

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

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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. The introduction of bank loan ratings leads to an increase in the use of debt by firms that obtain a rating, and also increases in firms' asset growth, cash acquisitions, and investment in working capital. Consistent with a causal effect of the ratings, the increase in debt usage and investment is concentrated in the set of borrowers who are of lower credit quality and do not have an issuer credit rating before 1995. A loan-level analysis demonstrates that previously unrated borrowers who obtain a loan rating gain increased access to the capital of less-informed investors. The results suggest that third-party debt certification has real effects on firm investment policy. (*JEL* G31, G32, G34, G21)

Can third-party rating agencies affect 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 agencies in the US, but organizations such as Dun & Bradstreet and Equifax also provide credit scores for private businesses. Djankov, McLiesh, and Shleifer (2007) show 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,

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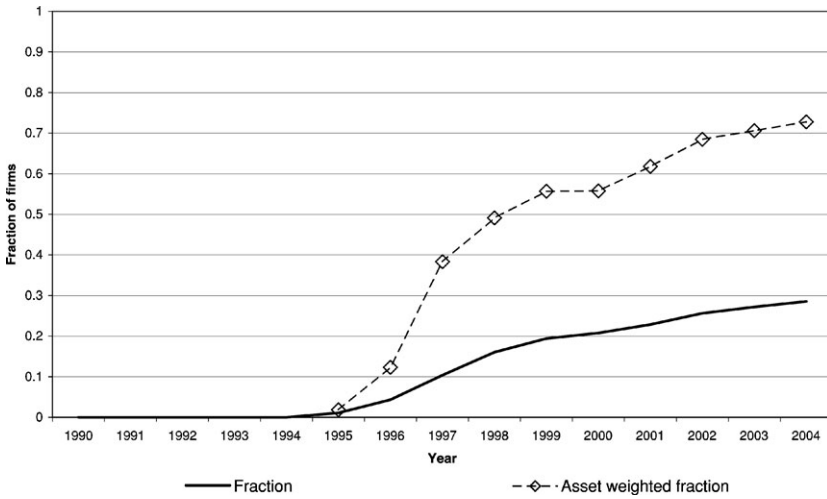


Figure 1

Fraction of firms that ever obtain a loan rating by year. The sample includes all publicly listed firms that exist in 1994 through 1996.

and helps explain why banks typically hold part of the loans they originate (see Sufi, 2007). Unlike a bank, a third-party rating agency does not hold the debt of the borrowers they certify, and relies on reputation alone when providing certification services. The key empirical question I seek to answer 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 US 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 Web site 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.

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. As Figure 1 demonstrates, by 2004, almost 30% of public firms that existed in 1995 had obtained a loan rating and over 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.

The empirical analysis is motivated by a theoretical framework in the spirit of 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 loan ratings. I assume that loan ratings reduce the total certification cost paid by borrowers. With this assumption, the framework predicts that borrowers who obtain loan ratings gain access to the capital of less-informed investors, and are therefore able to raise more debt financing. In turn, borrowers’ increased access to capital leads to an increase in investment.

In order to empirically evaluate this framework, I first examine the ex ante characteristics of firms that obtain a loan rating. I focus, in particular, on firms that do not have public debt before 1995 and subsequently obtain a loan rating by 1998. The findings suggest that the introduction of loan ratings in 1995 offered this particular set of firms a unique opportunity to obtain third-party debt certification. More specifically, as of 1994, these firms are in the middle of the size and firm age distribution, being smaller and younger than firms that already have access to public debt markets, but larger and older than firms without public debt that do not subsequently obtain a loan rating. In addition, these firms are smaller and younger in the year prior to obtaining the loan rating than firms in the year prior to initially accessing public debt markets. Given prior evidence that firm age and firm size are important determinants of whether firms are able to access public debt markets (Faulkender and Petersen, 2006), these results suggest that the smaller and younger firms that obtain loan ratings would have been less likely to access public debt markets if loan ratings had not been introduced.

In the second set of results, I examine whether the introduction of loan ratings increases firms’ use of debt and firm investment. Identifying the causal impact of loan ratings is difficult given that firms *choose* whether or not to obtain a loan rating after their introduction in 1995. 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 help 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 and outcomes would have to explain *changes* in outcomes *for the same firm* before and after obtaining the loan rating. 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 two-digit SIC industry indicator variables. The latter set of indicator variables captures any general trends over time in industry-specific investment opportunities.

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, I exploit the fact that some of the firms that obtain a loan rating already have an issuer credit rating before loan ratings are introduced, while other firms do not have an issuer credit rating. As the first set of results suggests the latter group is a particularly compelling treatment group, given that they would have been less likely to access public debt markets in the absence of the introduction of loan ratings. 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 worse) should benefit more from third-party debt certification.

Using this empirical strategy, the evidence suggests that the introduction of loan ratings increases the supply of available debt financing. Firms that obtain a loan rating experience an increase both 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 issuer credit rating before the introduction of loan ratings. For example, unrated firms that obtain a loan rating experience an increase in their leverage ratio by 0.11 more than rated firms that obtain a loan rating, which is 40% 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.

While existing research finds that issuer credit ratings are associated with higher leverage ratios (Faulkender and Petersen, 2006), a unique contribution of this article is to document the exact channel through which third-party ratings increase the availability of debt finance. More specifically, the evidence suggests that loan ratings allow borrowers to expand the set of creditors beyond domestic commercial banks toward less-informed investors, such as foreign banks and nonbank institutional investors. A loan-level analysis shows that the average firm's first rated loan has 4.5 more lenders on the syndicate compared to the previous unrated loan by the same firm. In particular, the increase in the number of lenders is driven by an increase in the number of foreign banks and nonbank institutional investors on the syndicate; these relatively less-informed creditors account for almost 60% of the increase in the number of lenders on a firm's first rated loan. A nonbank institutional investor is 13% more likely to be a syndicate member on a firm's first rated loan relative to the firm's previous

unrated loan. The evidence is consistent with the model by Boot, Milbourn, and Schmeits (2006), who argue that credit ratings are critical to attract funds from investors without specialized monitoring or screening skills.

In the final set of results, I show that the introduction of bank loan ratings has real effects. More specifically, firms without an issuer credit rating in 1995 that subsequently obtain a loan rating experience a doubling of both asset growth and cash acquisitions relative to their respective means. While the loan ratings do not affect capital expenditures, they do lead to a slight increase in investment in working capital. The increase in asset growth, cash acquisitions, and working capital is particularly strong among borrowers who do not have a previous issuer credit rating and have their initial loan rated BB+ or worse. These findings suggest that loan ratings affect the allocation of credit in the economy: the borrowers who have the most to gain from certification by a third-party credit rating agency are precisely the borrowers who experience the largest increases in investment.

Overall, the results are in line with the hypothesis that loan ratings afford informational-opaque borrowers increased access to the capital of uninformed investors. In turn, this increased access leads to more investment. Alternative omitted variables, such as demand shocks, are difficult to reconcile with these patterns—they cannot explain why lower-quality unrated borrowers experience the sharpest increase in real outcomes. In the last section of the article, I show that the effect of obtaining a loan rating on leverage ratios and investment is significantly larger than the effect of firms' obtaining either an issuer credit rating or an unrated syndicated loan.

This article makes contributions to three areas of existing research. First, it contributes to a growing body of research on the importance of information asymmetry in the syndicated loan market, which represents over \$3.5 trillion of debt financing (Dennis and Mullineaux, 2000; Lee and Mullineaux, 2004; Ivashina, 2005; Moerman, 2005; Sufi, 2007). The paper by Mullineaux and Yi (2006) is the only existing paper, to my knowledge, that examines syndicated bank loan ratings in any context. They find that loan rating downgrades are associated with drops in equity prices. This article 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 investment.

