Bank Loans, Bonds, and Information Monopolies across the Business Cycle

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Abstract

Modern corporate finance theory suggests that bank finance results in better monitoring of borrowers, but that this leads to a significant cost: the private information that banks gain from monitoring lets them "hold-up" the borrowers for higher interest rates. In this paper, we seek empirical evidence for this information hold-up effect through a novel approach. Since firms are 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. We test this by comparing 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. Firms with public debt market access pay lower spreads on their bank loans, and spreads tend to rise in recessions, but spreads for firms with public debt market access rise significantly less in recessions. These findings are 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, and that the magnitude of this effect is economically significant.

1 Introduction

The idea that there are both costs and benefits to relying on 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. Being relatively concentrated, bank debt has more incentive to monitor the borrower than does dispersed "arm's length" debt. 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 financial condition.[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. Our evidence suggests that these costs do exist and are economically significant.

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.

Our paper takes 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, during recessions, banks that have an exploitable information advantage should be able to raise their rates by more than is justified by increased 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

[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.

problems than smaller ones, it should bias us against finding evidence of such monopolistic loan pricing behavior. Furthermore, 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 95 basis points on average; recessions raise loan spreads by 28 basis points for firms without bond market access, but do not raise spreads for firms with market access. 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 33 basis points for firms without market access and only 11 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 second, 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 without significant change. 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 (2002) 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.[2] 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]Bernanke and Gertler (1995) survey some of this literature. Other work includes theoretical models by Thakor (1996), Holmstrom and Tirole (1997), and Diamond and Rajan (2000), and empirical work by Kishan and Opiela (2000), Kashyap and Stein (2000), and Hubbard et al. (2002).

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.[3]

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).

A final point about implementing this model for real loans is the fact that most of the Dealscan borrowers have multiple "inside" banks. Nevertheless, these banks may effectively collude on pricing to the extent that they have repeated interactions with one another. Indeed, loan syndication is one simple way to get a group of banks pricing their loans as one.[4]

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*

[3]Hauswald and Marquez (2003) present a more complex model of bank competition under asymmetric information that obtains similar qualitative results.

[4]For further discussion of loan syndication and repeated relationships in syndication, see Dennis and Mullineaux (2000) and Sufi (2005).

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 come from several data sources including the Loan Pricing Corporation's Dealscan database (LPC), the Securities Data Corporation's Domestic New Bond Issuances database (SDC), the Center for Research on Securities Prices's stock prices database (CRSP), the Stock-Watson recession indexes, the Salomon Brother's bond yields indices, and Compustat.

We use 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. 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 use this database to obtain information first, on individual loans, including its spread over Libor, maturity, seniority status, purpose and type; second on the borrower, including its sector of activity, and its legal status (private or public firm); and finally on the lending syndicate, including the identity and role of the banks in the loan syndicate.

We rely on SDC's Domestic New Bond Issuances database to identify which firms in our sample 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 rely on this database to identify some features of the bonds issued by the firms in our sample, including their issuance date, their credit rating, and whether they were privately placed.

We use Compustat to get information on firms' balance sheets. Even though LPC contains loans from both private firms and publicly listed firms, given that Compustat is dominated by the latter we have to exclude from our sample the loans borrowed by privately held firms.

We rely on the CRSP database to link companies and subsidiaries that are part of the same firm, and to link companies over time that went through mergers, acquisitions or name changes.[5] We then use these links to merge the LPC, SDC and 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 use CRSP to determine our measure of stock price volatility.

We use the Salomon Brother's yield indices on new industrial long-term bonds to control for changes in the cost to access the bond market. We consider the indices on yields of triple-A and triple-B rated bonds because these go further back in time than say the indices on the investment-grade and below-grade bonds. We use the yields on thirty-year and 5-year Treasury bonds to determine the slope of the Treasury yield curve and, therefore, control for the expected changes in the short-term interest rates.

Finally, we rely 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.[6] According

[5]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 where this information was missing 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. We adopted a conservative criteria to solve the cases of multiple "cross-links" between companies we encountered and dropped the companies that could not be reasonably linked.

