BANK LOANS, BONDS, AND INFORMATION MONOPOLIES ACROSS THE BUSINESS CYCLE

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Abstract

The tradeoff between arm's-length debt and bank debt is an integral part of the modern theory of corporate finance. Arm's-length debt suffers from free rider problems that prevent monitoring of the borrower. By being more concentrated, bank debt overcomes this problem, but then the private information which the bank gains through monitoring allows it to hold up the borrower. In this paper, we seek empirical evidence for this informational "hold-up" effect through a novel approach. Since firms are typically in greater danger of failure during recessions, it follows that banks that have an exploitable information advantage should be able to raise their rates in recessions by more than is justified by borrower default risk alone. To test this, we compare the pricing of bank loans for bank-dependent borrowers with the pricing of bank loans for borrowers with access to public debt markets both in good and bad times, controlling for a number of loan- and firm-specific factors. We find that firms that have issued public bonds in the past tend to pay lower spreads on their bank loans, all else equal; similarly, spreads tend to rise in recessions. Nevertheless, the interaction between these two variables has a negative effect on loan pricing: firms that have previously borrowed in the public bond markets pay lower spreads during recessions, all else equal. This finding is robust to a number of loan- and firm-specific controls and to the use of instruments for public debt market access. Our findings suggest that, during recessions, banks do in fact charge higher rates to customers with limited outside funding options. Finally, we find these magnitudes to be economically significant.

1 Introduction

The tradeoff between arm's-length debt and bank debt is an integral part of the modern theory of corporate finance. As formulated by Rajan (1992), the pros and cons are as follows. Arm's-length debt suffers from free rider problems that prevent monitoring of the borrower. By being more concentrated, bank debt overcomes this problem, but then the private information which the bank gains through monitoring allows it to "hold up" the borrower – if the borrower seeks to switch to a new funding source, it is pegged as a lemon regardless of its true situation.[1] In this paper, we seek empirical evidence for this informational hold-up effect by contrasting the pricing of bank loans for bank-dependent borrowers with the pricing of bank loans for borrowers with access to public debt markets.

Previous work on this topic has focused on firms' choice of funding. Thus, a large literature has looked at whether firms that depend on banks seek one or more bank relationships, arguing that reliance on a single bank implies that the benefits of a single bank outweigh the informational costs, whereas reliance on multiple banks suggests the opposite. Empirical results in this area are mixed; we discuss some of this literature below.

In this paper, we take a different approach, focusing on how the pricing of bank loans varies across the business cycle for firms that are more or less dependent on private finance. We begin with Rajan's (1992) theoretical prediction that firms with a higher probability of failure should suffer more from informational hold-up problems; intuitively, such firms are riskier, making the lemons problem that leads to hold-up more significant. Since firms are typically in greater danger of failure during recessions, it follows that banks that have an exploitable information advantage should be able to raise their rates more in recessions than is justified by borrower default risk alone.

To test this, we compare bank loan spreads for bank-dependent borrowers with bank loan spreads for borrowers that have continuing access to public debt markets, controlling for a number of loan- and firm-specific factors. Our sample is drawn from the Loan Pricing Corporation's DealScan database. Since this database focuses on large loans which are often, though not always, syndicated, and since large firms presumably suffer less from hold-up problems than smaller ones, it should bias us against finding evidence of such monopolistic

[1] Rajan in turn builds on work by Diamond (1984), who models the monitoring advantages of bank loans over arm's-length debt, and Sharpe (1990), who models the informational hold-up aspect of bank loans.

loan pricing behavior. Furthermore, most of our results focus on firms that are also listed in Compustat, which requires that the firms have publicly traded equity – an even more stringent restriction. Nevertheless, we do find that, during recessions, banks raise their rates more for bank-dependent borrowers than for those with access to public bond markets. Further analysis suggests that much of this is due to informational hold-up effects rather than to greater risk of bank-dependent borrowers versus those with bond market access.

As one would expect, we consistently find that, all else equal, firms that have issued public bonds in the past tend to pay lower spreads on their bank loans, and that loan spreads rise in recessions. Spreads for firms that have previously borrowed in the public bond markets rise significantly less in recessions, however. This finding is robust to a number of loan- and firm-specific controls. The economic magnitudes are significant. In our base specification, recent public bond market access decreases loan spreads by 92 basis points on average; recessions raise loan spreads by 18 basis points for firms without bond market access, but only raise spreads for firms with market access by 4 basis points. Of course, firms with market access may simply be less risky borrowers than firms without such access, but even when we add controls for firm-specific risk, recessions raise spreads by 37 basis points for firms without market access and only 13 basis points for firms with market access.

We measure public bond market access in two different ways: first, whether the firm has *ever* borrowed in the public bond market, and whether the firm's most recent bond issue was in the public market (as opposed to a private placement). While these two measures yield similar results, coefficients are consistently larger for the second measure. Moreover, the spread the firm pays is higher the longer it has been since the firm's last public bond issue. These results are consistent with informational effects; firms that have not issued public bonds recently may no longer have access to the public bond market, a suspicion that is even stronger if the firm's last bond issue was a private placement.

Of course, one possible caveat to our results is that access to public bond markets is endogenous, depending on firm-specific variables. To correct for this, we reestimate our equations using instrumental variables for bond market access. Our results hold unchanged. The upshot is that we find evidence that suggests that, during recessions, banks do in fact charge significantly higher rates to customers with limited outside funding options. Since our study focuses on firms that are relatively large and have publicly-traded equity, this suggests

that smaller firms may face even higher costs from relying on bank finance.

Our paper is most closely related to the literature on the number of banks with which firms have relationships. Although the overall results of this literature are mixed, a few papers do suggest that the hold-up problem of Sharpe (1990) and Rajan (1992) is significant. If this problem is a concern, it is likely to be most costly for firms that have many growth opportunities that need funding, and so these firms should use more public debt. Conversely, if the hold-up problem is not an issue, the advantages of relationship lending should make bank debt more attractive for firms with greater growth opportunities. Houston and James (1996) examine the mix of bank debt and public debt for a sample of publicly-traded U.S. firms. They find that firms with a single bank relationship tend to rely less on bank debt as growth opportunities are higher, but the opposite is true for firms with multiple bank relationships. This is consistent with the notion that having multiple bank relationships mitigates the hold-up problem. Farinha and Santos (1999) examine Portuguese data and find that firms with greater growth opportunities, less liquidity, or greater bank dependence are more likely to switch to multiple bank relationships, all of which is consistent with reducing hold-up problems. For further references, see the surveys by Boot (2000) and Ongena and Smith (2000).

Our paper also adds to the literature that examines "bank channel" effects for business cycle transmission and monetary policy. This literature typically focuses on how banks' liquidity and capital concerns lead them to exacerbate downturns by reducing the amount of credit that they supply to borrowers. By contrast, our paper suggests that some of the tightening of credit may be opportunistic, as banks exploit a reduction in competition for some borrowers by charging higher rates.

The remainder of the paper is organized as follows. The next section presents the theoretical basis for our hypothesis. Section 3 presents our data sources and characterizes our sample. This section also presents our methodology. Section 4 discusses our results. Section 5 presents some robustness tests to our key results. Section 6 concludes.

2 Theory: Information Monopoly and Loan Pricing

As noted in the introduction, the theoretical basis for our paper comes from Rajan (1992). In part of his paper, Rajan examines competition between an informed "inside" bank that is already lending to a risky firm and an uninformed "outside" bank that is not currently lending

to the firm. The inside bank knows whether the firm will succeed or fail, whereas the outside bank only knows that the firm will succeed with probability q. In this situation, if the outside bank makes a bid to lend to the firm, it faces the "Winner's Curse": since the inside bank only bids for the loan when the firm will succeed, the outside bank is more likely to win the loan when the firm is failing. The greater this risk, the less aggressively it competes for the loan, allowing the inside bank to earn higher average profits. Effectively, the inside bank's informational advantage gives it limited monopoly power over the borrower, allowing it to hold up the borrower.

More specifically, Proposition 3 of Rajan (1992) shows that the probability that the outside bank makes a bid to lend to the firm is increasing in q, and that the expected profits of the inside bank are decreasing in q. The higher is q, the lower is the risk that the outside bank will make a loan to a failing firm, so the outside bank bids more aggressively; the inside bank retains the loan less often, and earns a lower risk-adjusted loan rate when it does. We emphasize "risk-adjusted" because the lower rate is not simply a reflection of the firm's lower default probability; even after adjusting for expected losses, the bank earns a lower expected profit. It follows that firms that are perceived by uninformed lenders to have higher chances of failure – lower q – get less competitive lending rates and pay higher average lending rates, even after adjusting for their higher risk of default. This applies regardless of whether or not the inside bank or outside bank ends up winning the loan: even if the outside bank wins, it has bid less aggressively, so its risk-adjusted lending rate is higher on average. Since most firms tend to perform worse in recessions, perceived q should fall in recessions, increasing the monopoly power of inside banks and thus the rates that borrowers pay.