Second, this article contributes to an increasing body of literature that argues that the supply of debt financing is an important determinant of capital structure and investment (Leary, 2005; Faulkender and Petersen, 2006; Tang, 2006). Faulkender and Petersen find that firms with issuer credit ratings have higher leverage ratios, and that firms increase leverage in the year in which they obtain an issuer credit rating. Tang exploits Moody's decision to further refine credit ratings in 1982, and finds that upgraded borrowers issue more debt and increase investment relative to downgraded borrowers. This article adds to this line of research by focusing on bank loan ratings, which represent one of the most

important rating innovations in the last 15 years. In addition, this article is the first to document that ratings lead to an increase in available debt financing from less-informed creditors, such as noncommercial bank institutional investors and foreign banks.

Finally, this article is related to the literature on the importance of banks in the macroeconomy (Bernanke, 1983; Bernanke, Lown, and Friedman, 1991; Kashyap, Stein, and Wilcox, 1993). In the last 15 years, banks have increasingly shed the credit risk of loans they originate through securitizations, credit default swaps, and syndications (Loutskina, 2005; Loutskina and Strahan, 2005; Schuermann, 2004). 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. This article shows that the introduction of bank loan ratings has played an important role in disintermediation trends, as they have increased the ability of banks to syndicate corporate loans to noncommercial bank institutional investors and foreign banks.

The rest of this article is outlined as follows. Section 1 provides background on loan ratings and details the data used in the empirical analysis. Section 2 presents the theoretical framework. Sections 3 and 4 present results, and Section 5 concludes.

1. Loan Ratings: Background and Data

1.1 Background

In March and December of 1995, respectively, 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 (Dennis and Mullineaux, 2000; Sufi, 2007). The syndicated loan market is one of the largest sources of corporate finance worldwide, with over \$3.5 trillion of syndicated loans originated annually. A syndicated loan is a loan made to a firm jointly by more than one financial institution. 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, 2007). Pieces of the loan may trade in the secondary loan market (see Moerman, 2005, for a 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 nonbank institutional investors to participate in the market. As Bavaria (2002, p. 3) notes,

These [nonbank 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.

In addition, an *American Banker* (1996, p. 17) article¹ reports that "The increase [in the prevalence of bank loan ratings] underscores efforts by commercial banks and their corporate customers to cater to the growing number of institutional investors who want a piece of the bank loan syndication market. Standard & Poor's ratings . . . are used by the investor community to evaluate debt." The fact that nonbank institutional investors helped spur the creation of syndicated loan ratings helps support the notion that the introduction of loan ratings was supply-driven. While many anecdotes suggest that rating agencies introduced loan ratings as a response to increased willingness to supply financing by institutional investors, there is little evidence that loan ratings were a response to increased borrower demand for financing.

The evidence suggests that 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. As noted earlier, a large body of empirical research on syndicated loans documents the problems associated with information asymmetry in this market. The rating agencies claim that a loan rating can help to reduce these problems:

[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' (Bavaria, 2004, p. 2).

A borrower without a previous security rated by the rating agency goes through a two-step rating process.² First, a borrower is assigned an *issuer credit rating*, which measures the pure risk of default, and focuses solely on the

¹ I thank an anonymous referee for pointing me to this article.

² This process describes S&P's rating procedure. Moody's procedure is similar.

overall creditworthiness of the issuer. Second, the *loan rating* focuses on both 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 issuer credit rating; as Bavaria (2005, p. 23) 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 issuer credit rating—if holders of the syndicated loan can expect 100% recovery rates in case of default.³

The borrower decides whether or not to obtain a 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 one 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 point for the first \$1 billion, and 0.5 basis points thereafter. In addition, a borrower with no previous issuer credit rating from S&P must pay an initial \$50,000 fee. Finally, any borrower with an issuer credit rating must pay a \$39,000 annual fee to maintain the rating.

A final note concerns whether firms choose to obtain a loan rating, or whether the loan rating agency assigns a rating regardless of a request by the firm. When loan ratings were introduced, S&P provided them only at the request of the borrower, whereas Moody’s sometimes rated loans regardless of whether a borrower requested the rating (*American Banker*, 1996). As I discuss below, the most problematic identification issue is that borrowers choose to obtain a loan rating, and this choice may be correlated with increases in unobservable investment demand. Given that a rating agency most likely has less information on the unobservable investment opportunities of the borrower than the borrower itself, it is beneficial in terms of identification if rating agencies assigned loan ratings without the borrower’s permission. Regardless, all results presented below are robust to the complete exclusion of loans rated only by Moody’s.

1.2 Data and summary statistics

1.2.1 Data. The main data set used in this article 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, and the sample period covers firms from 1990 through 1998. I supplement the Compustat data with data on the universe of initial syndicated bank loan ratings; these data have been graciously provided by Moody’s and S&P. The final data set covers 3407 firms from 1990 through 1998, for a total of 25,538

³ Beginning in December 2003, S&P introduced *recovery ratings*, which are on a scale of 1+ to 5, that measure expected default recovery.

firm-year observations. Over 15% of the firms in the sample obtain a loan rating at some point after the inception of the program in 1995.

I examine firms only through 1998 for two reasons. First, almost 75% of the firms that obtain their initial loan rating between 1995 and 2004 obtain the rating by 1998 (523 out of 746). In other words, the main impact of the loan rating programs was realized shortly after their introduction. Second, the empirical analysis rests on the assumption that loan ratings represent an exogenous and previously unavailable service for firms. For firms that wait until 1999 or later to obtain a loan rating, it is difficult to assert that loan ratings exogenously provided a previously unavailable service. All core results are robust to an alternative sample period of 1990 through 1997 or 1990 through 1999.

The rest of this section provides more detail on the sample construction. Using Compustat, I begin with the universe of publicly traded nonfinancial US businesses with strictly positive assets in existence between 1990 and 1998. 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 that one-year lagged values of key financial items for these observations represent values for the firms while they are privately held. The resulting sample includes 7030 firms (39,046 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. I focus only on firms that are in existence immediately before and immediately after the introduction of 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 3407 firms, and I include all firm-years for these firms with available data from 1990 to 1998 (25,538 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 1200 borrowers to a Compustat firm. For the sample of Compustat firms with the restrictions mentioned above, I am able to match 803 borrowers who obtain a bank loan rating from Moody's or S&P or both between 1995 and 2004.⁴ Out of these 803 borrowers, 57 borrowers obtained a loan rating after

⁴ There are almost 400 borrowers who 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.

ceasing to be a publicly traded corporation. I investigate these borrowers, and find that the grand majority obtained a loan rating either after being acquired by a private equity firm or after emerging as a private company following a bankruptcy. Finally, I augment the 1990–1998 Compustat sample with the loan rating data, which leaves a sample of 523 firms that obtained a loan rating between 1995 and 1998.

The data from Moody's and S&P also contain 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 identical to public bond 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 data 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 (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 earnings before interest, taxes, depreciation, and amortization (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 [(item 14 + item 18)/data 6]. Finally, in the investment regressions, capital expenditures (item 128) and cash portion of acquisitions (item 129) are scaled by lagged total assets. I refer to the cash portion of acquisitions as “cash acquisitions” throughout. Investment in working capital is defined as the change in net working capital assets [(item 4 – item 10 – (item 5 – item 34))] 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 4.2.2 employs data from Loan Pricing Corporation's (LPC's) Dealscan. In order to find loans by firms in the sample, I begin with the sample of 344 borrowers who did not have a credit rating as of 1994 and subsequently obtained a loan rating by 2004. 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 to assess whether I can identify, for a given firm, a new loan or an amendment to an

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.

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 334 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 1990 up to and including the first rated loan.⁵ I am able to find loans for 161 of the 213 borrowers. I include only loans to borrowers who have Compustat data available, and only loans made from 1990 to 1998. The final sample includes 508 deals for these 161 borrowers.

