobservable measures of investment opportunities are correlated). In addition, all regressions include year indicator variables interacted with

¹³ The hypothesis that the sum of the coefficients $Bank\ Loan\ Rating + Bank\ Loan\ Rating * Unrated = 0$ can be rejected at the 6% confidence level using a Wald test statistic.

1-digit SIC industry codes. These interaction terms control for any technology or demand shifts that occur over time in the industry.

In columns (3), (6), and (9), I examine whether the positive effect of the loan ratings on real outcomes is differentially stronger among firms of lower credit quality. The results suggest that the increase in asset growth and cash acquisitions is concentrated among firms that are both unrated before 1995 and subsequently obtain a loan rating of BB+ or worse. These results appear uniquely consistent with the theoretical framework outlined in Section II. Firms that are unrated value third-party certification more than firms that have existing public debt ratings. In addition, firms of lower credit quality value certification higher than other firms. This is clear when one considers the lending process for a low credit quality unrated borrower in the absence of bank loan ratings. Without loan ratings, a low credit quality unrated borrower would rely more heavily on the skills of a lead arranger, and the lead arranger would find it more difficult to syndicate out the loan. Institutional investors would be less willing to provide financing without a credit rating, and the pool of total investors would be smaller. In this scenario, lower quality unrated borrowers would experience slower growth and conduct fewer acquisitions. While these results appear consistent with an expansion in the availability of debt financing, the fact that the results are strongest among unrated low credit-quality borrowers appears inconsistent with most omitted variable stories. For example, it is unlikely that low credit-quality borrowers are the borrowers with better unobservable investment opportunities. In addition, an adverse selection or signaling story implies that borrowers that are revealed by the third-party rating agency to be good types should experience the largest increase in asset growth and acquisitions.

Consistent with the theoretical framework discussed in Section III, the results in Table 6 suggest that the introduction of bank loan ratings increases real outcomes for borrowers that obtain them. The evidence suggests that third-party certification reduces the cost of obtaining finance from uninformed investors, and it allows firms to raise more capital and grow.

The regression specifications reported in columns (10) through (12) examine how cash balances change when firms obtain a loan rating. More specifically, the dependent variable is the change in cash

balances, scaled by lagged total assets. The results suggest that loan ratings have no economically meaningful effect on cash balances of the firm. There are two important implications of this finding. First, it shows that firms are not simply obtaining loans and holding the proceeds as cash, which would trivially lead to increases in asset growth. In other words, the asset growth results are not simply a reflection of growth in cash holdings. Second, and perhaps more importantly, the results dispute the notion that omitted investment demand variables simultaneously cause firms to increase asset growth and obtain a loan rating. Theoretical predictions from Myers and Majluf (1984) suggest that firms should always use cash to fund valuable investment opportunities before external financing, yet the firms in my sample have no change in cash balances while raising a large amount of new debt. The results suggest that the relative cost of debt financing to cash changes when a firm obtains a loan rating, which is consistent with an expansion in the supply of available debt financing.

D. Robustness and Extensions

1. Counter-factual Analyses

The results presented above suggest that loan ratings increase the availability of debt financing and increase real outcomes such as asset growth and cash acquisitions. The empirical methodology contains a number of techniques that mitigate omitted variable bias concern, and help strengthen the interpretation that bank loan ratings have a real effect. In this section, I provide further support for this interpretation of results by conducting four separate counter-factual analyses. The goal of the counter-factual analyses is to offer insight into the following question: in the absence of loan ratings, would firms that obtained loan ratings still have experienced the same increases in leverage, asset growth, and cash acquisitions? Obviously, the exact counter-factual does not exist: I cannot empirically measure what would have happened to these same firms had loan ratings not been available. However, in each of the four counter-factual analyses below, I consider reasonably close counter-factuals that attempt to answer this question.

[TABLE 7]

First, I consider the asset growth and cash acquisitions of firms that obtain a loan rating *before* loan ratings are available. In other words, I examine the leverage, asset growth, and cash acquisition behavior of the same firms that subsequently obtained loan ratings, but I examine them in the period between 1990 and 1994. In Table 7, I compare firm outcomes for the year that a loan rating is obtained with the highest realization of the outcome for the same firm in the years before loan ratings become available. The counter-factual for a given firm in the year that it obtains a loan rating is therefore the same firm in the year between 1990 and 1994 in which it experienced its largest increase in leverage, asset growth, or cash acquisitions. The methodology is as follows: I estimate firm fixed effects regressions relating each outcome (leverage, asset growth, and acquisitions) to all control variables in specifications reported in Tables 3 and 6. I then predict the residuals in the year of the loan rating, and in the years from 1990 through 1994. I then compare the residual in the year that a loan rating is obtained with the highest residual for the same firm from 1990 through 1994. Table 7 compares the averages across all firms from doing this comparison.

For firms unrated in 1994, the largest annual increase in debt scaled by lagged assets from 1990 through 1994 is on average 0.08. In the year the loan rating is obtained, the average is 0.18. These differences are statistically distinct at the 1% level. In other words, firms experience a larger increase in the use of debt in the year they obtain a loan rating even compared to the largest increase in the use of debt in any year between 1990 and 1994. The results are similar for asset growth and acquisitions, although the result for asset growth is statistically distinct only at the 12% level. In columns (3) and (4), I conduct the same counter-factual analysis using firms that are unrated in 1994 and subsequently obtain a loan rating of BB+ or worse. The increase in leverage, asset growth, and cash acquisitions is statistically significantly higher in the year the firm obtains the loan rating relative to the largest increase the firm experiences before loan ratings are available.