Applying the model to the reality of loans reported in DealScan requires a slight augmentation of Rajan's model. The model implies that risk-adjusted lending rates should be higher in recessions, assuming that inside banks are always fully informed about the borrower's situation whereas outside banks are uninformed. We need to address the difference between bank-dependent firms and firms with access to public bond markets. Intuitively, inside banks should have a smaller information advantage for firms with access to public bond markets. These firms have a broader investment base, are usually rated by a major credit rating agency, and produce public signals not only through their rating but through the market price of their bonds and through analysis by their underwriters and bond market analysts.

To incorporate this in a simple way, we assume that outside lenders have a probability ϕ of knowing just as much about the firm as an inside bank (i.e., knowing whether the firm will succeed or fail), and a probability $1 - \phi$ of only knowing that the firm will succeed with probability q. It is easy to show that, whenever outside lenders have as much knowledge as the inside bank, Bertrand competition causes the inside bank's profits to drop to zero, so that it breaks even on average. Whenever outside lenders are uninformed, the results are as in Rajan (1992), where inside banks earn informational rents that decrease with the firm's perceived chance of success q. The upshot is that average risk-adjusted lending rates are decreasing in ϕ.

Assuming that ϕ is higher for firms with access to public bond markets, it follows that, all else equal, risk-adjusted lending rates should be lower for such firms than for similar firms that are bank-dependent. Moreover, since inside banks with an information advantage earn higher informational rents as q decreases, average risk-adjusted lending rates should increase more in recessions for bank-dependent firms (low ϕ) than for firms with public bond market access (high ϕ).

We can state these results as the following hypotheses.

Hypothesis 1: *controlling for other firm and loan characteristics, loan spreads should be lower for firms with public bond market access than for firms that do not have such access.*

Hypothesis 2: *controlling for other firm and loan characteristics, loan spreads should be higher in recessions than in expansions.*

Hypothesis 3: *controlling for other firm and loan characteristics, the increase in loan spreads during recessions should be lower for firms with public bond market access than for firms without such access.*

These three hypotheses form the basis of our empirical work. Of them, the most critical are Hypotheses 1 and 3, since these directly focus on the impact of having access to public debt markets. We now turn to the data and methodology we will use to test these hypotheses.

3 Data and Methodology

3.1 Data

The data for this project came from five different data sources: the Loan Pricing Corporation's (LPC) Dealscan database, the Securities Data Corporation's (SDC) Domestic New Bond Issuances database, Compustat, the Center for Research on Securities Prices's (CRSP) stock prices database, the Stock-Watson recession indexes, and Compustat.

We used LPC's Dealscan database to identify the firms that borrowed from banks and when they did so. This database contains mainly information on syndicated loans, but it also reports information on some non-syndicated loans.[2] It goes as far back as the beginning of the 1980s. In the first part of that decade the database has a somewhat reduced number of entries but its comprehensiveness has increased steadily over time. We also used this database to obtain information first on individual loans, including its spread, maturity, seniority status, purpose and type; second on the borrower, including its sector of activity, legal status (private or public firm), and its size as proxied by the firm sales; and finally on the lending syndicate, including the number of banks in the syndicate.

We considered SDC's Domestic New Bond Issuances database to identify which firms in our sample have issued bonds prior to borrowing in the syndicated loan market. This database contains information on the bonds issued in the United States by American nonfinancial since 1970. We also relied on this database to identify some features of the bonds issued by the firms in our sample, including the issuance date, whether they were privately placed, whether they where rated and this case what was their rating. Finally, we used the information in this database to identify the first time firms issued bonds and to measure the frequency that our firms have issued bonds over time.

We used Compustat to get information on firms' balance sheets. Because Compustat is dominated by firms that are publicly listed, whenever we want to control for firm characteristics which are captured in their balance sheets, other than sales, we have to exclude from our sample the loans borrowed by privately held firms. For this reason, we present our results first without considering information from Compustat and then including this information.

We used information from CRSP to link companies and subsidiaries that are part of

[2]See Dennis and Mullineaux (2000) for an extensive description of this database.

the same firm, and to link companies over time that went through, for example, mergers, acquisitions or name changes.[3] We then used these links to merge the LPC-SDC-Compustat databases in order to find out the financial condition of the firm at the time it borrowed from banks and if by that date the firm had already issued bonds. We also used CRSP to determine the firm age at the time it borrowed from banks and to compute our measures of stock price volatility. To compute the firm age we proxied the firm's year of birth by the year it first appeared in CRSP.

Finally, we relied on the Stock-Watson Experimental Coincident Recession Index to define recessions and expansions. This is a monthly index which measures the probability that the economy is in a recession. Because we wanted to identify important recessions, as opposed to just short periods of slow output growth, we identified recessions as any period of time of four (or more) consecutive quarters with a quarterly Stock-Watson index larger than the index's life-time mean (this index started in 1959). This resulted in three recessions during our sample period. The first recession started in 1981:2 and ended in 1983:1. The second recession went from 1990:3 to 1991:2. The final recession started in 2000:4 and ended in 2002:1.[4] According to this classification there are 67 quarters of expansion and 14 quarters of recession during our sample period 1982:1-2002:4. Still according to this definition, 85% of the 43,166 loans in our sample were issued in expansions and the remaining 15% were issued in recessions.

[3]The process we used to link LPC, SDC, and Compustat can be summarized as follows. The CRSP data was first used to obtain CUSIPs for the companies in LPC that did not have CUSIPs. We did this through a name-matching procedure. With a CUSIP, LPC could then be linked to both SDC and Compustat, which are CUSIP based datasets. We proceed by using the PERMCO variable from CRSP to group companies across CUSIP, since that variable tracks the same company across CUSIPs and ticker changes. Since the original link from LPC to CRSP was based on name (LPC was also linked to Compustat and SDC directly on name to obtain more CUSIPS), there were some cases of multiple "cross-links" between companies. These issues arose due to name similarities, mergers over time, and subsidiary relationships. As a result, we had to determine which of our links were valid. We assigned a score to each link in our dataset pairs (LPC-SDC, LPC-Compustat) based on whether the link was "1 to 1" – no overlapping cross links and the name was a perfect match after cleaning up punctuation. We defined a scale 1 to 4, with 4 satisfying neither of these criteria. To be conservative, we excluded from our sample all of the links in the two databases that had a score equal to 4.

[4]It is worth noting that these recessions overlap with the three recessions that existed during our sample period according to the National Bureau of Economic Research Business Cycle Dating Committee.

3.2 Methodology

In order to test Hypotheses 1 through 3, we need to examine loan spreads and examine the impact of borrower access to public bond markets and of recessions, controlling for various borrowing firm and loan-specific characteristics. We, therefore, estimate the following model of the loan credit spreads:

$$\begin{aligned} LOANSPREAD &= c + \delta \cdot PUBONDACCESS + \zeta \cdot REC + \eta \cdot REC \cdot PUBOND\ ACCESS \\ &+ \psi_i \sum_{i=1}^{L} X_i + \nu_j \sum_{j=1}^{F} Y_j + \epsilon. \end{aligned} \tag{1}$$

Here $LOANSPREAD$ is the loan's spread over Libor at issue date; this is a standard measure of loan pricing. $PUBONDACCESS$ is a dummy variable that takes the value 1 if the firm has access to public bond markets as of the date of the loan; as we discuss below, we used two different definitions of this variable. REC is a dummy variable that takes the value 1 if there was a recession at this date. The X_i represent various loan-specific variables such as loan maturity, purpose, etc. which might be expected to affect the loan's credit risk and thus its spread. Similarly, the Y_j represent firm-specific variables such as firm size, profitability, etc. which might be expected to affect the loan's credit risk. Note that our three hypotheses are nested in this single equation: Hypothesis 1 is equivalent to δ being negative (firms with public market access pay lower spreads); Hypothesis 2 is equivalent to ζ being positive (recessions increase spreads); Hypothesis 3 is equivalent to η being negative (in recessions, spreads increase less for firms with public market access than for bank-dependent firms).

One objection to our methodology is that spreads reflect firm-specific credit risk, and it is possible that firms with public bond market access differ in risk from firms without such access. We control for this in two ways. The first is apparent from the estimation equation: we include controls that proxy for different aspects of credit risk. The second was alluded to in the introduction: since bond market access itself is likely to be endogenous, in part depending on unobservable risk factors, we later use instrumental variables to estimate $PUBONDACCESS$.

A critical part of our methodology is the definition of $PUBONDACCESS$. In our theory, this should reflect whether the firm currently has access to the public markets, in the sense that the firm can tap into a large number of reasonably well-informed investors. We have used at two different definitions to implement this. The first is the dummy variable $PBOND$,

which equals one if the firm in question has ever issued a public bond and zero otherwise. One difficulty with this measure is that, if the bond was issued some time ago, it is possible that the firm's circumstances have changed in a way that makes continued access to the bond market harder or impossible. Our second definition is given by the dummy variable $MRPBOND$, which equals one if the firm's most recent bond issue was public and zero otherwise; thus, $MRPBOND$ focuses on more recent access to the bond market. Our reported results focus on this second measure, but we discuss the first measure as well.