1.2.2 Issuer credit ratings and bank loan ratings. An important data-clarification issue concerns the difference between issuer credit ratings and bank loan ratings, and how they are related. Compustat item 280 represents the issuer credit rating of a borrower, which is S&P's opinion of the issuer's overall creditworthiness. S&P provides an issuer credit rating for every borrower for which it rates any security, regardless of whether the security is registered with the SEC. As mentioned above, when S&P assigns a new loan rating, they also assign an issuer credit rating. Consistent with this practice, almost 90% of the firms in the sample that do not have an issuer credit rating before they obtain a loan rating from S&P subsequently obtain an issuer credit rating in the same year they obtain the loan rating. In other words, *item 280* becomes nonmissing in the same year as a firm obtains a loan rating.

Extant research uses the existence of item 280 as a proxy for whether the firm has outstanding public debt (Faulkender and Petersen, 2006; Cantillo and Wright, 2000). Before 1995, this proxy is accurate given that S&P primarily rated instruments that were registered with the SEC. However, as the above information suggests, after the introduction of loan ratings in 1995, the existence of item 280 is no longer an accurate proxy for whether the firm has outstanding public debt. A firm that obtains a loan rating also obtains an issuer credit rating even if the firm does not issue public debt.⁶ After 1995, if a firm obtains an issuer credit rating without having obtained a loan rating, it has likely issued publicly registered debt securities during the fiscal year.

Throughout this article, I follow the extant literature and classify firms with an issuer credit rating before 1995 as firms with outstanding public debt. After 1995, I classify a firm as having outstanding public debt if the firm obtains an issuer credit rating *without* having obtained a loan rating.

1.2.3 Summary statistics. Figure 1 plots the increase in the fraction of firms that obtain a bank loan rating from 1995 through 2004. The rise is most dramatic from 1995 through 1998, when the fraction of firms rises from 0 to almost 20%. By the end of 2004, almost 30% of firms have obtained a bank loan rating. The

⁵ In unreported robustness analyses, I have found similar results when isolating the sample to 1994 through 1998.

⁶ Examples of firms that obtain an issuer credit rating (and loan rating) but do not issue new public debt are Stryker Corp in 1998, Arch Coal in 1998, and Kennametal in 1998.

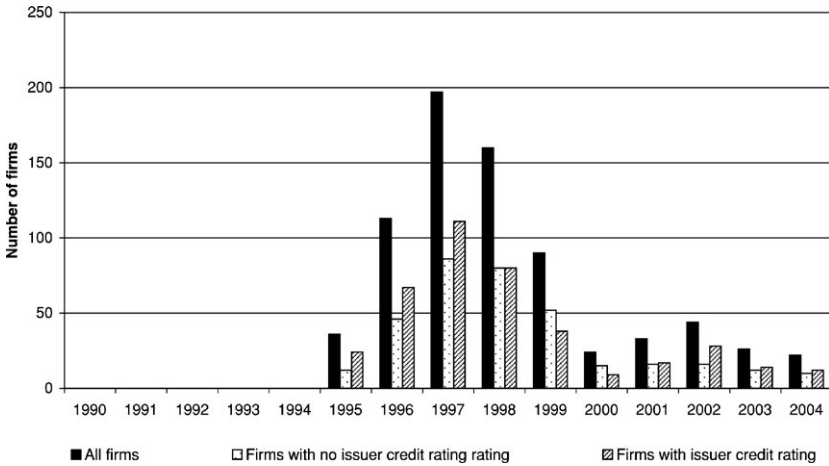


Figure 2

Number of firms that obtain their initial bank loan rating by year and by whether the firm has an issuer credit rating as of 1994.

rise in the asset-weighted fraction of firms with a bank loan rating is even more dramatic. From 1995 to 1998, the asset-weighted fraction of firms that obtained a bank loan rating went from 0 to 50%. By the end of 2004, over 70% of the assets of public firms in the 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 US 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 plots by year the number of firms that obtained their initial bank loan rating. It also splits firms by their issuer 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. 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 the years directly after their introduction in 1995. Figure 2 also suggests that both unrated and rated borrowers obtained loan ratings in almost equal proportion.

Table 1 presents summary statistics for the unbalanced panel of 3407 firms from 1990 to 1998 (25,538 firm-year observations). Overall, 15% of the firms that are ever in the sample obtain a bank loan rating from Moody's, S&P, or both by 1998. Slightly more firms obtained their initial bank loan rating from Moody's than S&P (7.0% versus 5.4%). About 3% 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

Table 1
Summary statistics

	Mean	Standard deviation	
Fraction that obtain loan rating	0.154	0.361	
Initial rating by Moody's	0.070	0.169	
Initial rating by S&P	0.054	0.225	
Initial rating by both	0.029	0.256	
Unrated before 1995	0.069	0.253	
Initial loan junk rated	0.085	0.278	
Both unrated and initial loan junk rated	0.049	0.215	
<i>Summary statistics</i>	Mean	Median	Standard deviation
<i>Conditional on obtaining loan rating</i>			
Amount of first rated loan (\$M)	678	300	1,590
Number of tranches of first rated loan	1.478	1.000	0.853
Loan rating (1 = AAA, 2 = AA, etc.)	4.475	5.000	0.957
Amount of first rated loan/total assets	0.284	0.216	0.241
<i>Full sample</i>			
Total assets (\$M)	1,547	142	7,802
Sales (\$M)	1,364	160	5,457
Firm age (years since IPO)	17	12	13
Book debt to assets	0.241	0.219	0.208
Market-to-book ratio (Q)	1.896	1.392	1.544
Tangible assets to total assets	0.334	0.272	0.240
EBITDA/total assets	0.093	0.124	0.180
Cash flow/assets _{$t-1$}	0.062	0.091	0.188
Advertise/assets	0.009	0.000	0.024
R&D/assets	0.083	0.000	0.346
<i>Outcomes</i>			
Asset growth	0.151	0.068	0.388
Capital expenditures/assets _{$t-1$}	0.080	0.055	0.083
Cash acquisitions/assets _{$t-1$}	0.027	0.000	0.087
Change in NWC/assets _{$t-1$}	0.018	0.008	0.103

This table contains summary statistics for an unbalanced panel of 3407 firms from 1990 through 1998 (25,538 firm-years).

agencies to determine the quarter 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 have no issuer 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 of firms that obtain a loan rating. Initially rated loans in the sample are in aggregate \$355 billion and are \$55 billion for firms that were unrated in 1994 and subsequently obtained a junk-rated loan.

Table 1 also presents summary statistics for the initial loans rated by Moody's and S&P. The average (median) loan is \$678 million (\$300 million) and represents 28% (22%) 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 issuer credit ratings in 1994 have an issuer credit rating of BB+ or worse. Finally, Table 1 presents

summary statistics for Compustat variables, which coincide with statistics in other studies.

2. 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 level 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. 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, p. 669) 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.”

I informally extend this framework to analyze how the introduction of loan ratings affects borrowers. First, I assume that the duties of the informed lender can be split into two different functions, both of which involve costs. The first function is *certification*. 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. The second function is *monitoring*. 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 progressing poorly.

The second assumption I make is 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 or S&P provides certification for the borrower at a cheaper cost than certification by the lead arranger alone. While the empirical analysis does not attempt to discern *why* Moody’s and S&P

provide certification at lower cost, I offer three reasons here.⁷ First, consistent with a regulatory advantage, many institutional investors are restricted either internally or externally from investing in securities that are not rated by Moody's or S&P. Second, 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. Third, a lead arranger on 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 rating 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, p. 1) specifically pitch their product as important to investors that "need ratings or do not have large internal credit staffs." Bavaria (2002) argues that nonbank institutional investors "must have ratings" in order to participate in the syndicated loan market. In addition, a large body of empirical evidence supports this assumption by showing that credit ratings contain new information that affects market prices (Hand, Holthausen, and Leftwich, 1992; Mullineaux and Yi, 2006; Tang, 2006).⁸

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 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 straightforward. 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 that certifies the borrower at lower cost, the borrower relies less on informed lender capital.⁹

⁷ See Boot, Milbourn, and Schmeits (2006) for theoretical research on this subject.