[TABLE 8]

In the second counter-factual analysis, I consider whether firms that obtained a loan rating would have been able to fund projects using public debt in the absence of loan ratings. Faulkender and Petersen

(2006) find evidence that firm age and firm size are strong determinants of the ability of firms to access public debt markets.¹⁴ Table 8 compares the average age and size of firms that do not have a public debt rating by 1994 and subsequently obtain a loan rating to the average age and size of firms that have a public debt rating in 1994. The averages demonstrate that firms that subsequently obtain loan ratings are both smaller and younger than the average firms that have public debt ratings. For example, the average firm with a public debt rating is three times as large as the average firm obtaining a bank loan rating and 9 years older. The same patterns hold when comparing firms with junk-rated public debt as of 1994 to firms that subsequently obtain junk-rated syndicated loans. Given the importance of firm size and firm age in obtaining public debt, these results suggest that firms that do not have public debt ratings in 1994 and subsequently obtain loan ratings could not have easily raised public debt to finance acquisitions and asset growth.

In the third counter-factual analysis, I examine the outcomes for firms that initially obtain a public debt rating, as opposed to a bank loan rating. I focus on firms that obtain a public debt rating between 1990 and 1994 for one important reason: After 1995, *Compustat item 280* reflects the existence of a corporate credit rating, not the existence of a public debt rating. As mentioned above, all borrowers that obtain a loan rating receive a corporate credit rating; therefore, after 1995, it is impossible to separate borrowers that uniquely obtain a loan rating versus firms that uniquely obtain a public debt rating. In unreported results, I conduct the exact same firm fixed effects regressions that are reported in Tables 3 and 6, but I relate borrower outcomes to an indicator for the first year a firm obtains a public debt rating as opposed to a bank loan rating. I find that firms that obtain a public debt rating experience an increase in their leverage ratio of 0.006 which is statistically distinct from zero at the 6% level. There is no increase in cash acquisitions scaled by lagged assets, and there is a 0.06 increase in asset growth, which is statistically distinct from 0 at the 1% level. The average effects of a bank loan rating on the leverage

¹⁴ Faulkender and Petersen (2006) also use whether a firm is in the S&P 500 or whether a firm trades on the New York Stock Exchange. Unfortunately, *Compustat* only records whether the firm is in the S&P 500 or trades on the NYSE in the latest year the data is available; there is no historical information in *Compustat* to assess whether firms obtained a loan rating while being on a certain exchange or in a certain index.

ratio, cash acquisitions scaled by lagged assets, and asset growth are 0.05, 0.04, and 0.16, respectively. For all three outcomes, the increase associated with a given firm obtaining a bank loan rating is significantly higher than the increase associated with a given firm obtaining a public debt rating.

[TABLE 9]

In the final counterfactual analysis, I examine whether large increases in asset growth or cash acquisitions are always correlated with increases in the leverage ratio. In other words, do firms always fund cash acquisitions and asset growth with debt financing? Table 9 reports coefficient estimates from firm fixed effects specifications that relate the leverage ratio to asset growth and cash acquisitions. The results in column (1) show that, in general, asset growth is not correlated with an increase in the leverage ratio, except when the asset growth occurs via a bank loan rating. The results in column (2) suggest that cash acquisitions are strongly positively correlated with increases in the leverage ratio; however, the effect is twice as strong when the borrower obtains a loan rating. In other words, firms tend to finance cash acquisitions with debt, but firms that obtain a loan rating rely on debt financing to a much greater degree when conducting acquisitions.

2. Persistence

[TABLE 10]

How persistent are the increases in leverage and real outcomes for borrowers that obtain a loan rating? In Table 10, I document how leverage and real outcomes change after the firm obtains the initial loan rating. The third row of coefficients shows that the core results of Tables 3 and 6 are robust when including the years after a borrower initially obtains the loan rating. Unrated firms that obtain a loan rating experience increases in leverage, asset growth, and cash acquisitions in the year they obtain the bank loan rating. The fourth row contains the key variable of interest; the coefficient estimates on the *After bank loan rating obtained * Unrated* variable quantify the changes in leverage and real outcomes in the years after the loan rating is obtained. Column (1) shows that the increase in leverage is persistent but decreases slightly. Firms maintain a leverage ratio that is, on average, 0.08 higher after they obtain a bank loan rating, compared to an increase of 0.11 in the year the firm obtains the bank loan rating. The

availability of a bank loan rating leads to a persistent shift in leverage ratios. However, real outcomes do not show persistence. Column (2) shows that firms experience slower asset growth after the initial year they obtain the bank loan rating. Column (3) shows that cash acquisitions return to their pre-bank loan rating level in the years after the bank loan rating is obtained. Overall, these results suggest that a borrower that obtains a bank loan rating experiences a one time increase in real outcomes, followed by a period in which they invest either at or below pre-loan rating levels.