Note that we do not count privately placed bonds as a measure of public bond market access. We believe private placements are very different from public issues, reaching a smaller set of investors and thus not increasing informed competition as much as a public issue does. This is consistent with earlier work that considers private placements to be closer syndicated bank loans than to public bonds. We do investigate the impact of having access to private placements but not to public issues by including an additional dummy variable, $BOND$, which equals one if the firm has ever issued a bond and zero otherwise.

In some of our specifications, we break down the firms that have access to public bond markets by their rating, adding two dummies. The first equals one if the firm's bonds were rated below investment grade; the second equals one if the bonds were not rated at all.[5]

As noted, we also include a number of loan-specific and firm-specific controls that may affect a firm's risk. We begin by discussing the firm-specific variables that we use, since these are more likely to be exogenous to the loan rate that is set. Several of these variables are proxies for the risk of the firm. AGE is the firm's age in years. Older firms are typically better established and so less risky, so we expect this variable to have a negative effect on the loan spread. $ASSETS$ is the firm's real assets in millions of 1980 dollars, computed with the CPI deflator. Larger firms are usually better diversified across customers, suppliers, and regions, so again we expect this to have a negative effect on the loan spread.

We also include variables that proxy for the risk of the firm's debt rather than that of the overall business. $PROFMARGIN$ is the firm's profit margin (net income divided by sales). More profitable firms have a greater cushion for servicing debt. A more direct measure of the ability to service debt is $LINTCOVERAGE$, which is the log of interest coverage ratio

[5]We considered for this purpose the Moody's ratings. When the bond did not have one of these ratings but it had a rating from the S&P, we considered this rating instead.

(1+ EBITDA divided by interest expense) truncate at 0. Again, a higher interest coverage ratio should make the firm's debt less risky. $DEBTASSETS$ is the firm's leverage ratio (debt over total assets); higher leverage suggests a greater chance of default, so this should have a positive effect on spreads. $EARNVOL$ is the standard deviation of the firm's quarterly return on assets (net income divided by assets) over the last three years; this proxies for earnings risk, which should have a positive effect on spreads.

Another aspect of credit risk is losses to debt holders in the event of default. To capture this, we include several variables that measure the size and quality of the asset base that debt holders can draw on in default. $COLLATERAL$ is the firm's tangible assets – inventories plus plant, property, and equipment – as a fraction of total assets. Tangible assets lose less of their value in default than do intangible assets such as brand equity, so this should have a negative effect on spreads. $ADVERTISING$ is the firm's advertising expense divided by sales; this proxies for the firm's brand equity, which is intangible, so we expect this to have a positive effect on spreads. Similarly, $R\&D$ is the firm's research and development expense divided by sales, which also proxies for intangible assets; again, we expect this to have a positive effect on spreads. $NWCDEBT$ is the firm's net working capital (current assets less current liabilities) divided by total debt; this measures the liquid asset base, which again is less likely to lose value in default, so we expect this to have a negative effect on spreads. Finally, $MKTBOOK$ is the firm's market to book ratio, which proxies for the value the firm is expected to gain by future growth. Although growth opportunities are vulnerable to financial distress, we already have controls for the tangibility of book value assets. Thus, this variable could have a negative effect on spreads if it represents additional value (over and above book value) that debt holders can in part access in the event of default.

Finally, we include dummies for single digit SIC industry groups. A given industry may face additional risk factors that are not captured by this list of variables, so this allows us to capture such risk at a very broad level.

By contrast with these firm level variables, many of the loan-specific variables are endogenous, being jointly determined along with the lending rate. This can create a problem if both the feature and the loan spread are affected by an unobservable factor. For example, we include dummies equal to one if the loan has restrictions on paying dividends ($DIVRESTRICT$), is senior ($SENIOR$), is secured ($SECURED$), has a guarantor ($GUARANTOR$),

or has a sponsor ($SPONSOR$). All else equal, any of these features should make the loan safer, decreasing the spread, but it is well known that lenders are more likely to require these features if they think the firm is riskier (see for example Berger and Udell (1990)), so the relationship may be reversed. Loans with longer maturities ($MATURITY$, in years) may face greater credit risk, but they are more likely to be granted to firms that are thought to be more creditworthy; again, the effect on spread is ambiguous. Larger loans (measured by $LOANAMT$, the loan amount in 1980 dollars) may represent more credit risk, raising the loan rate, but they may also allow economies of scale in processing and monitoring the loan; again, the sign of this variable's effect on loan spreads is ambiguous. A number of other dummy variables reflect the different purposes and types of loans; for example, whether the loan is being used to finance a takeover, whether the loan is a term loan or credit line, etc.

We also include several loan-specific variables that may reflect the relative information advantage of lenders. $REFINANCE$ and $RENEWAL$ are dummies indicating whether this loan is refinancing another loan from a different lending group or is a renewal of an existing loan, respectively. In a refinancing, lenders may be more concerned that they are getting someone else's "lemon," leading to a positive effect on spread; conversely, if lenders are renewing a loan, this should indicate that the firm is in relatively good shape, leading to a negative effect on spread.[6] $SYNDICATED$ is a dummy variable that equals one if the loan is syndicated and zero otherwise. Since syndicated loans have more lenders present and also tend to go with better-known borrowers, we would expect that this has a negative impact on spreads. Finally, $TIMRPBOND$ is the number of months since the firm last issued a public bond. As discussed above, the longer since the bond issue, the less current is information produced at that time, and so the greater the information advantage of inside banks over outside lenders. Thus, we expect that this variable should have a positive effect on spreads.

[6]In Rajan's (1992) model, this would not occur, since outside lenders are assumed to be completely uninformed about the inside bank's decision. In our extension of Rajan's model, however, whenever the inside bank has a positive view of the firm, there is a chance that outside lenders have the same information, causing them to be more aggressive and lowering average spreads. The same reasoning applies in reverse if the inside bank has a negative view of the firm.

3.3 Sample characterization

Table 1 characterizes our sample of bank loans. The left-hand side panel characterizes the sample of loans we use in the first part of our analysis, that is, before we control for firm characteristics other than sales, legal status and sector of activity, which are available from DealScan, our data source on bank loans. This sample, therefore, includes both loans taken out by public firms as well as and privately held firms. As we mentioned above, in order to get additional information on firms, we merged this data set with Compustat. Because this data source only contains information on publicly listed firms we had to drop from our original sample all of the loans taken out by private firms and by the public firms that are not in Compustat. The right-hand side panel of Table 1 characterizes the loans taken out by the public firms in our initial sample that are also in Compustat.

Both panels of the table compare the loans taken out by bank-dependent firms with those taken out by non bank dependent firms, that is, firms with access to the public bond market. We classify a firm as a non bank dependent if the firm's most recent bond prior to its loan was issued in the public bond market. Even though we have to drop about two thirds of the loans in order get detailed information on firms, comparing the two panels of Table 1 we see that there is an overwhelming number of similarities between our samples of loans. In only one instance a variable is statistically significant in both panels but the difference between bank-dependent and non bank dependent firms changes signs in the two panels. This happens with, $REFINANCE$, which measures the portion of loans taken out to repay debt.

Looking at the remaining variables that we consider we find a pattern of results which is in general consistent with what one would expect between bank dependent vs non bank dependent firms. The former firms are smaller, pay higher loan spreads, and take out smaller and longer maturity loans. These firms are more likely to have a guarantor and to face dividend restrictions as a result of their loans. They are more likely to borrow through term loans and to use their loans for working capital purposes. In contrast, these firms are less likely to borrow through credit lines and to use bridge loans. Loans to bank-dependent firms are less often syndicated and are provided by a smaller number of banks. These loans, in addition, are more likely to be senior and secured.

Looking at the variables that are unique to each of the two panels of Table 1 we find, as expected, that bank-dependent firms are more likely to be private firms. Bank-dependent

firms are also on average younger, have less collateral to pledge and more volatile earnings. On average these firms, however, have more growth opportunities and higher interest coverage.

4 Results

4.1 A univariate analysis of loan spreads

We begin our analysis by focusing on the full DealScan sample of 43,166 bank loans. This prevents us from incorporating the firm-specific controls, but we view this as a first-cut attempt to find out if the raw data is consistent with our hypotheses. The results of this comparison are presented in Table 2. As we now discuss, the results are consistent with our predictions.