⁸ Mullineaux and Yi (2006) find that loan rating *downgrades* affect stock prices, but they do not find any evidence that loan rating *initiations* affect stock prices. This is partly due to the fact that loan ratings are typically initiated simultaneously with changes in investment patterns or acquisitions, which makes it difficult to measure the unique effect of the rating itself on stock prices.

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.

Table 2
Who obtains a bank loan rating?

	Firm classification			
	(1) Obtains loan rating and has no public debt (<i>N</i> = 234)	(2) Does not obtain loan rating and has no public debt (<i>N</i> = 2495)	(3) Obtains loan rating and has public debt (<i>N</i> = 289)	(4) Does not obtain loan rating and has public debt (<i>N</i> = 389)
Total assets (\$M)	897	230*	5769*	4784*
Sales (\$M)	796	222*	4839*	4267*
Firm age (years since IPO)	15	12*	27*	27*
Market-to-book ratio (Q)	1.709	1.969*	1.456*	1.513*
Book debt to assets	0.277	0.189*	0.350*	0.324*
Tangible assets to total assets	0.365	0.293*	0.430*	0.461*
EBITDA/total assets	0.139	0.066*	0.140	0.134

This table presents 1994 mean characteristics of firms by whether they obtain a loan rating subsequent to 1995 and whether they have public debt as of 1994. Whether a firm has public debt in 1994 is measured by whether the firm has an S&P issuer credit rating as of 1994 (Compustat item 280). * indicates statistically distinct from column 1 at the 5% level.

This leads to a lower total certification cost, allowing more capital from uninformed investors and thus a higher investment rate. Therefore, the framework suggests that increased borrower investment as a result of debt certification is financed primarily by less-informed lenders.

3. Who Obtains a Bank Loan Rating?

In this section, I examine the ex ante characteristics of the firms that obtain bank loan ratings between 1995 and 1998. This analysis serves two purposes. First, it contributes to existing research that describes the firms that obtain debt ratings. Second, it isolates the set of firms for which loan ratings represent a unique opportunity to obtain third-party debt certification. It therefore serves as a preview of the identification strategy employed in Section 4, where I attempt to demonstrate a causal effect of loan ratings on leverage and investment.

Table 2 presents summary statistics for four groups of firms, measured as of 1994. Column 1 focuses on the key treatment group in the empirical analysis: the set of borrowers who do not have public debt in 1994 and subsequently obtain a loan rating between 1995 and 1998. These firms lie in the middle of the distribution on almost every characteristic. They are larger, older, and more levered than firms without public debt that do not obtain a loan rating (Column 2), and they are smaller, younger, and less levered than firms that have public debt in 1994 (Columns 3 and 4).

One of the key determinants of the value of loan ratings is the question of whether borrowers who obtain loan ratings would have been able to access public debt markets if loan ratings were not introduced. Results in Table 2, together with the findings of Faulkender and Petersen (2006), suggest that borrowers without public debt in 1994 that obtain loan ratings between 1995 and 1998 would have been less likely to be able to access public debt markets

Table 3**Comparing firms in year before obtaining loan rating to firms in year before obtaining public debt**

	(1) Year before obtaining loan rating (<i>N</i> = 193)	(2) Year before initially obtaining public debt prior to 1995 (<i>N</i> = 188)	(3) Year before initially obtaining public debt 1995 or after (<i>N</i> = 181)
Total assets (\$M)	1228	1992*	1776
Total sales (\$M)	1061	1540*	1561*
Firm age (years since IPO)	15	16	17

This table compares the size and age of firms in the year before obtaining a loan rating (conditional on not having public debt) and the year before obtaining public debt. Before 1995, the year a firm initially obtains public debt is the year it obtains an issuer credit rating. For 1995 and after, the year a firm initially obtains public debt is the year it obtains an issuer credit rating without having previously or concurrently obtained a loan rating. Assets and sales are measured in 2000 dollars. * indicates statistically distinct from column 1 at the 5% level.

in the absence of loan ratings. In particular, Faulkender and Petersen suggest that size and firm age are two critical determinants of whether firms are able to access public debt markets. Size is critical because there are large fixed costs associated with bond issues relative to bank debt, and bond amounts must be sufficiently large for market liquidity. Firm age is critical given the necessity of information in the market, and the fact that the market knows more about firms with longer track records. The statistics in Table 2 demonstrate that unrated firms that obtain loan ratings are significantly smaller and younger than the average firm with access to public debt markets.

Table 3 presents a sharper test of the hypothesis that firms that obtain loan ratings would not have been able to access public debt markets if loan ratings were not introduced. It compares the size (total assets and total sales) and age of firms in the year before they obtain a loan rating to the size and age of firms in the year before they first obtain an issuer credit rating. As discussed earlier, for firms that obtain an issuer credit rating before 1995, the first year they obtain the rating proxies well for the first year they access public debt markets. After 1995, the first year in which a firm obtains an issuer credit rating without having obtained a loan rating proxies well for the first year the firm accesses public debt markets. As Table 3 shows, firms in the year prior to accessing public debt markets are larger and older than firms in the year prior to obtaining a loan rating. This is true both for firms that initially access public debt markets before 1995 (Column 1 versus Column 2) and for firms that initially access public debt markets without obtaining a loan rating after 1995 (Column 1 versus Column 3). The differences in total assets and total sales are statistically significant at the 1 to 15% level, although the differences in firm age are not statistically significant at a reasonable confidence level.

The results in Tables 2 and 3 suggest that the introduction of loan ratings offered a unique opportunity for younger and smaller firms to obtain third-party debt certification. Based on their size and age, these firms would have been less likely to access public debt markets in the absence of loan ratings. The analysis in Section 4 assesses whether this unique opportunity enabled firms to access

the capital of less-informed investors, and whether these firms subsequently experienced changes in leverage and investment.

An additional question raised by Table 2 is why the smallest and youngest firms are unlikely to obtain a loan rating. There are three possible explanations. First, there is a large fixed cost component to the pricing of a loan rating, which suggests that the loan ratings are relatively expensive for firms with smaller financing needs. Second, the framework by Holmstrom and Tirole (1997) suggests that borrowers with small investment projects rely on informed capital alone. According to this explanation, smaller borrowers do not have investment projects that are large enough to require uninformed capital. Finally, Dennis and Mullineaux (2000), Lee and Mullineaux (2004), and Sufi (2007) suggest that lead arrangers must hold large percentages of syndicated loans when borrowers are informational-opaque. These findings suggest that very young and small firms may be unable to access the capital of uninformed lenders, even with third-party debt certification. Distinguishing among these three explanations is material for future research.

4. Bank Loan Ratings, Leverage, and Investment

4.1 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, 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:

$$y_i = \alpha + \beta \times \text{LoanRate}_i + \varepsilon_i. \quad (1)$$

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: $E[\varepsilon_i | \text{LoanRate}_i] = 0$.

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. 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

$$y_{it} = \sum_{t=1991}^{t=1998} \alpha_t \times SIC_i + \sum_{i=1}^N \alpha_i + \beta \times LoanRate_{it} + \delta' X_{it} + \varepsilon_{it}. \quad (2)$$

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.

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 and investment 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 the result of loan ratings. The second element is the inclusion of a comprehensive set of control variables that partial out the effect of firm demand for investment or debt financing. When the outcome of interest is leverage ratios, I include in the matrix X_{it} the market-to-book ratio, asset tangibility, firm size, firm cash flow, and measures of the firm's advertising and research and development expenses.¹⁰ When the outcome of interest is investment, I include in the matrix X_{it} cash flow, lagged cash flow, and Tobin's Q . In addition, in all specifications, I include SIC two-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 two-digit industry in the same year.