[6]These recessions overlap with the three recessions that existed during our sample period according to the

to this classification there are 67 quarters of expansion and 14 quarters of recession during our sample period 1982:1-2002:4. In the Robustness Checks section we discuss the implications for our results of using the Stock-Watson Recession Index itself instead of the recession dummy we just described.

3.2 Methodology

In order to test Hypotheses 1 through 3, we need to investigate loan spreads and determine 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:

$$LOANSPREAD = c + \delta \cdot PUBONDACCESS + \zeta \cdot REC + \eta \cdot REC \cdot PUBONDACCESS + \psi_i \sum_{i=1}^{L} X_i + \nu_j \sum_{j=1}^{F} Y_j + \epsilon. \quad (1)$$

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 use 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 and the Y_j represent firm-specific variables which might be expected to affect the loan's credit risk (more on these variables below). 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

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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 bond markets, in the sense that the firm can tap into a large number of reasonably well-informed investors. We use 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 in the Robustness Checks section.

We complement our definition of firms' access to the public bond market by controlling for the time that has elapsed since a firm issued its most recent public bond (prior to the loan). Specifically, we control for $LTIMRPBOND$, which measures the log of the number of months since the firm issued its most recent public bond. 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.

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 to 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 the credit rating of their bonds, adding two dummy variables, $MRPBONDblg$ and $MRPBONDnr$, respectively. The first variable equals one if the firm's most recent public

bond (prior to the loan) was rated below investment grade; the second variable equals one if that bond did not have a rating in SDC database. We consider for this purpose the Moody's ratings. When the bond does not have a Moody's rating but it has a rating from the S&P, we consider this rating instead.

As noted above, we also include a number of firm-specific and loan-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. $LAGE$ is the log of the firm's age in years. To compute the firm age we proxied the firm's year of birth by the year of its equity IPO. Older firms are typically better established and so less risky, so we expect this variable to have a negative effect on the loan spread. $LSALES$ is the log of the firm's real sales in hundreds of 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 and so should pay lower spreads on their loans. A more direct measure of the ability to service debt is its interest coverage, which we measure by $LINTCOVERAGE$, – the log of 1 plus the interest coverage ratio (EBITDA divided by interest expense) truncated at 0.[7] Again, a higher interest coverage ratio should make the firm's debt less risky. $LEVERAGE$ 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. We also attempt to account for the firm's probability of bankruptcy by controlling for its $ZSCORE$. This is an indicator of risk in the sense that it measures the number of standard deviations below the mean by which profits would have to fall in order to eliminate the firm's equity. Thus, the higher the $ZSCORE$ the lower the firm's risk, so we expect this variable to have a negative effect on the loan spread.[8]

[7]For firms with no interest expense this variable is set equal to the log of 1 plus earnings before taxes and depreciation.

[8]Following Boyd and Runkle (1993), we estimate the $ZSCORE$ for a firm using the following definition:

$$Z = \frac{1}{S_r}\left[\frac{1}{n}\sum_{j=1}^{n}\frac{2\tilde{\pi}_j}{A_j + A_{j-1}} + \frac{1}{n}\sum_{j=1}^{n}\frac{E_j + E_{j-1}}{A_j + A_{j-1}}\right],$$

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. $TANGIBLES$ 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 we expect this variable to 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.[9] Similarly, $R\&D$ is the firm's research and development expense divided by sales; this proxies for intellectual capital, which is intangible, and so we also 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 is less likely to lose value in default, so we expect this to have a negative effect on spreads.[10] $MKTBOOK$ 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 dummy variables 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 this reason, when we estimate our model of loan spreads we first account for firm-specific controls and then

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where A is the firm's assets, E is its equity, and S_r is the estimated standard deviation of r, the firm's return on assets, computed with quarterly data over the past three years.

[9] Firms are required to report expenses with advertising only when they exceed a certain value. For this reason, this variable is often missing in Compustat. The same is true of expenses with research and development. In either case, when the variable is missing we set it equal to zero. In the Robustness Checks section we discuss what happens when we drop these variables from our models.