VI. Conclusion

The findings of this paper suggest that third-party certification by rating agencies increases the availability of debt financing for firms, and increases real outcomes. I informally extend the theoretical framework of Holmstrom and Tirole (1997) to show how the innovation of a third-party ratings technology reduces the certification cost borne by the borrower. The technology increases the amount of future income streams that the borrower can pledge to uninformed lenders, and therefore increases the availability of debt financing. The increased participation of uninformed lenders also allows the firm to increase investment. I exploit the introduction of loan ratings by Moody's and S&P in 1995 to empirically evaluate this framework. I find evidence that large and young borrowers are more likely to obtain loan ratings, and this result is stronger among firms that did not have an existing credit rating before loan ratings are introduced. The evidence suggests that small firms do not need syndicated loan certification services, which is consistent with evidence that small firms rely mostly on sole lender loans. The evidence also suggests that younger firms value the certification of a third-party rating agency higher than older firms, a result that is unique among firms that did not have a credit rating prior to 1995.

I find that the firms that obtain a loan rating experience economically significant increases in leverage, asset growth, and cash acquisitions. The evidence on capital expenditures also suggests an increase, but is weaker in both statistical significance and magnitude. I also identify the channel through which firms are able to raise additional debt financing: The results suggest that a loan rating awards borrowers increased access to foreign bank and non-bank institutional investor capital. I present evidence that suggests that the results are reflective of an expansion in the supply of debt financing as a result of

loan rating. In other words, I present evidence that increases in leverage and real outcomes would not have been as pronounced had bank loan ratings not been introduced. For example, the empirical strategy relies on within-firm variation in the availability of the ratings technology, which is unavailable for all firms prior to 1995, to identify the within-firm changes in leverage and outcomes. In addition, I show that increases in leverage and real outcomes are unique to firms that are unrated before 1995 and are of lower credit quality. A series of counter-factual analyses support the conclusion that loan ratings have an important impact on firm investment and financial policy.

The findings of this paper are important in understanding the syndicated loan market and the effect of syndicated loan ratings. By 2004, over 30% of firms in my sample obtained a bank loan rating, and over 70% of asset-weighted firms obtained a bank loan rating. This paper represents the first attempt, to my knowledge, to evaluate the effect of loan ratings on firm investment and financial policy.

In a broader sense, this paper improves our understanding of the increasing disintermediation of the banking sector in the United States. In particular, this paper shows evidence that a separation of certification duties from traditional banking can improve the allocation of capital in the economy. In the U.S., banks are increasingly originating loans that they subsequently do not hold. This practice is apparent in the rapid rise in the use of securitizations, credit default swaps, and syndications. Generally, the ability of banks to diversify their portfolio by shedding credit risk and syndicating loans may have important implications for the health of the banking sector during economic downturns and for the credit channel of monetary policy. This paper shows that the link between holding the loan and certifying the borrower may not be as strong as previously hypothesized; that is, third-party credit rating agencies improve the ability of borrowers to access funds from arm's length investors.

Research presented here points to three directions for future research. First, many private companies obtained bank loan ratings after their introduction in 1995. Given that private companies are even less certified ex ante than public companies without existing credit ratings, I expect that the results presented here would be even stronger among private companies. Second, in December 2003, S&P introduced bank loan *recovery ratings*, which assess the liquidation value of a bank loan and vary within a

given loan rating. The introduction of recovery ratings may further improve liquidity and access to capital for borrowers that obtain bank loan ratings. Finally, while the introduction of bank loan ratings in the U.S. is arguably one of the largest rating technology introductions in the last 15 years, several rating agencies in various countries also began rating borrowers during this time period. An analysis of the effects of rating agencies in less financially developed economies may further strengthen the hypothesis that third-party rating organizations increase the availability of external finance for borrowers.

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Figure 1
Fraction of all firms that have obtained bank loan rating