¹⁰ In unreported results, I follow Faulkender and Petersen (2006) and include a measure of asset volatility and stock returns computed using market data. The results are almost identical with the inclusion of the two variables. I do not include these variables, because they are missing for almost 10% of observations.

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 2. The idea is straightforward: among the 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 predicts that the effect of a loan rating on investment and leverage should be lower for firms that have an existing issuer credit rating. Consistent with this prediction, the results in Section 3 suggest that the introduction of loan ratings in 1995 offered a unique opportunity for unrated borrowers to access the capital of uninformed investors. Second, firms of lower credit quality would have a more difficult time obtaining debt financing from uninformed lenders in the absence of a third-party ratings institution. This follows directly from the theoretical framework outlined in Section 2: the aggregate amount of lead arranger capital places a strict restriction on total available financing when the returns from certification and monitoring are highest. Given that certification and monitoring are especially important when there is a high probability of default, lower credit quality borrowers should benefit more from certification by Moody's or S&P. I use the initial loan rating as a measure of credit quality.¹¹

4.2 Bank loan ratings and debt financing

4.2.1 Loan ratings and debt. Table 4 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 4 includes only the observations up to and including the year that the loan rating is obtained. (The effects of a loan rating after the year of initial rating are explored in Table 9.) The coefficient estimates in Column 1 show that firms that obtain a bank loan rating experience statistically significant increases in net debt issuance. In terms of magnitude, a firm with a credit rating in 1994 experiences an increase in net debt issuance of 0.046 and a firm without a credit rating in 1994 experiences an increase of 0.205 ($0.046 + 0.159$). The specification reported in Column 2 includes control variables that Rajan and Zingales (1995) and Faulkender and Petersen (2006) show are correlated with the use of debt by firms. The coefficient estimates when the control variables are included are almost identical. Column 3 reports 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 net debt issuance 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 net debt issuance. In other words, among firms that are both unrated and of

¹¹ I also use an implied junk rating based on lagged firm characteristics (firm size and firm EBITDA scaled by assets) with qualitatively similar results (unreported).

Table 4
The effect of obtaining a bank loan rating on availability of debt

	Dependent variable					
	$(\Delta \text{ debt/lagged assets})_{it}$			Debt to assets ratio $_{it}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Loan rating $_{it}$	0.046** (0.017)	0.043** (0.017)	0.035* (0.017)	-0.002 (0.009)	0.002 (0.009)	0.006 (0.009)
Loan rating $_{it}$ *Loan junk rated $_{it}$			0.019 (0.036)			-0.009 (0.018)
Loan rating $_{it}$ *Unrated $_{i,1994}$	0.159** (0.032)	0.186** (0.031)	0.043 (0.041)	0.121** (0.017)	0.105** (0.017)	0.018 (0.017)
Loan rating $_{it}$ *Unrated $_{i,1994}$ *Loan junk rated $_{it}$			0.198** (0.061)			0.130** (0.030)
Market-to-book ratio $_{i,t-1}$		0.012** (0.002)	0.012** (0.002)		-0.003 (0.002)	-0.003 (0.002)
Tangible assets to total assets $_{i,t-1}$		-0.004 (0.028)	-0.005 (0.028)		0.220* (0.023)	0.219* (0.023)
$\ln(\text{total assets}_{i,t-1})$		-0.061** (0.005)	-0.062** (0.005)		0.031** (0.005)	0.031** (0.005)
EBITDA/total assets $_{i,t-1}$		0.107** (0.018)	0.109** (0.018)		-0.152** (0.019)	-0.152** (0.019)
Advertising/total assets $_{i,t-1}$		0.173 (0.113)	0.170 (0.112)		0.018 (0.122)	0.015 (0.122)
R&D/total assets $_{i,t-1}$		0.022* (0.009)	0.022* (0.009)		-0.022** (0.009)	-0.022** (0.009)
R^2	0.09	0.12	0.12	0.70	0.72	0.72
Number of firms	3,407	3,407	3,407	3,407	3,407	3,407
Number of firm-years	25,001	25,001	25,001	25,001	25,001	25,001

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 . The dependent variable in columns 1 through 3 is the change in debt levels from $t-1$ to t scaled by the book value of assets at $t-1$, and the dependent variable in columns 4 through 6 is the book debt to assets ratio. All regressions include year indicator variables interacted with two-digit SIC industry codes. Standard errors are clustered at the firm level. * Coefficient estimate is statistically distinct from 0 at the 5 and 1% levels, respectively.

lower credit quality, there is a larger increase in net debt issuance when the firm obtains a loan rating.

Columns 4 through 6 of Table 4 present the estimates where the dependent variable is the book debt to book assets ratio.¹² 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 0.12 in the leverage ratio, which is 41% (0.12/0.29) 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 4 suggest that firms are able to raise significantly more debt in the year they obtain a loan rating relative to previous years. This is consistent with the theoretical framework in Section 3, which suggests that a

¹² I also replicate all leverage specifications replacing the book debt to book assets ratio with the book debt to market value of assets ratio. The results, which are unreported, are qualitatively similar.

Table 5
Loan deal summary statistics

	Mean	Median	Standard deviation
Amount of loan deal (\$M)	212	109	336
Number of tranches on loan deal	1.547	1.000	0.906
Number of term loan tranches	0.512	0.000	0.810
Interest rate spread (bp + LIBOR)	161	134	113
Number of lenders on deal	6.541	4.000	7.633
Domestic banks	4.037	3.000	3.819
Foreign banks	2.252	1.000	3.871
Nonbank institutional investors	0.248	0.000	1.169
Fraction of uninformed lenders	0.252	0.200	0.274

This table presents summary statistics on loan deals obtained by borrowers who do not have an issuer credit 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, only borrowers whom I am able to match to LPC's Dealscan, and only borrowers for whom lagged book debt, market to book ratio, EBITDA, tangible assets, and total assets from Compustat are nonmissing. The sample includes 508 loan deals by 161 borrowers, and the loan deals are originated between 1990 and 1998. A *domestic bank* is any domestic commercial bank, finance company, or investment bank.

reduction in certification costs provides greater access to external financing. 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. Overall, these results suggest that loan ratings have important effects on capital structure.

4.2.2 Loan ratings, loan characteristics, and syndicate composition. The section above demonstrates that borrowers who 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 5 presents summary statistics for the sample of 508 loan deals by 161 borrowers. These are borrowers who are unrated in 1994 and subsequently obtain a loan rating, and the sample includes all loans by these firms from 1990 through 1998. The average (median) loan amount is \$212 million (\$109 million), and the average (median) interest rate spread is 161 (134) basis points above LIBOR.

In terms of the syndicate size and composition, there is an average (median) of 6.5 (4) lenders providing funds on deals. I classify each lender into one of five groups: domestic commercial banks, foreign commercial banks, investment banks, finance companies, and nonbank institutional investors. Domestic commercial banks, investment banks, and finance companies are combined into one group labeled "domestic banks." These banks are considered informed lenders—lenders who have specialized screening and monitoring skills. A few foreign banks with a large presence in the US through subsidiaries are classified as domestic banks (e.g., ABN AMRO). Given that the classification is not based on SIC codes (which are unavailable in Dealscan), the Appendix provides a sample of financial institutions and the groups in which they are classified.

As Table 5 shows, domestic banks are the most common type of lenders in this market, with an average of 4.0 domestic banks in the syndicate. Foreign banks represent on average 2.3 lenders in syndicates, and nonbank institutional investors represent only 0.25 lenders. These averages demonstrate that the syndicated loan market is primarily a market in which banks with specialized monitoring and screening skills participate.