[10] For firms with no debt, this variable is set equal to the difference between current assets and current liabilities.

investigate what happens when we add the following loan-specific controls. We include dummy variables equal to one if the loan has restrictions on paying dividends ($DIVRESTRICT$), is senior ($SENIOR$), is secured ($SECURED$), has a sponsor ($SPONSOR$), and a guarantor ($GUARANTOR$). 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 (measured by the log of maturity in years, $LMATURITY$) 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 $LLOANAMT$, the log of loan amount in hundreds of millions of 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.

Because the purpose of the loan is likely to impact its credit spread, we include dummy variables for loans taken out for corporate purposes, $CORPURPOSES$, to repay existing debt, $REFINANCE$, to finance takeovers, $TAKEOVER$, and for working capital purposes, $WORKCAPITAL$. Similarly, we include dummy variables to account for the type of the loan. Specifically, we include a dummy variable for lines of credit, $CREDITLINE$, a dummy variable for term loans, $TERMLOAN$, and a dummy variable for bridge loans, $BRIDGELOAN$.

We include an additional variable that may reflect the relative information advantage of existing lenders. $RENEWAL$ is a dummy variable indicating whether this loan is a renewal of an existing loan. If lenders are renewing a loan, this should indicate that the firm is in relatively good shape, leading to a negative effect on spread.[11]

We also control for the size of the loan syndicate by including the log of the number of lenders in the syndicate, $LLENDERS$, and by including a dummy variable, $SINGLENDER$, to distinguish the loans with a single lender. Syndicate participants do not compete to extend the loan to the firm, instead, they act cooperatively. Thus larger syndicates do not necessarily imply a higher competition to extend a loan to a firm. In contrast, larger loans usually have

[11] 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.

larger syndicates. Thus, the effect of this variable on spreads is ambiguous for the same reasons we discussed above regarding the effect of the size of the loan on spreads.

Finally, in addition to the checks we already mentioned, in the Robustness Checks section we investigate if our results are robust to several additional tests. In particular, we investigate if our main findings continue to hold when we (a) account for another measure of firm risk – the volatility of the firm's stock – $STOCKVOL$, (b) the slope of the yield curve, $TSPREAD$, and the difference the yields of new bonds rated triple-B and those of triple-A bonds, $BBBSPREAD$, (c) the level of $LIBOR$, which is the interest rate over which we compute our loan spreads, (d) the borrower's lending relationships with the banks in the loan syndicate, (e) the interaction of our recession dummy with our measures of firm's risk – $REC \cdot LEVERAGE$ and $REC \cdot ZSCORE$. We further investigate the robustness of our findings when we use the Stock Watson recession index, SW, instead of our recession dummy, REC, and when we classify firms as being non bank dependent based on our $PBOND$ dummy variable instead of $MRPBOND$. Recall that $PBOND$ takes the value one if the firm issued at least once in the public bond market prior to the loan while $MRPBOND$ takes the value one only if the firm's last bond issue (prior to the loan) was in the public bond market. Also, given that on several instances the loans to a firm in the LPC database are part of a deal package, and therefore have many features in common, we randomly select one loan per deal and rerun our models on the new sample made of these loans and those that are part of deals with a single facility. Finally, since different types of loans may have very different pricing characteristics, we reran our tests on a subsample consisting only of credit lines, which are the most numerous (66%) loan type in our sample.

3.3 Sample characterization

As we mentioned above, our data source for loans, the LPC database, includes both loans taken out by public firms as well as privately held firms. In order to get additional information on firms, however, we need to merge this data set with Compustat. Because Compustat only contains information on publicly listed firms we have 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. This left us with a sample of 13,846 loans.

Table 1 characterizes our sample of bank loans. The table compares 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. As the first row of the table shows, effectively on average bank dependent firms pay higher credit spreads on their loans than non bank dependent firms. Looking at the 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. Our firm controls, for example, indicate that bank dependent firms are younger, smaller, have fewer tangible assets, and spend more on advertising and R&D. The stock of bank dependent firms is on average more volatile but these firms are less leverage up. Also, on average, these firms have more growth opportunities and higher interest coverage. Bank dependent firms, however, borrow less often from the banks they borrowed from in the past.