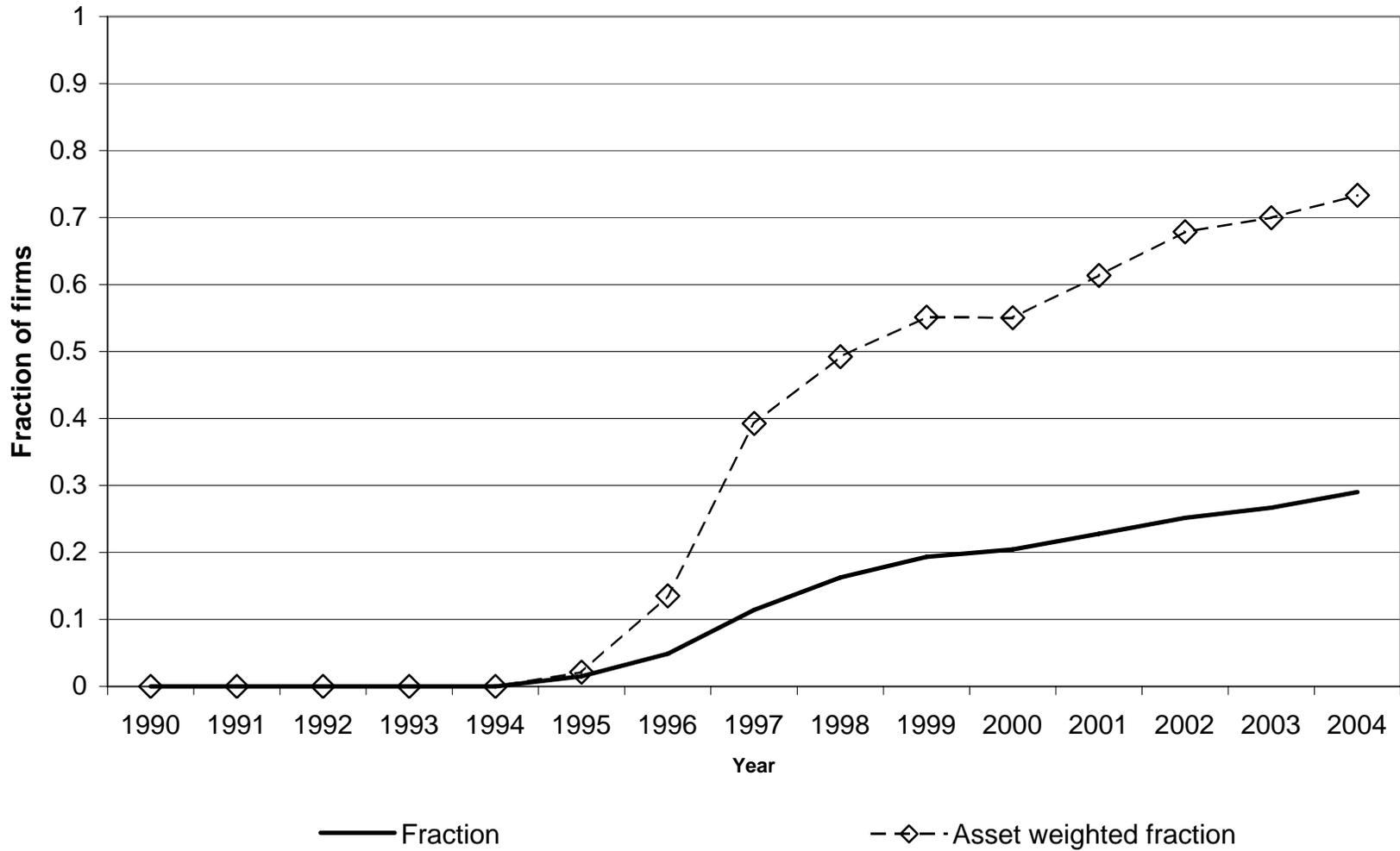


Figure 2
Number of firms obtaining new loan rating, by 1994 debt rating

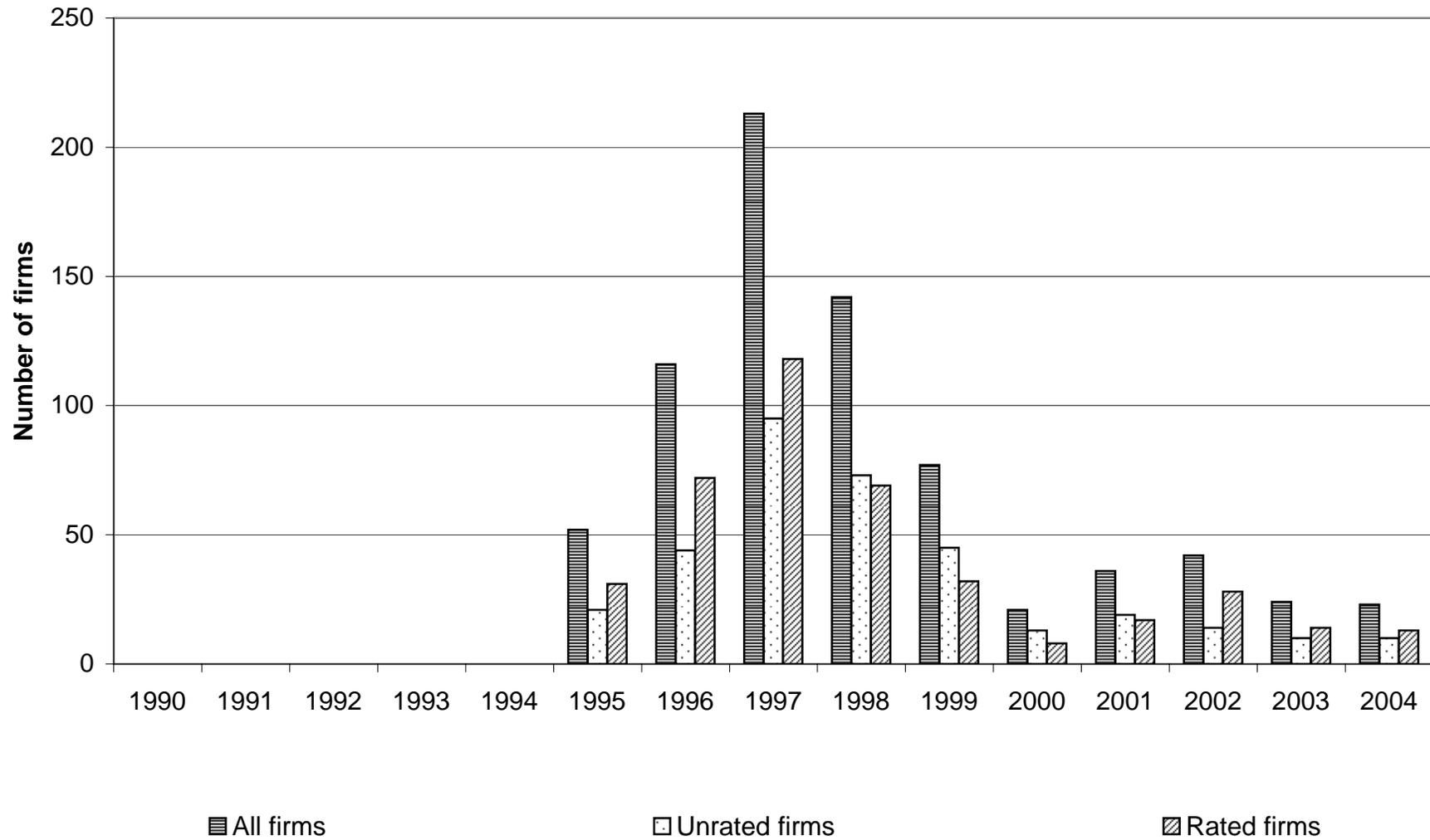


Table 1
Summary Statistics

This table contains summary statistics for an unbalanced panel of 3,459 firms (39,608 firm-years).