The results presented in Table 6 describe how a firm's first rated loan compares to its previous unrated loans. Each cell in Table 6 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 coefficient estimates, and Column 2 reports first difference estimates. All specifications include year indicator variables and control for the firm's lagged book debt ratio, EBITDA to assets ratio, tangible assets ratio, the market-to-book ratio, and the natural logarithm of total assets. 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 70% increase in the size of the loan, and the first difference estimate implies a 47% 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. Although the loan size increases by almost 70%, the interest rate spread does not show a statistically significant change.

Rows 5 through 11 of Table 6 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 5.8 in the fixed effects specification, and 4.5 in the first difference specification. Moreover, rows 7 and 8 show that between 50 and 60% of the increase in the number of lenders represents increases in foreign bank and nonbank institutional investor participation. Row 9 shows that there is a statistically significant increase in the fraction of uninformed lenders in the syndicate, where the first difference coefficient estimate is significant at the 10% level. The fixed effects coefficient estimates in rows 10 and 11 imply that a foreign bank or nonbank institutional investors is 26 and 16% more likely to be on the first rated loan syndicate, relative to previous loans by the same firm.

The evidence in Table 6 suggests that loan ratings increase the pool of investors that are willing to hold part of a syndicated loan. In particular, the results suggest that borrowers gain increased access to less-informed investors, such as foreign banks and nonbank institutional investors.¹³

¹³ Table 5 also implies a simultaneous increase in the number of term loan tranches and the number of nonbank 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

Table 6
The effect of a loan rating on loan characteristics and syndicate composition

	Dependent variable	Specification type	
		(1) Fixed effects Loan rated	(2) First differences Loan rated
(1)	ln(loan amount)	0.698** (0.155)	0.469** (0.166)
(2)	Number of tranches on loan deal	0.606** (0.196)	0.468** (0.175)
(3)	Number of term loan tranches	0.442* (0.174)	0.305 (0.161)
(4)	Interest rate spread (bp + LIBOR)	12 (15)	7 (18)
(5)	Number of lenders on deal	5.796** (1.370)	4.454** (1.300)
(6)	Number of domestic banks	2.579** (0.666)	2.036** (0.609)
(7)	Number of foreign banks	2.428** (0.695)	1.715** (0.688)
(8)	Number of institutional investors	0.771* (0.328)	0.684** (0.234)
(9)	Fraction of uninformed lenders	0.119** (0.042)	0.076 (0.046)
(10)	Indicator for foreign bank	0.260** (0.077)	0.212** (0.079)
(11)	Indicator for institutional investor	0.163** (0.056)	0.133* (0.056)

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 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 includes all loans by borrowers from 1990 up to and including borrower's first rated loan. All regressions include year indicator variables, and controls for the borrowers' lagged book debt ratio, EBITDA to assets, asset tangibility, natural logarithm of total assets, and the market-to-book ratio. The sample size for each regression is 508 loan deals by 161 borrowers. * and ** coefficient estimate is statistically distinct from 0 at the 5 and 1% levels, respectively.

4.3 Bank loan ratings and investment

The results presented in Tables 4 through 6 suggest that loan ratings increase the availability and use of debt financing. Table 7 examines whether firms increase investment as a result. More specifically, it examines the impact of the availability of bank loan ratings on asset growth, capital expenditures, cash acquisitions, and working capital investment. The coefficient estimates in Column 1 show that firms with an issuer credit rating before the introduction of loan ratings experience an increase in asset growth of 0.078 when they obtain a loan rating. Unrated firms experience a statistically significantly larger increase in asset growth of 0.274 ($0.078 + 0.196$). Coefficient estimates from regressions using capital expenditures, cash acquisitions, and working capital investment are presented in columns 4, 7, and 10, respectively. The coefficient estimates on bank loan ratings suggest a similar pattern for capital expenditures

credit. After the firm obtains a loan rating and nonbank intermediaries are willing to lend, they usually participate in term tranches.

Table 7
The effect of obtaining a bank loan rating on real outcomes

Dependent variable	Panel A					
	(1)	(2)	(3)	(4)	(5)	(6)
		Asset growth _{<i>it</i>}			CapEx _{<i>it</i>} /Assets _{<i>i,t-1</i>}	
Loan rating _{<i>it</i>}	0.078* (0.031)	0.058 (0.030)	0.058 (0.033)	0.007 (0.004)	0.004 (0.004)	0.007 (0.004)
Loan rating _{<i>it</i>} *Loan junk rated _{<i>it</i>}			-0.002 (0.062)	0.002 (0.007)		-0.008 (0.008)
Loan rating _{<i>it</i>} *Unrated _{<i>i,1994</i>}	0.196** (0.061)	0.230** (0.058)	0.064 (0.081)		0.007 (0.006)	-0.004 (0.007)
Loan rating _{<i>it</i>} *Unrated _{<i>i,1994</i>} *			0.239* (0.116)			0.019 (0.012)
Loan junk rated _{<i>it</i>}						
Q _{<i>i,t-1</i>}		0.111** (0.005)	0.111** (0.005)		0.012** (0.001)	0.012** (0.001)
Cash flow _{<i>it</i>} /Total assets _{<i>i,t-1</i>}		0.536** (0.052)	0.536** (0.052)		0.028** (0.006)	0.028** (0.006)
(EBITDA/Total assets) _{<i>i,t-1</i>}		-0.208** (0.048)	-0.208** (0.048)		0.022** (0.006)	0.022** (0.006)
(Book debt/Total assets) _{<i>i,t-1</i>}		-0.332** (0.042)	-0.333** (0.042)		-0.065** (0.007)	-0.065** (0.007)
R ²	0.13	0.24	0.24	0.53	0.56	0.56
Number of firms	3,407	3,407	3,407	3,388	3,388	3,388
Number of firm-years	25,001	25,001	25,001	24,646	24,646	24,646

Dependent variable	Panel B					
	(7)	(8)	(9)	(10)	(11)	(12)
		Acq _{<i>it</i>} /Assets _{<i>i,t-1</i>}			Δ Net working capital _{<i>it</i>} /Assets _{<i>i,t-1</i>}	
Loan rating _{<i>it</i>}	0.014 (0.009)	0.012 (0.009)	0.015 (0.010)	0.001 (0.006)	-0.003 (0.006)	-0.007 (0.006)
Loan rating _{<i>it</i>} *Loan junk rated _{<i>it</i>}	0.067** (0.018)	0.071** (0.018)	-0.006 (0.019)	0.013 (0.010)	0.020* (0.010)	0.008 (0.012)
Loan rating _{<i>it</i>} *Unrated _{<i>i,1994</i>}			0.004 (0.023)			0.006 (0.015)
Loan rating _{<i>it</i>} *Unrated _{<i>i,1994</i>} *			0.100** (0.035)			0.016 (0.020)
Loan junk rated _{<i>it</i>}						
Q _{<i>i,t-1</i>}		0.005** (0.001)	0.005** (0.001)		0.014** (0.001)	0.014** (0.001)
Cash flow _{<i>it</i>} /total assets _{<i>i,t-1</i>}		0.006 (0.009)	0.007 (0.009)		0.244** (0.013)	0.244** (0.013)
(EBITDA/total assets) _{<i>i,t-1</i>}		0.014 (0.008)	0.014 (0.008)		-0.067** (0.013)	-0.067** (0.013)
(Book debt/total assets) _{<i>i,t-1</i>}		-0.075** (0.008)	-0.076** (0.008)		-0.079** (0.011)	-0.079** (0.011)
R ²	0.19	0.20	0.20	0.07	0.17	0.17
Number of firms	3,397	3,397	3,397	3,325	3,325	3,325
Number of firm-years	23,855	23,855	23,855	24,227	24,227	24,227

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* ($[A_t - A_{t-1}]/A_{t-1}$), columns 4 through 6 relate capital expenditures at *t* scaled by assets at *t* - 1, columns 7 through 9 relate cash acquisitions at *t* scaled by assets at *t* - 1, and columns 10 through 12 relate the change in net working capital at time *t* scaled by assets at *t* - 1 to the existence of a loan rating at *t*. All regressions include year indicator variables interacted with two-digit SIC industry codes; standard errors are clustered at the firm level. *, ** indicate coefficient estimate is statistically distinct from 0 at the 5 and 1% levels, respectively.

and working capital investment, but the coefficients are not statistically distinct from 0 at a reasonable confidence interval. Unrated firms that obtain a bank loan rating experience an increase in cash acquisitions of 0.081 (0.014 + 0.067), 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.