With regard to our loan controls, bank dependent borrowers take out smaller and longer maturity loans. Loans to bank-dependent firms are provided by a smaller number of banks and are more likely to be provided by a single lender. These firms are more likely to have a guarantor and to face dividend restrictions as a result of their loans. Their loans, in addition, are somewhat more likely to be senior and secured.[12] Finally, bank dependent firms are more likely to borrow through term loans and to use their loans for working capital purposes, to fund takeovers and to refinance; they are less likely to borrow through credit lines and to use bridge loans.

4 Results

4.1 A univariate analysis of loan spreads

As a first cut at the problem, we begin by analyzing the impact of bank dependence and recessions on loan spreads, ignoring all other factors. The results of this comparison are presented in Table 2. As we now discuss, these results are consistent with our predictions.

In the table, Models 1 through 4 are univariate regressions of loan spread on $BOND$,

[12]The low percentage of loans that are secured is most likely the result of the large number of missing observations this variable has in the LPC database. The same is likely to be true of the renewal dummy, which also is extremely low.

$PBOND$, $MRPBOND$, and REC, respectively. The terms in parentheses below the coefficient estimates are p values. Throughout, standard errors are adjusted for clustering by firm. We see that firms that have issued any bond typically pay 75 basis points less than other firms; firms that have issued public bonds pay 90 basis points less than other firms; and firms whose most recent bond was publicly issued pay 102 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 20 basis points higher than during expansions, which is consistent with Hypothesis 2.[13]

Models 5 through 7 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 $REC \cdot BOND$ 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 31 basis points, 11 points more than in Model 4. Most strikingly, the interaction term $REC \cdot PBOND$ is strongly statistically and economically significant, at minus 25 basis points. Effectively, firms that have issued public bonds experience only a 6 basis point rise in spreads during a recession, unlike other borrowers, who face a rise of 31 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

[13]For further evidence on the impact of the state of the economy on bond credit spreads see Santos (2005), Bernanke (1993) and Fama and French (1989).

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 32 basis points.

In sum, consistent with our predictions, access to public bond markets produces first-cut results that are consistent with our hypotheses on the impact of bank information 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 versus those without) 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

Our multivariate results are shown in Table 3. Throughout, we use $MRPBOND$ as our measure of public bond market access. As we will see, the results continue to support Hypotheses 1 through 3.

Model 1 duplicates Model 7 from Table 2, and is shown for purposes of comparison. Model 2 and 3 begin the new analysis by including the firm-specific controls derived from Compustat; the two models differ only in that Model 3 adds $ZSCORE$ to the controls. As can easily be seen, the addition of this variable has negligible effect on the regression coefficients.

Although having access to the public bond market continues to reduce spreads significantly, the magnitude of the decrease is much smaller now: the coefficient on $MRPBOND$ is now only minus 17 basis points, versus minus 95 in Model 1. This suggests that much of the coefficient in Model 1 is due to differences in risk between firms with public bond market access and those without. By contrast, the recession dummy and the interaction between recessions and public bond market access have coefficients of roughly the same magnitude as before. Recessions raise spreads by 33 basis points, versus 28 basis points in Model 1. In a recession, loan spreads for firms with public bond market access rise by 22 basis points less than those of firms without such access, versus 32 basis points in Model 1. These results are

consistent with Hypotheses 1, 2, and 3.

The coefficients for the control variables 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, working capital/debt, leverage, and Z-score – all have their expected signs, and all but profit margin are strongly significant.

In Model 4, we augment the firm-level controls with the loan-specific controls. The basic thrust of the results is unchanged. The direct impact of public bond market access more than doubles to minus 38 basis points, though the impact of a recession falls to 22 basis points, and the interaction term is essentially unchanged at minus 20 basis points. The larger coefficient on bond market access 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. The weaker effect of a recession may reflect the fact that, in recessions, lenders tighten nonprice terms, muting the impact on spread. On a related note, one new control is the log of one plus the time since the firm's last public bond issue ($LTIMRPBOND$). This has a significantly positive effect, which is consistent with the notion that, the less recently the firm has issued public bonds, the lower the likelihood that it still has such access.