In the table, Models 1 through 4 are univariate regressions of loan spread on $BOND$, $PBOND$, $MRPBOND$, and REC, respectively. The terms in parentheses below the coefficient estimates are p values. We see that firms that have issued any bond typically pay 66 basis points less than other firms; firms that have issued public bonds pay 83 basis points less than other firms; and firms whose most recent bond was publicly issued pay 94 basis points less than other firms. All are highly significant and are consistent with Hypothesis 1. The larger effect for public bonds is consistent with our prediction that issuers of public bonds face smaller informational hold-up problems (in our model, higher ϕ) than do issuers of private placements. The even larger effect for firms whose most recent bond issue was public rather than private is also consistent with this prediction, since recent public bond market access is likely to be a better indicator of the firm's current ability to access this market. Similarly, during recessions, spreads are 15 basis points higher than during expansions, which is consistent with Hypothesis 2.[7]

Models 5 through 8 examine these two hypotheses and Hypothesis 3 simultaneously. Model 5 uses $BOND$ as the measure of market access. We see that firms that have issued any bond pay less than bank-dependent firms, and recessions raise spreads, with magnitudes that are significant and close to the results from Model 1 and 4. Nevertheless, the interaction term

[7]Santos (2002) show that recessions increase bond credit spreads at issue date and the effect is largest for mid-credit quality firms. Fama and French (1989) report that credit spreads of Aaa bonds tend to be low around NBER business-cycle peaks and high near troughs, and Bernanke (1993) notes that credit spreads of Baa bonds widened significantly during the Great Depression. Stock and Watson (1989) and Friedman and Kuttner (1992), in turn, report that credit spreads of commercial paper increase in downturns.

$REC \cdot BOND$ has a small positive and statistically insignificant, which is not consistent with Hypothesis 3.

Since we have argued that public bond market access is the better measure of not being bank-dependent, we now turn to our two variables that measure such access. Model 6 uses $PBOND$ as the measure of market access and finds much stronger results. Firms that have issued public bonds pay less than other firms, with magnitude comparable to the results of Model 2, and recessions raise rates by slightly more than the result from Model 4. Most strikingly, the interaction term $REC \cdot PBOND$ is strongly statistically and economically significant, at minus 11 basis points. Effectively, firms that have issued public bonds experience only an 8 basis point rise in spreads during a recession, unlike other borrowers, who face a rise of 19 basis points. This is consistent with Hypothesis 3.

Model 7 uses $MRPBOND$ as the measure of market access and finds even stronger results. Again the direct effect of having one's most recent bond issue be public is comparable to that from Model 3, and the direct effect of a recession is somewhat greater than in Model 4. The interaction term now has an even stronger negative effect than in Model 6, at minus 14 basis points.

Finally, in Model 8, we include both $BOND$ and $MRPBOND$; this allows us to directly measure the differential impact of having access to private placements as opposed to (recent) public issues. The coefficients on both variables are significantly negative, consistent with Hypothesis 1 and with the idea that issuers of public bonds face smaller information problems than issuers of private placements: whereas access to private placements reduces loan spreads by 40 basis points, access to public bonds reduces spreads by *another* 60 basis points. Consistent with earlier results, recessions increase spreads. However, the results on the interaction terms differ.$REC \cdot BOND$ has a significantly positive coefficient of 9 basis points, indicating that private placement issuers actually experience *more* deterioration in loan spreads than firms without any bond market access. $REC \cdot MRPBOND$ has a significantly negative coefficient of 22 basis points; thus, the net effect for recent issuers of public bonds is that spreads decrease by 13 basis points relative to spreads for firms without *any* bond market access.

The upshot is that, consistent with our predictions, access to public bond markets produces first-cut results that are consistent with our hypotheses on the impact of bank in-

formation monopolies on loan pricing. By contrast, access to private placements has mixed effects, reducing average loan spreads relative to those of firms without any bond market access but losing much of this advantage during recessions. In what follows, we focus on access to public bond markets as our measure of relative lack of bank-dependence. Nevertheless, a caveat is in order: none of these results control for firm and loan risk. Since these are likely to vary across borrower types (those with access to public bonds, those with access to only private placements, and those with neither) and across time (recessions versus expansions), the results in this section are suggestive at best. We now turn to multivariate results that include controls for firm and loan characteristics.

4.2 A multivariate analysis of loan spreads

We begin by including the controls that are present in the DealScan database, which include $SALES$, the firm's sales, and $PRIVATE$, which is a dummy equal to one if the firm is privately held and zero otherwise, as well as the loan-specific variables already described. Even making use of sales and private/public status reduces the sample size to 36,392 observations from 43,156; requiring values for the loan-specific variables further reduces the sample to 33,270. Throughout, we use $MRPBOND$ as our measure of public bond market access.

Table 3 contains the results for this more restricted sample. Models 1 through 3 are analogous to Models 3, 4, and 7 of Table 2, with the log of firm sales and whether the firm is privately held added as controls. Public bond market access continues to have a significantly negative direct effect on loan spreads, but the impact is smaller: between minus 22 and 24 basis points, as opposed to minus 92 or 94 basis points in the models from Table 2. This change is accounted for by the significantly negative impact of sales, which is consistent with the fact that firms with recent public bond market access tend to be significantly larger. Recessions raise spreads by 19 to 21 basis points, consistent with our earlier results. Most strikingly, the interaction term for recessions and public bond market access (Model 3) has almost exactly the same coefficient as in Table 2: in a recession, loan spreads for firms with public bond market access rise by 13 basis points less than those of firms without such access. These results are consistent with Hypotheses 1, 2, and 3. The controls have the predicted signs, with greater sales (and thus size) reducing spreads, and privately-held firms paying higher spreads.

In Model 4, we augment the two firm-level controls with the loan-specific controls.

The basic thrust of the results is unchanged; indeed, the direct impact of public bond market access doubles to minus 45 basis points, and the impact of public bond market access in a recession grows to minus 18 basis points. Looking at the new controls, among the loan-purpose variables, takeovers are associated with somewhat greater spreads, whereas the others have negative impacts of varying sizes. Among loan types, credit lines have lower spreads than term loans, which in turn are not nearly as risky as bridge loans. Larger loans have lower spreads; this could reflect economies of scale in loan size, but it also reflects the fact that larger (hence safer) firms have larger loans. This is consistent with the decrease in the coefficient on the log of firm sales.

With the exception of seniority, loan features that aim to increase loan safety (dividend restrictions, secured interests, guarantors, and sponsors) generally have positive effects on spreads. This is consistent with the well-established result that banks tend to require these features for riskier credits. Conversely, longer-term loans have lower spreads, reflecting lenders' preference for lending long-term only to safer credits. As noted above, many of these loan features are clearly endogenous, that is, lenders set them in tandem with the spread. Syndicated loans have lower spreads, which could reflect the relative safety of borrowers that qualify for such credits or the lower exposure of individual banks in a syndication.

A final control is the log of one plus the time since the firm's last public bond issue. This has a significantly positive effect, which is consistent with the notion that, the more recently the firm has issued public bonds, the greater the likelihood that it still has such access.

In Model 5, we decompose the public bond market access variable by adding two additional dummies. *MRPBONDblg* takes on the value one if the firm has most recently issued a public bond that was below investment grade, and $MRPBONDnrt$ takes on the value one if the firm has most recently issued a public bond that was not rated. With the addition of these variables, the coefficients on $MRPBOND$ represent the impact of recent public issues of *investment-grade* bonds; to get the full impact of having publicly issued below-grade or unrated bonds, one must add the coefficients of the two new dummies to that of $MRPBOND$.

. The results are largely what one would expect. As before, recessions have a significantly positive impact on spreads. Firms with public investment-grade bonds have spreads 67 basis points below those of bank-dependent firms, firms with public below-grade bonds

have somewhat higher spreads (a total impact of plus 14 basis points), and firms with public unrated bonds have somewhat lower spreads (total impact of minus 17 basis points).The interaction of REC and $MRPBOND$ is still significantly negative, but only minus 9 basis points now and with a p-value of .08. The additional impact in a recession of having recently issued below-grade or unrated debt is not statistically different from zero, but the first of these is positive 7 basis points, which negates much of the advantage from having a public bond issue. Overall, the results support Hypotheses 1 and 3 for investment-grade and unrated bonds, but below-grade bonds seem to have little or no advantage versus bank-dependent firms. Since the debt of below-grade issuers is by definition rather risky, the higher spreads could simply reflect greater risk, but they could also reflect greater informational hold-up effects for riskier borrowers even when they have public bond market access. On the other hand, our loan-specific controls are at best an imperfect control for firm default risk; to get better controls, we must use the firm-specific data from Compustat..

In Table 4 we add these additional controls. Since Compustat only tracks firms with publicly-traded equity, our sample size falls much further, to 13,810 loans as compared to 33,270 in Table 3. Since publicly-traded firms may differ from privately-held firms, we begin by repeating our baseline analysis for the reduced sample. This is presented in Model 1 of Table 3, which estimates the same equation as that used in Model 7 of Table 2. Qualitatively, the results are very similar to those from the full sample, the main difference being that the coefficients are somewhat larger. Firms with access to public bond markets pay lower average spreads (by 95 basis points, versus 92 basis points for the full sample). Recessions increase average spreads (by 28 basis points, versus 18 basis points for the full sample), but firms with access to public bond markets have a relative drop in spreads during recessions that more than offsets this (by 32 basis points, versus 14 basis points for the full sample). Again, these results are consistent with our three hypotheses.