Columns 2, 5, 8, and 11 of Table 7 present coefficient estimates from regressions that include a variety of investment opportunity control variables. Although these variables are statistically powerful predictors of investment, they do 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—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 two-digit SIC industry codes. These interaction terms control for any technology or demand shifts that occur over time in the firm's two-digit industry.

Columns 3, 6, 9, and 12 of Table 7 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, cash acquisitions, and working capital investment is larger for firms that are both unrated before 1995 and subsequently obtain a loan rating of BB+ or worse.

Consistent with the theoretical framework discussed in Section 3, the results in Table 7 suggest that the introduction of bank loan ratings increases outcomes for borrowers who 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. 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 firms have better unobservable investment opportunities.

4.4 Robustness and extensions

4.4.1 Obtaining public debt or an unrated loan. The results presented above suggest that loan ratings increase the availability of debt financing and also 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 the introduction of loan ratings has a real effect. In this section, I conduct two counterfactual analyses with the goal of answering 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?

Panel A of Table 8 examines net debt issuance, leverage ratios, asset growth, and cash acquisitions, and compares the coefficient estimates on loan ratings

Table 8
Obtaining loan rating, issuer credit rating, and unrated loan

	(1) (Δ Debt/ Lagged assets) $_{it}$	(2) Debt to assets ratio $_{it}$	(3) Asset growth $_{it}$	(4) Acq $_{it}$ / Assets $_{it-1}$
Panel A: Obtaining loan rating versus obtaining credit rating without loan rating				
(a) Loan rating $_{it}$	0.051** (0.017)	0.004 (0.009)	0.067* (0.029)	0.013 (0.009)
(b) Loan rating $_{it}$ * Unrated $_{i, 1994}$	0.185** (0.031)	0.105** (0.017)	0.228** (0.058)	0.071** (0.018)
(c) Credit rating, without loan rating $_{it}$	0.147** (0.017)	0.041** (0.008)	0.172** (0.028)	0.024** (0.008)
Difference: (a) + (b) - (c)	0.089 ⁺⁺	0.068 ⁺⁺	0.123 ⁺	0.060 ⁺⁺
Panel B: Obtaining loan rating versus obtaining unrated loan				
(a) Loan rating $_{it}$	0.052** (0.017)	0.007 (0.009)	0.071* (0.030)	0.020* (0.009)
(b) Loan rating $_{it}$ * Unrated $_{i, 1994}$	0.198** (0.031)	0.108** (0.017)	0.249** (0.058)	0.076** (0.018)
(c) Unrated loan $_{it}$	0.011* (0.005)	0.009* (0.004)	0.016 (0.009)	0.013* (0.003)
(d) Unrated loan $_{it}$ * Unrated $_{it}$	0.053** (0.007)	0.013** (0.005)	0.083** (0.013)	0.025** (0.004)
Difference: (a) + (b) - (c) - (d)	0.186 ⁺⁺	0.093 ⁺⁺	0.221 ⁺⁺	0.058 ⁺⁺

This table presents two counterfactual analyses. Panel A reports coefficient estimates from firm fixed effects regressions relating outcomes to an indicator for whether the firm obtains a loan rating and an indicator for whether the firm initially obtains a credit rating without a loan rating. Panel B reports coefficient estimates from firm fixed effects regressions relating outcomes to an indicator for whether the firm obtains a loan rating and an indicator for whether the firm obtains an unrated loan. The regression specification reported in column 1 also includes all control variables in column 2 of Table 4, and the regression specifications reported in columns 2–4 include all control variables in column 2 of Table 7. All regressions include year indicator variables interacted with two-digit SIC industry codes; standard errors are clustered at the firm level. *, ** indicate that coefficient estimate is statistically distinct from 0 at the 5 and 1% levels, respectively. ⁺, ⁺⁺ indicate that difference in coefficient estimates is statistically distinct from 0 at the 5 and 1% levels, respectively.

to the coefficient estimate on whether a firm initially obtains an issuer credit rating. The underlying assumption of this analysis is that a reasonably close counterfactual to firms that initially obtain a loan rating are firms that initially obtain an issuer credit rating *without* obtaining a loan rating. These results are comparable to the results in Faulkender and Petersen (2006), where leverage is regressed on an indicator of whether a borrower has an issuer credit rating. The specifications in columns 1 and 2 include all control variables listed in Table 4, and the specifications in columns 3 and 4 include all control variables listed in Table 7.

The results suggest a significantly larger increase in net debt issuance, leverage, asset growth, and cash acquisitions for unrated firms that obtain a loan rating relative to unrated firms that obtain an issuer credit rating without obtaining a loan rating. These results together with the results in Tables 2 and 3 are consistent with the following two claims. First, the results in Tables 2 and 3 suggest that unrated firms that obtain loan ratings would not have been able to access public debt markets in the absence of the loan rating. Second, even if they would have been able to access public debt markets, the results in Table 8 suggest that the increase in outcomes would have been lower if they obtained public debt without obtaining a loan rating.

The estimates reported in Panel A of Table 8 provide a more conservative magnitude assessment than do the results in Tables 4 and 7. The estimates suggest that firms increase their leverage by 0.07 more, or 22% evaluated at the mean, when obtaining a loan rating relative to obtaining an issuer credit rating without a loan rating. A firm increases asset growth and cash acquisitions by 41 and 80% more than it would have had it obtained an issuer credit rating without a loan rating, respectively.

Panel B of Table 8 conducts a similar counterfactual exercise that examines firms that obtain unrated loans. I measure whether a firm obtains an unrated loan in a given year using LPC's Dealscan. Although Dealscan omits smaller loans and loans to smaller firms, this sample bias should bias coefficients on the unrated loan indicator variable *upwards*, as only the largest loans for a given borrower are likely to make it into the data set. In other words, any sample bias will tend to cause the coefficient estimate on the unrated loan indicator to be higher, which would make it more difficult to show that rated loans uniquely lead to increases in outcomes. The evidence in Panel B suggests that unrated firms that obtain a rated loan experience significantly larger increases in all outcomes relative to unrated firms that obtain unrated loans. The differences in Panel B are even larger than in Panel A: for example, unrated firms that obtain a rated loan in a given year experience asset growth that is 0.22 more than do unrated firms that obtain an unrated loan in a given year. It is important to emphasize that all specifications in Table 8 include firm fixed effects. The coefficient estimates therefore imply that the same firm experiences much larger increases in outcomes when obtaining a rated versus an unrated loan.

4.4.2 Advancements in the loan sales market. An additional concern with the empirical strategy is that advancements in the secondary loan market occurred simultaneously with the introduction of loan ratings. For example, the Loan Syndication and Trading Association (LSTA) was founded in 1995 and certain trading conventions were introduced in 1996. The worry is that advancements in the secondary loan market are responsible for the trends documented above, as opposed to the introduction of loan ratings.