Looking at the other new controls, among the loan-purpose variables, takeovers have an insignificant impact on spreads, whereas other purposes 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 may also reflect the fact that larger (hence safer) firms have larger loans, which 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. The number of banks in the loan syndicate does not appear to have an effect on the loan spread once we control for our set of loan features.

In Models 5 and 6, 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 (or the rating was missing in the SDC database). 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 appropriate new dummy to that of $MRPBOND$. Model 5 does this with only the firm-specific controls, whereas Model 6 adds the loan-specific controls.

The results are largely what one would expect. Taking Model 5 first, as before, recessions have a significantly positive impact on spreads. Firms with public investment-grade bonds have spreads 37 basis points below those of bank-dependent firms, firms with public below-grade bonds have equivalent spreads to bank-dependent firms (a net of zero basis points), and firms with public unrated bonds have somewhat higher spreads (total impact of plus 7 basis points). The interaction of REC and $MRPBOND$ is still significantly negative, but only minus 16 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; even taking these coefficients at face value, the net impact (coefficient on $MRPBOND$ plus that for the appropriate credit rating dummy) remains negative.

Turning to Model 6, results are very similar. The impact of public bond market access is somewhat larger for investment grade bonds, and the net impact is now negative for both below-grade and unrated borrowers (minus 14 and minus 13 basis points, respectively). As in Model 4, the impact of a recession is slightly weaker (plus 22 basis points), but the impact of the interaction terms is roughly the same.

Overall, our results do suggest that, during recessions, banks increase lending rates for bank-dependent firms more than rates for firms with public bond market access – even if the access is to below-grade or unrated bonds. 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. 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 sales. 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 determinants (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 direct effect on firm risk. 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 ($S\&P500$) 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 bond issues exceed the minimum amount required to be in Lehman Brothers Corporate Bond Index ($LEHMAN$). 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 either have issued their most recent bonds publicly ($INDMKACCESSmrpbond$) or have ever issued public bonds ($INDMKACCESSpbond$). Finally, we include a dummy ($OLDERFIRMS$) 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 4 displays the first-stage results. The controls for firm age, sales, 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. These findings are consistent with Faulkender and Petersen (2003), who find that, all else equal, firms with public bond market access have higher leverage than those that without such access. As they suggest, this may reflect a relaxation of credit constraints for firms that are not bank-dependent.

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 consistently positive, it is statistically insignificant. Also, a chi-squared test soundly rejects the null hypothesis that the coefficients of the instrumental variables are jointly equal to zero.

The second-stage regression results are shown in Table 5. The five models correspond to the five models from Table 4. In all cases, we also include the "exogenous" firm-level controls 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. The coefficient on REC is positive and at the high end of the range of estimates from Table 3, at roughly 32 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 17 to 23 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.

5.2 Accounting for firm risk

Tables 6 through 8 present the results of several tests we perform to evaluate the robustness of our findings. In all tests we use models 4 and 6 of Table 3; these include both firm- and loan-specific controls, but for brevity, we do not report the coefficients of the loan-specific variables. Recall that the difference between model 4 and model 6 is that the latter accounts for the credit rating of the firm's last public bond prior to the loan. We start by investigating the robustness of our key findings to our controls for the firm's risk. As we will see, our findings are largely robust to these alternative measures of firm risk.

Our first test investigates the impact of controlling for the firm's risk as measured by the volatility of its stock. Toward this end we add $STOCKVOL$ to the control variables used in models 4 and 6 of Table 3. The results of this test are reported in models 1 and 2 of Table 6. As expected the coefficient on $STOCKVOL$ is positive and statistically significant. More importantly,. the coefficients on $MRPBOND$, REC, and their interaction are statistically significant and consistent with Hypotheses 1 through 3.

Our second test attempts to control for expected changes in the short-term interest rates and for the price of risk in the bond market. Toward this end we add to our core models the slope of the Treasury yield curve as defined by the difference between the 30 year and 5 year Treasury bonds, and the spread of new triple-B industrial bonds over new triple-A industrial bonds. Both of these spreads are measured at the time of the loan. The results of this test are

reported in models 3 and 4 of Table 6. The coefficients on the new controls are positive and statistically significant. Again, the results on our three terms of interest are consistent with Hypotheses 1 through 3.