The next column (Model 2) of Table 4 incorporates the dummy variables for firms with public bonds that are below-grade or unrated. Similar to what occurred in Table 3, the coefficient on $MRPBOND$ becomes more negative (152 basis points), while the two new dummies have positive coefficients that almost offset this (144 and 124 basis points). The interaction terms for firms with public bonds during a recession all have negative coefficients, but none of these are significant. Overall, the results for this model are consistent with Hypotheses 1 and

2 and weakly consistent with Hypothesis 3.

Models 3 and 4 take the analysis a step further by including the "exogenous" firm-level controls. These are generally consistent with the discussion given in the Data and Methodology section. Older firms, larger firms, and firms with more tangible assets pay significantly lower spreads. The variables proxying for intangible assets have insignificant effects, though advertising's sign is in the expected direction. The market to book ratio comes in strongly positive; although this runs counter to the expected effect of growth opportunities, as we discussed earlier, this could simply reflect greater market value to cushion the risk of debt. The proxies for default risk – profit margin, interest coverage, leverage, and earnings volatility – all have their expected signs, and all but profit margin are strongly significant.

Moving to the critical variables for our analysis, Model 3 focuses on the effects of public bond market access without any further breakdown by credit rating. The baseline impact of recessions is actually somewhat higher than before, at 37 basis points. The impact of public bond market access on average spreads drops substantially; while still statistically significant, such access only lowers loan spreads by 10 basis points rather than 95. This suggests that much of the impact from Model 1 is due to differences in risk between firms with public bond market access and those without. Nevertheless, the impact of the interaction term is still strongly significant, both economically and statistically: in recessions, loan spreads for firms with public bond market access increase by 25 basis points less than those of firms without such access. This is strong support for Hypothesis 3.

Model 4 adds credit rating breakdowns of firms with public bond market access. The baseline impact of a recession is essentially unchanged from Model 3. Public bond market access for investment grade firms decreases average spreads by 30 basis points. By contrast, for those firms that are either below investment grade or unrated, the net effect (coefficient on $MRPBOND$ plus that for the appropriate credit rating dummy) is positive. Nevertheless, there is strong support for Hypothesis 3 for all three types of firms with public bond market access. The coefficient on $REC \cdot MRPBOND$ is a statistically significant decrease of 19 basis points. Although the coefficients for the interactions of the recession dummy and the dummies for below-grade and unrated bonds are not statistically different from zero, that for below-grade is only plus 8 basis points, whereas that for unrated firms is quite negative (minus 27 basis points). This suggests that loan spreads for all three types of firms with recent public

bond market access rise by less in recessions than do spreads for bank-dependent firms.

Finally, Models 5 and 6 repeat the analysis with the additional "endogenous" loan-specific controls. The results are generally consistent with those of the previous models, so we will not give a detailed discussion. The main difference from Models 3 and 4 is that the coefficient of $MRPBOND$ is much larger than before, which suggests that there are significant differences in the loan terms between loans to firms with market access and those to firms that are bank-dependent.

Overall, these results do suggest that, during recessions, banks increase lending rates for bank-dependent firms more than rates for firms with public bond market access. This is consistent with our model, which links this change to an increase in banks' informational power when firms are in more danger of failure. In general, rates to bank-dependent firms are higher than those for firms with public bond market access, but this difference is largely driven by investment grade firms. Banks also increase their lending rates in recessions by more than is explained by our controls. Nevertheless, it can be argued that our results are driven by other, unobservable risk factors that vary across firms that do and do not have access to bond markets. In the next section, we address this issue through instrumental variables.

5 Robustness issues

5.1 Endogenous access to bond markets

As just noted, it is possible that our results are driven by unobservable risk factors that affect both loan spreads and access to public bond markets. To deal with this, we use instrumental variables through a two-stage procedure. As we will see, if anything, our results become more striking.

In the first stage, we estimate a probit model of the determinants of recent access to public bond markets ($MRPBOND$). Clearly, a number of the firm-level factors used to explain spreads are likely to be important here as well. During recessions, public bond markets become "tighter" (see Santos (2002)), so we include REC in the first stage. Older, hence better-established, firms and larger firms are more likely to be well-known, improving access to public bonds markets, so we include our variables for firm age and real assets. Firms with higher profit margins, more tangible assets, and greater interest coverage may be more

attractive to bond holders, whereas firms with more intangible assets or greater risk of default may be less attractive, so we include the relevant variables from our list of firm-level controls. Again, some of these (such as the market to book ratio) may have ambiguous sign, for reasons similar to those discussed in the Data and Methodology section.

We also need to include variables that are not included in the second stage regression, in order to serve as instruments. Preferably, such instruments should correlate with bond market access but have no effect on spreads through direct channels. Two of the instruments we use have to do with the firm's visibility through inclusion in well-known groups: the S&P 500 Index and the New York Stock Exchange (NYSE). Inclusion in either should boost the firm's visibility to the financial community, making it less costly to issue bonds to the investing public. For similar reasons, following Faulkender and Petersen (2003), we include a dummy variable that equals one if the firm's asset size times the median debt ratio is more than the minimum size required to be in Lehman Brothers Corporate Bond Index. Industry visibility may also matter: if a firm is in an industry where many competitors have already issued bonds to the public, investors may find it easier to evaluate any bonds that this firm issues, simply because they already have experience in assessing this industry. Accordingly, we include the percentage of firms in the given firm's two-digit SIC code industry that have already issued public bonds. Finally, we include a dummy that equals one if the firm is at least 21 years old, which is the median age of firms that have publicly-issued bonds.

Table 5 displays the first-stage results. The controls for firm age, asset size, and asset tangibility all have the expected positive signs and are strongly significant, as is the market to book ratio. Interest coverage and leverage are strongly significant but have opposite effects from what one might expect: firms with higher interest coverage are less likely, and firms with higher leverage more likely, to have public bond market access. This may reflect scale effects (firms with higher absolute debt levels are more likely to access the bond markets), or the fact that firms with greater credit risk are more likely to exhaust bank funding and have to issue (riskier) bonds. Earnings volatility does have the expected sign: firms with riskier earnings are less likely to access the public bond markets.

All of the instrumental variables have the expected signs, and almost all are strongly significant. The one exception is the dummy for firm age over 21 years; although this is positive and somewhat significant in Model 3, in Model 4 (which adds the Lehman debt scale dummy)

it becomes insignificant.

The second-stage regression results are shown in Table 6. The four models correspond to the four models from Table 5. In all cases, we also include the "exogenous" firm-level controls used in Table 4 but not the "endogenous" loan-specific controls. The results generally support the three hypotheses of our paper. The coefficient on the predicted value of $MRPBOND$ is negative and both economically and statistically significant in all versions except Model 4, where the instruments include the Lehman dummy. The coefficient on REC is positive and at the high end of the range of estimates from Table 3, ranging from 34 to 37 basis points. Finally, the coefficient on the interaction term between REC and the predicted value of $MRPBOND$ is always significantly negative, with estimates ranging from 19 to 24 basis points.

Although it is possible that some of our instruments correlate directly with unobserved risk factors that affect loan spreads, this is hard to argue in most of the cases. Inclusion in the S&P and NYSE probably correlates with size and age, but both of these are included in the second stage regression. Although such inclusion increases visibility, it is difficult to see why it would have any direct effect on risk other than by making access to financial markets easier, which is the point we want to focus on. The same applies to the Lehmann size and firm age over 21 years dummies. The only instrument that might proxy for unobserved risk is the fraction of firms in the industry that have issued public bonds. Conceivably, industries with more such firms may be less risky, which might affect spreads directly in ways we have not controlled for. This should be offset at least in part by our use of industry dummies, albeit at the one-digit SIC code level.

6 Final remarks

In this paper, we compare bank loan spreads for borrowers that have access to public bond markets with those of bank-dependent borrowers. We find that these spreads are higher for bank-dependent firms than for firms with access to public bond markets, rise in recessions, and rise by a greater amount in recessions for bank-dependent firms. These contrasts are stronger when public bond market access is more recent. Our results are both economically and statistically significant, and they continue to hold when we control for firm- and loan-specific factors and for the endogeneity of public bond market access. Our findings are consistent with a model in which banks earn informational rents as per Rajan (1992), since such rents should

be greater for bank-dependent firms and should increase when firms face greater risk.

Our work opens up several avenues for additional research. As we have noted, our sample focuses on relatively large, often syndicated, loans. Since information problems are typically thought to be greater for smaller firms, investigating the behavior of loan spreads for such firms across the business cycle might afford greater insight into the size of any informational rents that banks earn.

A further question involves the possible benefits of bank-firm relationships. Petersen and Rajan (1995) find that, although banks charge higher average spreads when they have more monopoly power, they also extend loans to riskier young firms because their future rents on the survivors make up for additional failures. Some have argued that similar concerns ought to lead banks with greater power over their borrowers to subsidize them in bad times, raising spreads in recessions by less than banks that have less power over their borrowers. Although we do not find evidence of this in our comparison of bank-dependent firms with firms that have public bond market access, it would be interesting to investigate how loan spread behavior for bank-dependent borrowers varies with their banks' market power.