The evidence does not support this view. In fact, the major impact of the introduction of loan ratings was complete before the secondary loan market reached significant volumes. According to the LPC, the secondary loan market had aggregate volume of only \$80 billion in 1998. In contrast, the aggregate amount of all initially rated loans (both in and not in my final sample) from 1995 through 1998 was \$490 billion, which reflects the rapid adoption of loan ratings after their introduction in 1995. Even if one assumes that all the loans traded on the secondary market were initially rated loans, only 16% of initially rated loan amounts were traded on the secondary market in 1998. Consistent with this growth pattern, although the LSTA was founded in 1995, its coverage of secondary loan prices was limited until well after the introduction of bank loan ratings. For example, Gupta, Singh, and Zebedee (2006) report that only about

Table 9
Financial and real outcomes after bank loan rating is obtained

	Dependent variable		
	(1) Debt to assets ratio _{<i>it</i>}	(2) Asset growth _{<i>it</i>}	(3) Acq _{<i>it</i>} /Assets _{<i>i,t-1</i>}
Panel A: Short-run persistence (1990–1998)			
Bank loan rating obtained in this year _{<i>it</i>}	0.003 (0.009)	0.060* (0.029)	0.014 (0.009)
After bank loan rating obtained _{<i>it</i>}	−0.011 (0.011)	−0.016 (0.021)	0.004 (0.009)
Bank loan rating obtained in this year _{<i>it</i>} *Unrated _{<i>i,1994</i>}	0.103** (0.016)	0.230** (0.058)	0.070** (0.018)
After bank loan rating obtained _{<i>it</i>} *Unrated _{<i>i,1994</i>}	0.076** (0.018)	0.027 (0.045)	−0.003 (0.015)
Panel B: Long-run persistence (1990–2004)			
Bank loan rating obtained in this year _{<i>it</i>}	0.004 (0.008)	0.064* (0.028)	0.014 (0.009)
After bank loan rating obtained _{<i>it</i>}	−0.011 (0.011)	−0.024 (0.013)	−0.006 (0.004)
Bank loan rating obtained in this year _{<i>it</i>} *Unrated _{<i>i,1994</i>}	0.108** (0.016)	0.224** (0.056)	0.068** (0.017)
After bank loan rating obtained _{<i>it</i>} *Unrated _{<i>i,1994</i>}	0.073** (0.017)	−0.062** (0.023)	−0.007 (0.007)

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. Panel A includes observations up to and including 1998, and Panel B includes observations up to and including 2004. The regression specification reported in column 1 also includes all control variables in column 2 of Table 4, and the regression specifications in columns 2 and 3 include all control variables in column 2 of Table 7. All regressions include year indicator variables interacted with two-digit SIC industry codes; standard errors are clustered at the firm level. *, ** indicate that coefficient estimate is statistically distinct from 0 at the 5 and 1% levels, respectively.

100 loans were covered in the LSTA main database before November 1999 (see also Moerman, 2005). The timing of the introduction of loan ratings and the secondary loan market expansion suggests that the introduction of loan ratings preceded the development of the secondary loan market, and involved a large number of loans that were not traded. Even after 1998, Moerman (2006) finds a strong positive effect of a loan being rated at origination on the probability that a loan is traded in the secondary market. This suggests that loan ratings facilitate secondary market trading, not vice versa.

4.4.3 Persistence. How persistent are the increases in leverage and real outcomes for borrowers who obtain a loan rating? Table 9 documents how leverage and real outcomes change after the firm obtains the initial loan rating. Panel A uses the sample only through 1998, whereas Panel B examines long-run persistence by extending the analysis through 2004. In both panels, the third row of coefficients shows that the core results of Tables 4 and 7 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 $\times$ *Unrated* variable quantify the changes in leverage and real outcomes in the years after the loan rating is obtained. The short-run and long-run results suggest that the increase in leverage is persistent but decreases slightly; these results suggest that loan ratings lead to permanent increases in leverage ratios. Columns 2 and 3 of Panel A show that asset growth and cash acquisitions return to their preloan rating level in the years after the bank loan rating is obtained. In the long run (Panel B), the results suggest that asset growth declines relative to the preloan levels. Overall, these results suggest that a borrower who 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 preloan rating levels.

5. Conclusion

The findings suggest that third-party certification by rating agencies increases the availability of debt financing for firms, and increases investment and acquisitions. 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 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 use this framework to empirically explore the introduction of loan ratings by Moody's and S&P in 1995. My first set of results suggests that loan ratings afford unrated firms a unique opportunity to obtain third-party debt certification. The second set of results shows that the firms that obtain loan ratings experience significant increases in the availability of debt financing, asset growth, and cash acquisitions. The identification strategy exploits the cross-sectional pattern of firms that choose to obtain loan ratings, and shows that the results are strongest among previously unrated, lower credit quality borrowers. These results support the hypothesis that the introduction of loan ratings caused an expansion in the supply of debt financing for these firms. Several robustness tests imply that the increases in outcomes would not have been as large had loan ratings not been available. Finally, I document a channel through which third-party debt ratings expand the supply of debt financing: I find evidence that less-informed nonbank institutional investors and foreign banks are more willing to serve on syndicates when a firm obtains a loan rating.

Research presented here points to two directions for future research. First, there are additional research avenues to examine the real effects of ratings. For example, 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. Also, 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 who obtain bank loan ratings. In addition, while the introduction of bank loan ratings in the US 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.

Second, there is a large and growing body of research documenting the importance of credit ratings in corporate policy (Faulkender and Petersen, 2006; Kisgen, 2006; Tang, 2006), but there is little empirical evidence on the precise mechanism by which ratings improve access to capital. In other words, why do ratings reduce certification costs and expand the base of creditors? Is it because of the information produced by rating agencies? Do agency problems within organizations of institutional investors make a rating necessary for investment? Is it due to holding requirements imposed by regulatory authorities? Answering these questions will likely necessitate detailed information on the securities held by institutional investors. An analysis of why many nonbank institutional investors must have ratings would offer valuable insight into the importance of rating agencies in the economy.

Appendix:
Classification of Lenders in LPC's Dealscan

Domestic commercial banks	Nonbank institutional investors
Bank of New York	Police Officers Pension System of the City of Houston
Credit Suisse First Boston	Robert Fleming & Co Ltd
National City	Mountain CLO Trust
Northern Trust	European American
Bank One	PAM Capital Funding
JPMorganChase	Reliastar Financial Corp
Webster Bank	Reliastar Life Insurance Co
Seattle First National	KZH Holding Corp IV
BankBoston	Rural Telephone Finance Cooperative
Suntrust	Canpartners Investments IV LLC
First National Bank of Maryland	Keyport Life Insurance Co
Firststar	North American Senior Floating Rate Fund
Bank of Oklahoma	Sankaty Advisors LLC
Citigroup	ORIX Leveraged Finance [aka Orix Business Credit]
Foreign commercial banks	Riviera Funding LLC
Industrial Bank of Japan	Stein Roe & Farnham
Banca di Roma	Fidelity & Guaranty Life Insurance Co
BNP Paribas	SRF Trading Inc
Royal Bank of Scotland	Harch Capital
Credit Agricole	Pilgrim Fund
Toronto Dominion	Mackay Shields Offshore Hedge Fund
National Australia	Pilgrim Prime
Bank Hapoalim	FC CBO Ltd
Allied Irish	Prime Income
	Sequils-Cumberland I LLC
	Highland Capital

(Continued)

Appendix:
(Continued)

Investment banks	Nonbank institutional investors
Goldman Sachs	Muirfield Trading LLC
Morgan Stanley	Debt Strategies Fund III
Bear Stearns	Stein Roe Floating Rate Ltd
Lehman Brothers	Capital Business Credit
	SunAmerica Life Insurance Co
Financing companies	Hartford Life Insurance Co
Foothill	Archimedes Funding LLC
Heller Financial	United of Omaha Life Insurance
Congress Financial	PPM Spyglass Funding Trust
	Pimco Advisors
	Pilgrim Senior Income Fund

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

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