Our third test attempts to control to changes in the level of the interest rate used to compute the loan spreads. Toward this end we add to the core models the level of this interest rate, $LIBOR$. The results of this test are reported in models 5 and 6 of Table 6. Note that there is a negative relationship between loan spreads and Libor. This variable, however, is only significant in model 6, and even there its p-value is only 0.8. More importantly, as with the previous tests, the results on our three variables of interest are consistent with Hypotheses 1 through 3.

Our fourth test investigates the impact of the way we control for the state of the economy on banks' ability to extract rents from borrowers. All the results presented so far were based on the recession dummy REC which we created based on the Stock-Watson Coincidental Recession Index. Recall that this is a monthly index which measures the probability that the economy is in a recession. Models 7 and 8 of Table 6 report the results of our tests when we use the index itself ($SWATSON$) rather than the recession dummy. Results are generally consistent with Hypotheses 1 through 3. In particular, the index has a significant coefficient of plus 31 basis points, and the interaction term between the index and bond market access has a significant coefficient of minus 25 basis points. The one caveat is that, for below-grade bonds, there is not support for Hypothesis 3: the positive coefficient on the interaction between the Stock-Watson index and having public below-grade bonds is somewhat significant and positive, causing a net effect of plus 28 points. On the other hand, the level of significance is significantly lower than that for the interaction between the index and bond market access.

Our fifth test investigates the impact of potential changes in firms' risk over the business cycle. Toward this end we added to our core models the interaction of our recession dummy with our measures of firm risk, that is, $REC \cdot LEVERAGE$ and $REC \cdot ZSCORE$. In the interest of space and because the second interaction is not statistically significant, models 1 and 2 of Table 7 report our results with only the first interaction. This new variable is positive and statistically significant, the impact of leverage on spreads is heightened during downturns. Still, the results on our three variables of interest continue to be consistent with Hypotheses 1 through 3.

5.3 Controlling for firm's bond market access and lending relationships

Thus far we have tested our hypotheses assuming that firms have access to the bond market if their most recent bond issue prior to the loan was a public bond. Models 3 and 4 of Table 7 investigate how our results are affected if instead we classify firms as having access to the public bond market if they have ever issued public bonds prior to the date of the loan ($PBOND$ equals one). The results are generally consistent with our hypotheses, but weaker than the results in Table 3. This is consistent with our view that recent bond issuance is a better measure of current access to the bond market. In this respect, it is interesting to note that the coefficient on the interaction term for below-grade is significantly positive, causing a net positive impact. Since we do not find this when we look at the most recent bond issue ($MRPBOND$), this suggests that below-grade bond issuers are more likely to have been shut out of the public bond market in a recession if they have not issued there recently.

Models 5 through 8 of Table 7 investigate the robustness of our findings when we account for firms' bank lending relationships. We assume that a firm has a relationship with a bank if it borrowed from it at least once over the last three years prior to the loan. We measure a firm's lending relationships with banks in two alternative ways. Under our first definition, we consider the firm's relationship with only the banks that act as lead underwriters for the loan syndicates that lent to the firm. Under the second definition, we consider the firm's relationship with all the banks that participated in the syndicates in a lending capacity to the firm. The results of controlling for the first measure of a firm's bank lending relationships are reported in models 5 and 6 of Table 7; the results of controlling for the second measure are reported in models 7 and 8. Our findings show that firms which borrow repeatedly from the same bank pay lower spreads on their loans, irrespective of the way we measure bank lending relationships. More importantly, the remaining results continue to be consistent with Hypotheses 1 through 3 after we control for the importance of bank lending relationships.

5.4 Accounting for loan deals with multiple facilities

A feature of syndicated loans is the existence of loan deals that give rise to multiple facilties. In some cases there are differences between these facilities; some have longer maturity than others, are associated with larger loans, or are provided by different sets of banks. In other cases, however, the multiple facilities of the same deal are similar. Thus far, we have treated

each facility in the database as a different loan. In order to test the robustness of our findings to this feature of the data, we selected (randomly) one facility from those deals with multiple facilities and retained the deals with a single facility. This led to a reduction in our sample from 13,846 loan to 9,857 loans.