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Table 1 Sample characteristics[a]

Variables	All firms				Public firms			
	Bank-dependent	Non dependent	Difference	T Statistic	Bank-dependent	Non dependent	Difference	T Statistic
LOANSPREAD	241.933	147.619	94.314	51.815	226.196	124.683	101.513	36.142
FIRM CONTROLS								
SALES	7.354	38.648	-31.194	51.362	6.326	38.689	-32.362	39.746
PRIVATE	55.111	23.103	32.008	46.806	–	–	–	–
AGE	–	–	–	–	14.203	30.176	-15.974	56.041
ASSETS	–	–	–	–	6.644	40.989	-33.989	38.951
COLLATERAL	–	–	–	–	0.729	0.823	-0.094	11.709
ADVERTISING	–	–	–	–	0.011	0.014	-0.003	1.963
MKTBOOK	–	–	–	–	2.147	2.032	0.115	3.364
INTCOVERAGE	–	–	–	–	2.097	1.882	0.215	5.194
EARNVOL	–	–	–	–	0.042	0.018	0.024	4.073
LOAN CONTROLS								
CORPURPOSES	27.600	26.787	0.813	1.299	22.680	25.478	-2.799	3.182
REFINANCE	23.006	24.410	-1.405	2.374	31.162	24.044	7.118	7.500
TAKEOVER	11.510	12.069	-0.560	1.247	13.398	12.536	0.010	1.226
WORKCAPITAL	13.452	7.520	5.932	12.755	16.716	7.104	9.612	13.127
CREDITLINE	58.696	72.874	-14.178	20.801	63.215	76.127	-12.913	13.170
TERMLOAN	33.621	20.743	12.878	19.801	30.711	17.521	13.191	14.227
BRIDGELOAN	1.696	3.085	-1.389	6.028	1.801	2.766	-0.010	3.308
LOANAMT	0.660	2.682	-2.022	54.975	0.762	3.097	-2.335	34.490
DIVRESTRICT	32.347	25.225	7.121	10.962	48.107	28.381	19.726	19.347
SENIOR	94.196	93.142	1.054	3.177	95.653	94.877	0.776	1.797
SECURED	6.261	3.327	2.934	8.916	9.153	4.303	4.850	8.548
RENEWAL	1.232	1.205	0.026	0.172	1.470	0.683	0.787	3.335
GUARANTOR	1.677	1.120	0.557	3.164	2.242	1.332	0.910	3.087
SPONSOR	14.499	7.435	7.064	14.764	5.698	5.499	0.199	0.413
SYNDICATED	73.254	87.863	-14.609	24.307	70.594	91.154	-20.561	23.233
LENDERS	4.612	10.227	-5.616	55.753	5.030	11.626	-6.596	39.327
MATURITY	3.929	3.525	0.404	11.668	3.603	3.327	0.275	5.882
# Observations	36,696	36,696	36,696	36,696	13,810	13,810	13,810	13,810

[a] LOANSPREAD: Loan spread over Libor at the time of the loan. SALES: Sales in millions dollars at 1980 prices. PRIVATE: Dummy variable equal to 1 when firm is private.

AGE: Age in years. ASSETS: Assets in millions dollars at 1980 prices. COllATERAL: Property, plant and equipment plus inventories over assets. R&D: Research and development expenses over sales. ADVERTISING: Advertising expenses over sales. MKTBOOK: Market to book ratio. PROFMARGIN: Net income over sales. NWCDEBT: Current assets minus current liabilities over total debt. INTCOVERAGE: Earnings before taxes and depreciation over interest expenses. DEBTASSETS: Total debt over assets. EARNVOL: Standard deviation of the quarterly ROA over the last three years. CORPURPOSES: Dummy variable equal to 1 when loan is for corporate purposes. REFINANCE: Dummy variable equal to 1 when loan is to repay existing debt. TAKEOVER: Dummy variable equal to 1 when loan is for takeover purposes. WORKCAPITAL: Dummy variable equal to 1 when loan is for working capital purposes. CREDITLINE: Dummy variable equal to 1 for lines of credit. TERMLOAN: Dummy variable equal to 1 for term loans. BRIDGELOAN: Dummy variable equal to 1 for bridge loans. LOANAMT: Amount in millions dollars at 1980 prices. DIVRESTRICT: Dummy variable equal to 1 when borrower is imposed dividend restrictions. SENIOR: Dummy variable equal to 1 when loan is senior. SECURED: Dummy variable equal to 1 when loan is secured. RENEWAL: Dummy variable equal to 1 when loan is a renewal. GUARANTOR: Dummy variable equal to 1 when borrower has a guarantor. SPONSOR: Dummy variable equal to 1 when borrower has a sponsor. SYNDICATED: Dummy variable equal to 1 when loan is syndicated. LENDERS: Number of lenders the firm borrowed from. MATURITY: Maturity of the loan in years. TIMRPBOND: Number of months since the firm issued its most recent public bond.
Source: Authors' computations.

Table 2 Loan spreads at issue date for bank-dependent and non-dependent borrowers[a]

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	249.866 (0.000)	244.608 (0.000)	241.933 (0.000)	226.504 (0.000)	247.124 (0.000)	241.414 (0.000)	238.922 (0.000)	247.124 (0.000)
BOND	-65.624 (0.000)				-65.956 (0.000)			-39.933 (0.000)
PBOND		-83.098 (0.000)				-81.380 (0.000)		
MRPBOND			-94.314 (0.000)				-92.017 (0.000)	-60.286 0.000
REC				14.986 (0.000)	16.602 (0.000)	19.175 (0.000)	17.820 (0.000)	16.602 (0.000)
REC BOND					0.275 (0.938)			9.193 (0.032)
REC PBOND						-11.319 (0.006)		
REC MRPBOND							-13.850 (0.004)	-21.825 (0.000)
Adjusted R^2	5.21	5.87	5.85	0.18	5.42	6.10	6.07	7.24
Observations	43,156	43,156	43,156	43,156	43,156	43,156	43,156	43,156

[a] The dependent variable is LOANSPREAD: Loan spread over Libor at the time of the loan. BOND: Dummy variable equal to 1 for firms that issued bonds prior to their loan. PBOND: Dummy variable equal to 1 for firms that issued public bonds prior to the loan. MRPBOND: Dummy variable equal to 1 for firms whose most recent bond prior to the loan was a public bond. REC: Dummy variable equal to 1 for loans borrowed during a recession. Values in parenthesis are p values.
Source: Authors' computations.

Table 3 Loan spreads for bank-dependent and non-dependent borrowers: Full sample[a,b]

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	664.854 (0.000)	681.650 (0.000)	661.840 (0.000)	750.149 (0.000)	732.248 (0.000)
MRPBOND	-23.916 (0.000)		-21.631 (0.000)	-45.374 (0.000)	-67.444 (0.000)
MRPBONDblg					81.772 (0.000)
MRPBONDnrt					50.153 (0.000)
REC		19.105 (0.000)	21.390 (0.000)	21.008 (0.000)	19.798 (0.000)
REC MRPBOND			-13.374 (0.002)	-17.611 (0.000)	-8.759 (0.081)
REC MRPBONDblg					6.765 (0.419)
REC MRPBONDnrt					-0.574 (0.970)
FIRM CONTROLS					
LSALES	-32.834 (0.000)	-34.614 (0.000)	-32.898 (0.000)	-17.125 (0.000)	-15.987 (0.000)
PRIVATE	3.778 ()0.004	4.986 (0.000)	3.320 (0.011)	5.953 (0.000)	6.046 (0.000)
LOAN CONTROLS					
CORPPURPOSES				-22.799 (0.000)	-23.534 (0.000)
REFINANCE				-6.006 (0.001)	-8.551 (0.000)
TAKEOVER				6.819 (0.001)	3.996 (0.056)
WORKCAPITAL				-16.834 (0.000)	-19.021 (0.000)
CREDITLINE				-27.808 (0.000)	-27.917 (0.000)
TERMLOAN				12.728 (0.000)	12.031 (0.000)
BRIDGELOAN				113.454 (0.000)	108.691 (0.000)
LLOANAMT				-20.776 (0.000)	-20.044 (0.000)
DIVRESTRICT				10.392 (0.000)	9.532 (0.000)
SENIOR				-11.278 (0.000)	-9.538 (0.000)
SECURED				65.185 (0.000)	65.428 (0.000)
RENEWAL				3.080 (0.524)	-0.809 (0.866)
GUARANTOR				9.284 (0.046)	9.031 (0.050)

[a] Continues on the next page.