	Mean	Standard Deviation			
Fraction that obtain loan rating	0.216	0.411			
Initial rating by Moody's	0.091	0.287			
Initial rating by S&P	0.079	0.270			
Initial rating by both	0.046	0.209			
Unrated before 1995	0.099	0.299			
Initial loan junk rated	0.109	0.312			
Both unrated and initial loan junk rated	0.067	0.251			
<i>Summary statistics</i>					
	Mean	Standard Deviation	10 th	50 th	90 th
<i>Conditional on obtaining loan rating</i>					
Amount of first rated loan (\$M)	697	1,428	95	325	1500
Number of tranches of first rated loan	1.543	0.844	1.000	1.000	3
Loan rating (1=AAA, 2=AA, etc)	4.396	0.986	3	5	5.5
Amount of first rated loan/total assets	0.265	0.231	0.051	0.200	0.558
<i>Full Sample</i>					
Total assets (\$M)	2,091	12,000	11	174	3,683
Sales (\$M)	1,750	7,437	9	187	3,346
Firm age (years since IPO)	18	13	4	14	39
Book debt to assets	0.245	0.219	0.000	0.219	0.507
Market to book ratio (Q)	1.983	1.828	0.873	1.387	3.555
Tangible assets to total assets	0.320	0.239	0.059	0.256	0.708
EBITDA/Total assets	0.076	0.214	-0.089	0.118	0.232
Cash flow/Assets _{t-1}	0.046	0.218	-0.137	0.086	0.207
<i>Outcomes</i>					
Asset growth	0.141	0.410	-0.160	0.059	0.461
Capital expenditures/Assets _{t-1}	0.073	0.080	0.011	0.049	0.157
Cash acquisitions/Assets _{t-1}	0.028	0.086	0.000	0.000	0.072

Table 2
Who Obtains a Bank Loan Rating?

This table presents coefficient estimates from maximum likelihood estimations. Columns (1) and (2) present coefficient estimates from probit specifications where the probability that a firm obtains a bank loan rating subsequent to 1995 is related to firm characteristics as of 1994. Coefficient estimates in columns (1) and (2) represent marginal changes in the probability at the mean of the right hand side variable. Columns (3) and (4) present coefficient estimates from Cox hazard proportion duration specifications where the time until obtaining a bank loan rating is related to time-invariant firm characteristics as of 1994.

	Probit		Cox hazard proportion	
	(1)	(2)	(3)	(4)
Ln(total assets _{i,1994})	0.079** (0.005)	0.025** (0.008)	0.423** (0.028)	0.074 (0.043)
Ln(total assets _{i,1994})*Unrated _{i,1994}		0.069** (0.009)		0.636** (0.057)
Ln(firm age _{i,1994})	-0.024** (0.008)	0.022 (0.014)	-0.215** (0.053)	0.038 (0.080)
Ln(firm age _{i,1994})*Unrated _{i,1994}		-0.059** (0.016)		-0.438** (0.105)
Unrated _{i,1994}	-0.086** (0.022)	-0.574** (0.109)	-0.518** (0.107)	-3.667** (0.385)
Market to book ratio _{i,1994}	-0.001 (0.006)	0.000 (0.006)	-0.099 (0.052)	-0.101 (0.055)
Book debt to assets _{i,1994}	0.196** (0.032)	0.156** (0.031)	1.605** (0.199)	1.339** (0.209)
Tangible assets to total assets _{i,1994}	-0.008 (0.029)	-0.005 (0.027)	-0.093 (0.185)	-0.180 (0.187)
EBITDA/Total assets _{i,1994}	0.233** (0.056)	0.177** (0.057)	2.317** (0.500)	1.948** (0.539)
Pseudo R ²	0.304	0.321		
LR Chi-Squared Statistic			987.96	1121.89
Number of firms	3,459	3,459	3,459	34,59
Number of firm-years	3,459	3,459	23,688	23,688

Table 3
The Effect of Obtaining a Bank Loan Rating on Availability of Debt

This table presents coefficient estimates from firm fixed effects regressions relating debt at firm i in year t to the existence of a bank loan rating for firm i in year t . Columns (1) through (3) relate the change in debt levels from $t-1$ to t scaled by the book value of assets at $t-1$ to the existence of a bank loan rating at t . Columns (4) through (6) relate the book debt to book value of assets ratio at t to the existence of a bank loan rating at t . For firms that obtain a bank loan rating, the sample includes only observations for that firm up to and including the year that the bank loan rating was obtained. All regressions include year indicator variables interacted with 1-digit SIC industry codes. Standard errors are clustered at the firm level.