We then rerun our core loan pricing models and some of our robustness checks with this sample of unique facilities. The results are reported in Table 8. The results are similar to those from the analogous earlier tests.

5.5 Additional robustness checks

One additional caveat to our results is that the different types of loans (credit lines, term loans, etc.) may have very different pricing characteristics that are not captured by the additive specification we use. To control for this, we rerun our core models on the subsample of lines of credit in our data, which are the most numerous loan type (66%) in our sample. We find similar results to our earlier tests when we consider this subsample.

As we mentioned earlier, firms are required to report expenses on advertising and R&D only when these exceed a certain amount. Because of this criterion, this variable is often missing in Compustat. As we note earlier, in these cases we set both variables equal to zero. We rerun our core models dropping both variables from our list of controls and again find similar results on the variables of interest to test Hypotheses 1 through 3. Again this was somewhat expected given that both variables are usually not statistically significant.

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.

References

Berger, A. and G. Udell (1990), "Collateral, Loan Quality, and Bank Risk," *Journal of Monetary Economics* **25(1)**, 21-42.

Bernanke, B. (1993), "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression," *American Economic Review* **73(3)**, 257-276.

Bernanke, B., and M. Gertler (1995), "Inside the Black Box: The Credit Channel of Monetary Policy Transmission," *Journal of Economic Perspectives* **9(4)**, 27-48.

Boot, A.W.A.(2000), "Relationship Banking: What do we know?" *Journal of Financial Intermediation* **9(1)**, 7-25.

Boyd, J.H., and D. Runkle (1993), "Size and performance of banking firms, " *Journal of Monetary Economics* **31**, 47-67.

Dennis, S., and D. Mullineaux (2000), "Syndicated Loans," *Journal of Financial Intermediation* **9**, 404-426.

Diamond, D.W. (1984), "Financial Intermediation and Delegated Monitoring," *Review of Economic Studies* **51**, 393-414.

Diamond, D.W. (1991), "Monitoring and Reputation: The Choice between Bank Loans and Directly Placed Debt," *Journal of Political Economy* **99(4)**, 689-721.

Diamond, D.W., and R.G. Rajan (2000), "A Theory of Bank Capital," *Journal of Finance* **55**, 2431–2465.

Fama, E.F. and K.R. French (1989), "Business Conditions and Expected Returns on Stocks and Bonds," *Journal of Financial Economics* **25**, 23-49.

Farinha, L. and J.A.C. Santos (2002), "Switching from Single to Multiple Bank Lending Relationships: Determinants and Implications," *Journal of Financial Intermediation* **11(2)**, 124-151.

Faulkender, M., and M. Petersen (2003), "Does the Source of Capital Affect Capital Structure?" Working paper, Washington University in St. Louis.

Friedman, B. and K. Kuttner (1992), "*Why does the Paper-Bill Spread Predict Real Economic Activity?"* in J. Stock and M. Watson (eds.).*New Research on Business Cycle Indicators and Forecasting*Chicago University Press, Chicago.

Hauswald, R., and R. Marquez (2003), "Information Technology and Financial Services Competition," *Review of Financial Studies* **16(3)**, 921-948.

Holmstrom, B. and J. Tirole (1997), "Financial Intermediation, Loanable Funds, and the Real Sector," *Quarterly Journal of Economics* **112**, 663-691.

Houston, J. and C. James (1996), "Bank Information Monopolies and the Mix of Private and Public Debt Claims" *Journal of Finance* **51**, 1863-1899.

Hubbard, R.G., K. Kuttner, and D. Palia (2002), "Are There Bank Effects in Borrowers' Costs of Funds? Evidence from a Matched Sample of Borrowers and Banks," *Journal of Business* **75(4)**, 559-581.

Kashyap, A., and J. Stein (2000), "What Do a Million Observations on Banks Say about the Transmission of Monetary Policy?," *American Economic Review* **90(3)**, 407-428.