Table 3 (continued)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
SPONSOR				52.532 (0.000)	50.464 (0.000)
SYNDICATED				-26.198 (0.000)	-26.138 (0.000)
LLENDERS				0.911 (0.616)	0.814 (0.421)
LMATURITY				-5.492 (0.000)	-9.632 (0.000)
ADD BOND CONTROLS					
LTIMRPBOND				7.399 (0.000)	3.736 (0.000)
Adjusted R^2	24.33	24.28	24.63	37.17	38.37
# observations	36,392	36,392	36,392	33,270	33,270

[b] The dependent variable is LOANSPREAD: Loan spread over Libor at the time of the loan. MRPBOND: Dummy variable equal to 1 for firms whose most recent bond prior to the loan was a public bond. MRPBOND-blg: Dummy variable equal to 1 for firms whose last bond prior to the loan was a public bond with a below grade rating. MRPPBONDnr: Dummy variable equal to 1 for firms whose last bond prior to the loan was a public bond not rated. REC: Dummy variable equal to 1 for loans borrowed during a recession. LSALES=Log(SALES). LLENDER=LOG(LENDERS). LMATURITY=Log(Maturity). LTIMRPBOND=Log(1+TIMRPBOND). Remaining variables defined as in Table 1. Included in the regressions but not shown in the table are also dummy variables for the issuer's sector of activity as defined by SIC one-digit code. Values in parenthesis are p values. Source: Authors' computations.

Table 4 Loan spreads for bank-dependent and non-dependent borrowers: Public firms[a,b]

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	220.713 (0.000)	220.713 (0.000)	321.791 (0.000)	317.681 (0.000)	611.123 (0.000)	611.984 (0.000)
MRPBOND	-95.253 (0.000)	-151.690 (0.000)	-10.316 (0.001)	-29.870 (0.000)	-31.434 (0.000)	-43.520 (0.000)
MRPBONDblg		144.176 (0.000)		36.867 (0.000)		37.511 (0.000)
MRPBONDnrt		124.278 (0.000)		42.229 (0.000)		37.209 (0.000)
REC	27.807 (0.000)	27.807 (0.000)	37.111 (0.000)	36.522 (0.000)	25.548 (0.000)	24.725 (0.000)
REC MRPBOND	-31.517 (0.000)	-7.835 (0.310)	-24.507 (0.000)	-19.317 (0.005)	-22.189 (0.000)	-17.958 (0.004)
REC MRPBONDblg		-9.724 (0.501)		7.615 (0.550)		7.350 (0.529)
REC MRPBONDnrt		-3.088 (0.913)		-26.883 (0.279)		-9.167 (0.686)
FIRM CONTROLS						
LAGE			-6.648 (0.000)	-6.122 (0.000)	-6.288 (0.000)	-5.794 (0.000)
LASSETS			-47.726 (0.000)	-45.445 (0.000)	-19.911 (0.000)	-17.638 (0.000)
COLLATERAL			-26.131 (0.000)	-25.241 (0.000)	-18.563 (0.000)	-17.958 (0.000)
R&D[c]			-4.391 (0.251)	-4.451 (0.244)	-9.095 (0.009)	-9.153 (0.009)
ADVERTISING			19.235 (0.182)	20.503 (0.154)	5.900 (0.655)	7.342 (0.577)
MKTBOOK			-6.448 (0.000)	-6.233 (0.000)	-5.120 (0.000)	-4.945 (0.000)
PROFMARGIN[c]			-0.163 0.927	-0.273 (0.878)	-2.964 (0.069)	-3.044 (0.060)
NWCDEBT[c]			0.038 (0.002)	0.039 (0.001)	0.032 (0.003)	0.033 (0.003)
LINTCOVERAGE			-12.198 (0.000)	-12.177 (0.000)	-10.469 (0.000)	-10.427 (0.000)
DEBTASSETS			0.741 (0.000)	0.701 (0.000)	0.719 (0.000)	0.688 (0.000)
EARNVOL			9.508 (0.006)	9.857 (0.004)	7.084 (0.024)	7.255 (0.020)
LOAN CONTROLS						
CORPURPOSES					-21.797 (0.000)	-22.915 (0.000)
REFINANCE					-16.210 (0.000)	-17.332 (0.000)
TAKEOVER					0.021 (0.995)	-0.874 (0.797)
WORKCAPITAL					-24.539 (0.000)	-28.993 (0.000)

[a] Continues on the next page.

Table 4 (Continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CREDITLINE					-21.768 (0.000)	-21.001 (0.000)
TERMLOAN					17.322 (0.000)	17.564 (0.000)
BRIDGELOAN					95.743 (0.000)	94.138 (0.000)
LLOANAMT					-21.124 (0.000)	-21.415 (0.000)
DIVRESTRICT					21.674 (0.000)	20.787 (0.000)
SENIOR					-15.561 (0.000)	-13.720 (0.002)
SECURED					66.443 (0.000)	66.003 (0.000)
RENEWAL					-6.731 (0.400)	-7.566 (0.343)
GUARANTOR					15.433 (0.019)	15.511 (0.018)
SPONSOR					51.769 (0.000)	49.065 (0.000)
SYNDICATED					-23.655 (0.000)	-23.362 (0.000)
LLENDERS					-2.134 (0.176)	-2.372 (0.132)
LMATURITY					-20.332 (0.000)	-21.661 (0.000)
ADD BOND CONTROLS						
LTIMRPPBOND					4.569 (0.000)	3.210 (0.005)
Adjusted R^2	9.11	13.837	32.99	33.29	44.09	44.37
# observations	13,810	13,810	13,810	13,810	13,810	13,810

[b] The dependent variable is LOANSPREAD: Loan spread over Libor at the time of the loan. MRPBOND: Dummy variable equal to 1 for firms whose most recent bond prior to the loan was a public bond. MRPBONDblg: Dummy variable equal to 1 for firms whose last bond prior to the loan was a public bond with a below grade rating. MRPPBONDnr: Dummy variable equal to 1 for firms whose last bond prior to the loan was a public bond not rated. REC: Dummy variable equal to 1 for loans borrowed during a recession. LAGE=Log(AGE). LASSETS=LOG(ASSETS). LINTCOVERAGE=log(1+INTCOVERAGE) truncate at 0. LLENDER=LOG(LENDERS). LMATURITY=Log(Maturity). LTIMRPBOND=Log (1+TIMRPBOND). Remaining variables defined as in Table 1. Included in the regressions but not shown in the table are also dummy variables for the issuer's sector of activity as defined by SIC one-digit code. Values in parenthesis are p values.

[c] The coefficient of this variable was multiplied by an adjustment factor equal to 1,000,000.

Source: Authors' computations.

Table 5 Determinants of firms' access to the bond market: First stage of instrumental variable regression[a]

Variables	Model 1	Model 2	Model 3	Model 4
Constant	-2.459 (0.000)	-2.649 (0.000)	-2.570 (0.000)	-2.667 (0.000)
S&P500	0.343 (0.000)	0.378 (0.000)	0.374 (0.000)	0.336 (0.000)
NYSE	0.458 (0.000)	0.444 (0.000)	0.442 (0.000)	0.473 (0.000)
INDFIRMS		0.942 (0.000)	0.934 (0.000)	0.769 (0.000)
21YFIRMS			0.099 (0.070)	0.081 (0.155)
LEHMAN				0.941 (0.000)
FIRM CONTROLS				
LAGE	0.183 (0.000)	0.185 (0.000)	0.143 (0.000)	0.164 (0.000)
LASSETS	0.390 (0.000)	(0.362) (0.000)	0.361 (0.000)	0.214 (0.000)
COLLATERAL	0.134 (0.002)	0.058 (0.188)	0.057 (0.200)	0.114 (0.013)
R&D[b]	0.848 (0.938)	0.974 (0.926)	1.012 (0.924)	0.901 (0.932)
ADVERTISING	0.153 (0.370)	0.114 (0.515)	0.109 (0.536)	0.009 (0.961)
MKTBOOK	0.021 (0.075)	0.021 (0.069)	0.021 (0.067)	0.024 (0.041)
PROFMARGIN[b]	0.886 (0.879)	1.010 (0.072)	1.047 (0.877)	0.940 (0.871)
NWCDEBT[b]	0.001 (0.048)	0.001 (0.051)	0.001 (0.050)	0.001 (0.046)
LINTERESTCOV	-0.090 (0.000)	-0.086 (0.000)	-0.085 (0.000)	-0.071 (0.000)
DEBTASSETS	0.007 (0.000)	0.006 (0.000)	0.006 (0.000)	0.004 (0.000)
EARNVOL	-1.659 (0.000)	-1.517 (0.000)	-1.514 (0.000)	-1.016 (0.000)
Pseudo R^2				
# observations	13,810	13,810	13,810	13,810

[a] The dependent variable is MRPBOND: Dummy variable equal to 1 for firms whose most recent bond prior to the loan was a public bond. S&P500: Dummy variable equal to 1 for firms that are members of the S&P500 index. NYSE: Dummy variable equal to 1 for firms that trade in the NYSE. INDFIRMS: Percentage of the firms in the same industry (as defined by the two-digit SIC code) that have access to the bond market as defined by MRPBond. 21YFIRMS: Dummy variable equal to 1 for firms older than 21 years. LEHMAN: Dummy variable equal to 1 for firms that issued bonds in amounts larger than the minimum necessary to be included in the Lehman Brothers' Corporate Bond Index. LAGE=Log(AGE). LASSETS=LOG(ASSETS). LINTCOVERAGE=log(1+INTCOVERAGE) truncate at 0. Remaining variables defined as in Table 1. Included in the regressions but not shown in the table are also dummy variables for the issuer's sector of activity as defined by SIC one-digit code. Values in parenthesis are T statistics.