Dependent variable:	$(\Delta \text{ debt/lagged assets})_{it}$			Debt to assets ratio $_{it}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Loan rating $_{it}$	0.048** (0.013)	0.046** (0.013)	0.047** (0.013)	0.001 (0.007)	0.005 (0.007)	0.012 (0.007)
Loan rating $_{it}$ *Loan junk rated $_{it}$			-0.005 (0.030)			-0.021 (0.015)
Loan rating $_{it}$ *Unrated $_{i,1994}$	0.156** (0.025)	0.169** (0.024)	0.032 (0.028)	0.113** (0.013)	0.102** (0.013)	0.022 (0.013)
Loan rating $_{it}$ *Unrated $_{i,1994}$ *Loan junk rated $_{it}$			0.209** (0.048)			0.132** (0.025)
Market to book ratio $_{i,t-1}$		0.013** (0.001)	0.013** (0.001)		-0.001 (0.001)	-0.001 (0.001)
Tangible assets to total assets $_{i,t-1}$		-0.037* (0.018)	-0.038* (0.018)		0.184** (0.025)	0.184 (0.025)
Ln(total sales $_{i,t-1}$)		-0.034** (0.003)	-0.034** (0.003)		0.028** (0.004)	0.027 (0.004)
EBITDA/Total assets $_{i,t-1}$		0.048** (0.012)	0.048** (0.012)		-0.184** (0.018)	-0.183 (0.018)
R ²	0.06	0.08	0.09	0.60	0.62	0.62
Number of firms	3,459	3,459	3,459	3,459	3,459	3,459
Number of firm-years	36075	36075	36075	36075	36075	36075

*,** coefficient estimate is statistically distinct from 0 at the 5 and 1 percent, respectively.

Table 4
Loan Deal Summary Statistics

This table presents summary statistics on loans obtained by borrowers who do not have a public debt rating as of 1994, and subsequently obtain a loan rating in 1995 or after. The sample includes only borrowers for whom the first rated loan is rated at origination and only borrowers that I am able to match to Loan Pricing Corporation's *Dealscan*. The sample includes 580 loans by 169 borrowers. The data are from *Dealscan*. A *Domestic bank* is any domestic commercial bank, finance company, or investment bank.

	Mean	Standard Deviation	10 th	50 th	90 th
Amount of loan deal	270	409	30	150	550
Number of tranches on loan deal	1.63	0.96	1	1	3
Number of term loan tranches	0.55	0.85	0	0	2
Interest rate spread (bp + LIBOR)	163	113	45	138	305
Number of lenders on deal	7.61	8.32	1	5	18
Domestic banks	4.68	4.08	1	4	10
Foreign banks	2.43	3.93	0	1	7
Non-bank institutional investors	0.48	2.43	0	0	1

Table 5**The Effect of a Loan Rating on Loan Characteristics and Syndicate Composition**

This table presents regression coefficients from regressions relating the characteristics of a borrower's loans to whether the borrower's loan is rated. Each cell represents a separate regression, with each row listing a distinct dependent variable. The first column presents the fixed effects coefficient estimates and the second column presents the first difference coefficient estimates. The sample includes all loans by borrowers from 1993 up to and including the borrower's first rated loan. All regressions include year indicator variables. The coefficient on the "Loan rated" indicator variable represents the effect of the loan rating on the first rated loan relative to unrated loans by the same firm. Standard errors are calculated by clustering at the firm level. The sample size for each regression is 580 loan deals by 169 borrowers.

	Specification type: Dependent variable:	(1) Fixed effects Loan rated	(2) First differences Loan rated
(1)	Ln(loan amount)	0.758** (0.117)	0.558** (0.122)
(2)	Number of tranches on loan deal	0.656** (0.158)	0.569** (0.150)
(3)	Number of term loan tranches	0.518** (0.134)	0.450** (0.131)
(4)	Interest rate spread (bp + LIBOR)	21.3 (15.0)	-1.9 (16.9)
(5)	Number of lenders on deal	5.90** (1.22)	4.45** (1.07)
(6)	Number of domestic banks	2.54** (0.49)	1.96** (0.44)
(7)	Number of foreign banks	2.15** (0.54)	1.57** (0.51)
(8)	Number of institutional investors	1.21* (0.598)	0.93 (0.50)
(9)	Indicator for domestic bank	-0.002 (0.020)	0.006 (0.025)
(10)	Indicator for foreign bank	0.235** (0.065)	0.186** (0.064)
(11)	Indicator for institutional investor	0.165** (0.049)	0.123** (0.046)

Table 6, Panel A
The Effect of Obtaining a Bank Loan Rating on Real Outcomes

This table presents coefficient estimates from firm fixed effects regressions relating real outcomes at firm i in year t to the existence of a loan rating for firm i in year t . Columns (1) through (3) relate asset growth at time t ($[A_t - A_{t-1}] / A_{t-1}$) to the existence of a loan rating at t . Columns (4) through (6) relate capital expenditures at t scaled by assets at $t-1$ to the existence of a loan rating at t . Columns (7) through (9) relate cash acquisitions at t scaled by assets at $t-1$ to the existence of a loan rating at t . Columns (10) through (12) relate cash growth at time t scaled by assets at $t-1$ to the existence of a loan rating at t . For firms that obtain a loan rating, the sample includes only observations for that firm up to and including the year that the loan rating was obtained. All regressions include year indicator variables interacted with 1-digit SIC industry codes; standard errors are clustered at the firm level.

Dependent variable:	(1) Asset growth _{it}	(2) Asset growth _{it}	(3) Asset growth _{it}	(4) CapEx _{it} /Assets _{i,t-1}	(5) CapEx _{it} /Assets _{i,t-1}	(6) CapEx _{it} /Assets _{i,t-1}
Loan rating _{it}	0.089** (0.025)	0.073** (0.024)	0.088** (0.026)	0.006 (0.003)	0.004 (0.003)	0.007* (0.003)
Loan rating _{it} *Loan junk rated _{it}			-0.044 (0.056)			-0.009 (0.007)
Loan rating _{it} *Unrated _{i,1994}	0.178** (0.048)	0.200** (0.046)	0.017 (0.055)	0.001 (0.005)	0.003 (0.005)	-0.003 (0.005)
Loan rating _{it} *Unrated _{i,1994} *Loan junk rated _{it}			0.297** (0.092)			0.014 (0.010)
Q _{i,t-1}		0.105** (0.004)	0.105** (0.004)		0.010** (0.001)	0.010** (0.001)
Cash flow _{it} /Total assets _{i,t-1}		0.393** (0.040)	0.393** (0.040)		0.024** (0.005)	0.024** (0.005)
(EBITDA/Total assets) _{i,t-1}		-0.146** (0.037)	-0.146** (0.037)		0.019** (0.005)	0.019** (0.005)
(Book debt/Total assets) _{i,t-1}		-0.265** (0.029)	-0.266** (0.029)		-0.048** (0.004)	-0.048** (0.004)
R ²	0.08	0.20	0.21	0.48	0.51	0.51
Number of firms	3,459	3,459	3,459	3,446	3,446	3,446
Number of firm-years	36,042	36,042	36,042	35,584	35,584	35,584

*,** coefficient estimate is statistically distinct from 0 at the 5 and 1 percent, respectively

Table 6, Panel B
The Effect of Obtaining a Bank Loan Rating on Real Outcomes

	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable:	Acq _{it} /Assets _{i,t-1}	Acq _{it} /Assets _{i,t-1}	Acq _{it} /Assets _{i,t-1}	Cash growth _{it}	Cash growth _{it}	Cash growth _{it}
Loan rating _{it}	0.015*	0.014*	0.018**	0.008*	0.004	0.007
	(0.007)	(0.007)	(0.008)	(0.004)	(0.004)	(0.004)
Loan rating _{it} *Loan junk rated _{it}			-0.010			-0.008
			(0.015)			(0.008)
Loan rating _{it} *Unrated _{i,1994}	0.070**	0.073**	0.018	0.003	0.005	-0.005
	(0.014)	(0.014)	(0.018)	(0.009)	(0.009)	(0.010)
Loan rating _{it} *Unrated _{i,1994} *Loan junk rated _{it}			0.089**			0.020
			(0.028)			(0.016)
Q _{i,t-1}		0.004**	0.004**		0.035**	0.035**
		(0.000)	(0.000)		(0.002)	(0.002)
Cash flow _{it} /Total assets _{i,t-1}		0.009	0.009		0.097**	0.097**
		(0.006)	(0.006)		(0.016)	(0.016)
(EBITDA/Total assets) _{i,t-1}		0.012*	0.011*		-0.078**	-0.078**
		(0.005)	(0.005)		(0.016)	(0.016)
(Book debt/Total assets) _{i,t-1}		-0.056**	-0.056**		0.048**	0.048**
		(0.005)	(0.005)		(0.012)	(0.012)
R ²	0.08	0.16	0.16	0.01	0.09	0.09
Number of firms	3,450	3,450	3,450	3,459	3,459	3,459
Number of firm-years	34,496	34,496	34,496	36,074	36,074	36,074

*,** coefficient estimate is statistically distinct from 0 at the 5 and 1 percent, respectively

Table 7**Comparing Outcomes in the Year that Loan Rating Is Obtained with Highest Outcome before 1995**

This table compares the increase in debt, asset growth, and cash acquisitions in the year the firm obtains a loan rating with the highest annual increase in the respective outcome for the same firm in the years from 1990 through 1994. More specifically, I replicate the firm fixed effects regression specifications with all control variables listed in Tables 3 and 6, and compare the residual from the year the loan rating is obtained to the highest residual for the same firm in any year between 1990 and 1994. The figures show that a given firm experiences a larger increase in debt, asset growth, and cash acquisitions in the year it obtains a loan rating relative to the year in which it has the largest increase in these same variables before loan ratings are available.

	Firms unrated in 1994		Firms unrated in 1994 & first loan junk rated	
	(1) Highest value from 1990-1994	(2) Year loan rated	(3) Highest value from 1990-1994	(4) Year loan rated
Δ debt/lagged assets _{it}	0.08	0.18**	0.08	0.24**
Asset growth _{it}	0.16	0.23	0.15	0.29*
Acq _{it} /Assets _{i,t-1}	0.04	0.07*	0.04	0.09**

*,** statistically distinct from highest value from 1990-1994 at the 5 and 1 percent, respectively

Table 8**Could Firms Have Obtained Public Debt in Absence of Loan Ratings?**

This table compares the size and age (years since IPO) of firms with public debt ratings in 1994 versus firms that lack public debt ratings in 1994 and subsequently obtain a loan rating. Averages in columns (1) and (2) are for all firms, whereas averages in columns (3) and (4) are for junk-rated firms. Medians are reported in brackets.