[b] The coefficient of this variable was multiplied by an adjustment factor equal to 1,000,000.

Source: Authors' computations.

Table 6 Loan spreads for bank-dependent and non-dependent borrowers: Public firms
Second stage of instrumental variable regression

Variables	Model 1	Model 2	Model 3	Model 4
Constant	312.047 (0.000)	312.147 (0.000)	311.389 (0.000)	324.269 (0.000)
$\widehat{MRPBOND}$	-73.662 (0.000)	-71.658 (0.000)	-76.458 (0.000)	2.727 (0.752)
REC	33.766 (0.000)	34.432 ()0.000	34.230 (0.000)	36.534 (0.000)
REC $\widehat{MRPBOND}$	-20.762 (0.043)	-23.525 (0.022)	-23.487 (0.022)	-19.295 (0.047)
FIRM CONTROLS				
LAGE	-3.704 (0.015)	-3.769 (0.010)	-3.543 (0.016)	-7.319 (0.000)
LASSETS	-38.112 (0.000)	-38.338 (0.000)	-37.603 (0.000)	-49.890 (0.000)
COLLATERAL	-23.779 (0.000)	-23.840 (0.000)	-23.660 (0.000)	-26.647 (0.000)
R&D[b]	-4.131 (0.288)	-4.132 (0.288)	-4.111 (0.292)	-4.461 (0.244)
ADVERTISING	23.154 (0.115)	23.055 (0.116)	23.354 (0.112)	18.372 (0.203)
MKTBOOK	-6.120 (0.000)	-6.130 (0.000)	-6.100 (0.000)	-6.527 (0.000)
PROFMARGIN[b]	-0.151 (0.933)	-0.143 (0.937)	-0.141 (0.938)	-0.184 (0.917)
NWCDEBT[b]	0.040 (0.001)	0.040 (0.001)	0.040 (0.001)	0.004 (0.002)
LINTCOVERAGE	-12.538 (0.000)	-12.525 (0.000)	-12.551 (0.000)	-12.131 (0.000)
DEBTASSETS	0.793 (0.000)	0.792 (0.000)	0.796 (0.000)	0.730 (0.000)
EARNVOL	9.716 (0.005)	9.722 (0.005)	9.739 (0.005)	9.437 (0.006)
Adjusted R^2	30.98	31.07	30.78	52.87
# observations	13,810	13,810	13,810	13,810

[a] The dependent variable is LOANSPREAD: Loan spread over Libor at the time of the loan. $\widehat{LPBOND}$: Fitted values for MRPBOND computed based on models in Table 5. REC: Dummy variable equal to 1 for loans borrowed during a recession. LAGE=Log(AGE). LASSETS=LOG(ASSETS). LINTCOVERAGE=log(1+INTCOVERAGE) truncate at 0. Remaining variables defined as in Table 1. Included in the regressions but not shown in the table are also dummy variables for the issuer's sector of activity as defined by SIC one-digit code. Values in parenthesis are T statistics.
[b] The coefficient of this variable was multiplied by an adjustment factor equal to 1,000,000.
Source: Authors' computations.

Table 7 Loan spreads of single-bank borrowers vs multiple-bank borrowers[a,b]

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	299.147 (0.000)	302.632 (0.000)	294.610 (0.000)	606.096 (0.000)	616.355 (0.000)	607.959 (0.000)
SINGLEBK	40.213 (0.000)	36.291 (0.000)	41.469 (0.000)	15.407 (0.000)	10.443 (0.001)	16.946 (0.000)
MRPBOND		-19.437 (0.000)	-9892 (0.004)		-37.396 (0.000)	-27.436 (0.000)
SINGLEBK MRPBOND		7.336 (0.250)	-0.074 (0.991)		8.786 (0.146)	-0.200 (0.975)
REC	38.747 (0.000)		44.284 (0.000)	2.817 (0.000)		36.748 (0.000)
REC SINGLEBK	-16.372 (0.002)		-26.975 (0.000)	-18.894 (0.000)		-29.539 (0.000)
REC MRPBOND			-35.495 (0.000)			-35.138 (0.000)
REC SINGLBK MRPBOND			46.299 (0.011)			50.037 (0.003)
FIRM CONTROLS						
LAGE	-7.330 (0.000)	-5.564 (0.000)	-6.530 (0.000)	-6.584 (0.000)	-6.177 (0.000)	-6.640 (0.000)
LASSETS	-44.003 (0.000)	-40.577 (0.000)	-41.573 (0.000)	-21.919 (0.000)	-19.330 (0.000)	-20.045 (0.000)
COLLATERAL	-27.413 (0.000)	-27.495 (0.000)	-26.762 (0.000)	-18.031 (0.000)	-18.112 (0.000)	-17.521 (0.000)
R&D[c]	-4.863 (0.200)	-5.185 (0.174)	-4.612 (0.224)	-9.167 (0.009)	-9.605 (0.006)	-8.990 (0.010)
ADVERTISING	16.100 (0.260)	18.679 (0.193)	17.274 (0.226)	5.190 (0.695)	5.838 (0.660)	5.808 (0.660)
MKTBOOK	-6.645 (0.000)	-6.618 (0.000)	-6.516 (0.000)	-5.264 (0.000)	-5.240 (0.000)	-5.184 (0.000)
PROFMARGIN[c]	-0.798 (0.650)	-1.247 (0.481)	-0.691 (0.694)	-3.049 (0.061)	-3.360 (0.039)	-2.981 (0.066)
NWCDEBT[c]	0.038 (0.001)	0.039 (0.001)	0.037 (0.002)	0.034 (0.002)	0.032 (0.003)	0.031 (0.004)
INTCOVERAGE	-11540 (0.000)	-11.786 (0.000)	-11.583 (0.000)	-10.494 (0.000)	-10.560 (0.000)	-10.473 (0.000)
DEBTASSETS	0.800 (0.000)	0.811 (0.000)	0.811 (0.000)	0.716 (0.000)	0.717 (0.000)	0.717 (0.000)
EARNVOL	7.728 (0.023)	7.706 (0.024)	7.889 (0.020)	6.676 (0.034)	6.659 (0.035)	6.785 (0.031)
LOAN CONTROLS						
CORPURPOSES				-20.240 (0.000)	-21.444 (0.000)	-21.075 (0.000)
REFINANCE				-15.521 (0.000)	-17.624 (0.000)	-16.454 (0.000)
TAKEOVER				0.079 (0.982)	-2.328 (0.495)	0.331 (0.923)
WORKCAPITAL				-22.226 (0.000)	-23.018 (0.000)	-23.260 (0.000)

[a] Continues on the next page.

Table 7 Continued

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CREDITLINE				-23.462 (0.000)	-24.584 (0.000)	-23.241 (0.000)
TERMLOAN				16.061 (0.001)	15.088 (0.002)	15.735 (0.001)
BRIDGELOAN				96.906 (0.000)	96.145 (0.000)	96.649 (0.000)
LLOANAMT				-22.365 (0.000)	-22.818 (0.000)	-22.740 (0.000)
DIVRESTRICT				18.794 (0.000)	17.766 (0.000)	18.526 (0.000)
SENIOR				-15.804 (0.000)	-12.762 (0.004)	-15.862 (0.000)
SECURED				66.058 (0.000)	69.762 (0.000)	64.953 (0.000)
RENEWAL				-6.431 (0.423)	-10.695 (0.183)	-5.909 (0.461)
GUARANTOR				17.044 (0.010)	18.598 (0.005)	15.360 (0.020)
SPONSOR				51.056 (0.000)	49.746 (0.000)	50.986 (0.000)
LLENDERS				-0.904 (0.629)	-0.617 (0.746)	-0.463 (0.807)
LMATURITY				-20.438 (0.000)	-21.559 (0.000)	-20.722 (0.000)
<u>ADD BOND CONTROLS</u>						
LTIMRPBOND				-0.973 (0.029)	4.324 (0.000)	4.099 (0.000)
Adjusted R^2	34.10	33.39	34.38	43.75	43.51	43.99
# observations	13,810	13,810	13,810	13,810	13,810	13,810

[b] The dependent variable is LOANSPREAD: Loan spread over Libor at the time of the loan. SINGLEBK: Dummy variable equal to 1 for loans extended by a single bank. MRPBOND: Dummy variable equal to 1 for firms whose most recent bond prior to the loan was a public bond. REC: Dummy variable equal to 1 for loans borrowed during a recession. LAGE=Log(AGE). LASSETS=LOG(ASSETS). LLENDER=LOG(LENDERS). LMATURITY=Log(Maturity). LTIMRPBOND=Log(1+TIMRPBOND). Remaining variables defined as in Table 1. Included in the regressions but not shown in the table are also dummy variables for the issuer's sector of activity as defined by SIC one-digit code. Values in parenthesis are p values.
[c] The coefficient of this variable was multiplied by an adjustment factor equal to 1,000,000.
Source: Authors' computations.