	All firms		Junk rated firms	
	(1) Publicly rated in 1994	(2) Not rated in 1994 and subsequently obtained loan rating	(3) Publicly rated in 1994	(4) Not rated in 1994 and subsequently obtained loan rating
Total assets	6,019 [2090]	1,929** [772]	1,861 [717]	895** [428]
Firm age	26 [29]	17** [12.5]	18 [12]	15* [10]

*,** statistically distinct from average for publicly rated in 1994 firms at the 5 and 1 percent, respectively

Table 9**Do Firms Always Use Debt to Fund Cash Acquisitions and Asset Growth, Regardless of Obtaining a Loan Rating?**

This table presents coefficient estimates from firm fixed effects regressions relating the book debt to total assets ratio at firm i in year t to the firm i 's cash acquisitions and asset growth at year t . In particular, it examines whether firms always use debt to fund acquisitions and asset growth, regardless of whether the firms obtains a bank loan rating. The regression specification includes all control variables in column (2) of Table 3. All regressions include year indicator variables interacted with 1-digit SIC industry codes; standard errors are clustered at the firm level.

Dependent variable:	(1) Debt to assets ratio _{it}	(2) Asset growth _{it}
Asset growth _{it}	0.006 (0.004)	
Asset growth _{it} *Bank loan rating obtained in this year _{it} *Unrated _{i,1994}	0.107** (0.013)	
Acquisitions _{it} /Assets _{i,t-1}		0.204** (0.013)
Acquisitions _{it} /Assets _{i,t-1} *Bank loan rating obtained in this year _{it} *Unrated _{i,1994}		0.201** (0.039)
R ²		
Number of firms	3,459	3,450
Number of firm-years	36,042	34,496

*,** coefficient estimate is statistically distinct from 0 at the 5 and 1 percent, respectively

Table 10
Financial and Real Outcomes After Bank Loan Rating is Obtained

This table presents coefficient estimates from firm fixed effects regressions relating financial and real outcomes at firm i in year t to firm i obtaining a bank loan ratings in year t , and after firm i obtains a bank loan rating. The regression specification reported in column (1) also includes all control variables in column (2) of Table 3, and the regression specification columns (2) and (3) include all control variables in column (2) of Table 6. All regressions include year indicator variables interacted with 1-digit SIC industry codes; standard errors are clustered at the firm level.

Dependent variable:	(1) Debt to assets ratio _{it}	(2) Asset growth _{it}	(4) Acq _{it} /Assets _{i,t-1}
Bank loan rating obtained in this year _{it}	0.006 (0.007)	0.082** (0.023)	0.016* (0.007)
After bank loan rating obtained _{it}	-0.008 (0.009)	-0.005 (0.012)	-0.005 (0.003)
Bank loan rating obtained in this year _{it} *Unrated _{i,1994}	0.105** (0.013)	0.202** (0.045)	0.072** (0.014)
After bank loan rating obtained _{it} *Unrated _{i,1994}	0.079** (0.014)	-0.080** (0.021)	-0.007 (0.005)
R ²	0.63	0.20	0.14
Number of firms	3459	3459	3453
Number of firm-years	39608	39608	37837

*,** coefficient estimate is statistically distinct from 0 at the 5 and 1 percent, respectively

Appendix Table
Classification of Lenders in LPC's Dealscan

This table presents a sample of lenders in LPC's Dealscan, and how I classify these lenders into categories.

Domestic commercial banks

Bank of New York
 Credit Suisse First Boston
 National City
 Northern Trust
 Bank One
 JPMorganChase
 Webster Bank
 Seattle First National
 BankBoston
 Suntrust
 First National Bank of Maryland
 Firststar
 Bank of Oklahoma
 Citigroup

Foreign commercial banks

Industrial Bank of Japan
 Banca di Roma
 BNP Paribas
 Royal Bank of Scotland
 Credit Agricole
 Toronto Dominion
 National Australia
 Bank Hapoalim
 Allied Irish

Investment banks

Goldman Sachs
 Morgan Stanley
 Bear Stearns
 Lehman Brothers

Financing companies

Foothill
 Heller Financial
 Congress Financial

Non-bank institutional investors

Police Officers Pension System Of The City Of Houston
 Robert Fleming & Co Ltd
 Mountain CLO Trust
 European American
 PAM Capital Funding
 Reliastar Financial Corp
 Reliastar Life Insurance Co
 KZH Holding Corp IV
 Rural Telephone Finance Cooperative
 Canpartners Investments IV LLC
 Keyport Life Insurance Co
 North American Senior Floating Rate Fund
 Sankaty Advisors LLC
 ORIX Leveraged Finance [fka Orix Business Credit]
 Riviera Funding LLC
 Stein Roe & Farnham
 Fidelity & Guaranty Life Insurance Co
 SRF Trading Inc
 Harch Capital
 Pilgrim Fund
 Mackay Shields Offshore Hedge Fund
 Pilgrim Prime
 FC CBO Ltd
 Prime Income
 Sequils-Cumberland I LLC
 Highland Capital
 Muirfield Trading LLC
 Debt Strategies Fund III
 Stein Roe Floating Rate Ltd
 Capital Business Credit
 SunAmerica Life Insurance Co
 Hartford Life Insurance Co
 Archimedes Funding LLC
 United of Omaha Life Insurance
 PPM Spyglass Funding Trust
 Pimco Advisors
 Pilgrim Senior Income Fund