Kishan, R., and T. Opiela (2000), "Bank Size, Bank Capital, and the Bank Lending Channel," *Journal of Money, Credit, and Banking* **32(1)**, 121-141.

Ongena, S. and D.C. Smith (2000), "What Determines the Number of Bank Relationships? Cross-Country Evidence," *Journal of Financial Intermediation* **9(1)**, 26-56.

Rajan, R.G. (1994), "Why Bank Credit Policies Fluctuate," *Quarterly Journal of Economics* **109(2)**, 399-441.

Rajan, R.G. (1992), "Insiders and Outsiders: The Choice between Informed and Arm's Length Debt," *Journal of Finance* **47(4)**, 1367-1400.

Santos, J.A.C (2005), "Why Firm Access to the Bond Market varies over the Business Cycle: A Theory and some Evidence," Forthcoming in the *Journal of Banking and Finance*.

Sharpe, S (1990), "Asymmetric Information, Bank Lending, and Implicit Contracts: A Stylized Model of Customer Relationships," Journal of Finance **45(4)**, 1069-1087.

Stock, J.H. and M.W. Watson (1989), "*New Indexes of Coincident and Leading Economic Indicators*," in O. Blanchard and S. Fischer (eds.),*NBER Macroeconomics Annual*, Boston.

Sufi, A. (2005), "Agency and Renegotiation in Corporate Finance: Evidence from Syndicated Loans," working paper, Massachusetts Institute of Technology.

Thakor, A. (1996), "Capital Requirements, Monetary Policy, and Aggregate Bank Lending: Theory and Evidence," *Journal of Finance* **51(1)**, 279-324.

Table 1
Sample characteristics[a]

Variables	Firms			
	Bank-dependent	Non dependent	Difference	T Statistic
LOANSPREAD	226.186	124.683	101.503	36.165***
FIRM CONTROLS				
AGE	14	30	-16	57.119***
SALES	6.308	36.689	-32.381	39.832***
TANGIBLES	0.676	0.748	-0.072	12.673***
ADVERTISING	0.028	0.014	0.014	2.231**
R&D	0.586	0.015	0.571	3.182***
MKTBOOK	2.150	2.032	0.118	3.429***
PROFMARGIN	-0.322	0.017	-0.339	1.726*
INTCOVERAGE	33.825	8.854	24.971	3.974***
NWCDEBT	18.660	7.571	11.089	1.061
LEVERAGE	0.313	0.360	-0.047	9.409***
ZSCORE	2.424	7.842	-5.418	1.412
STOCKVOL	0.043	0.012	-0.031	7.271***
RLENDINGnarrow (%)	30.039	41.419	-11.380	12.044***
RLENDINGbroad (%)	26.097	34.284	-8.187	22.462***
LOAN CONTROLS				
CORPURPOSES (%)	22.779	25.478	-2.699	3.067***
REFINANCE (%)	31.169	24.044	7.125	7.510***
TAKEOVER (%)	13.354	12.534	0.820	1.165
WORKCAPITAL (%)	16.688	7.104	9.584	13.099***
CREDITLINE (%)	63.217	76.127	-12.910	13.171***
TERMLOAN (%)	30.683	17.520	13.163	14.203***
BRIDGELOAN (%)	1.795	2.766	-0.971	3.334***
LOANAMT	0.760	3.103	-2.343	34.634***
DIVRESTRICT (%)	48.049	28.381	19.668	19.297***
SENIOR (%)	95.613	94.877	0.736	1.698*
SECURED (%)	9.132	4.304	4.828	8.520***
RENEWAL (%)	1.466	0.684	0.782	3.320***
GUARANTOR (%)	2.235	1.332	0.903	3.067***
SPONSOR (%)	5.688	5.499	0.189	0.394
LENDERS	5	12	-7	39.440***
SINGLENDER (%)	43.882	15.028	28.854	29.478***
MATURITY (%)	4	3	1	5.821***
SECTOR ACTIVITY				
SERVICES	16.945	8.846	8.099	10.875***
TRADE	15.919	11.749	4.170	5.612***
TRANSPORTATION	11.193	19.741	-8.548	12.278***
MANUFACTURING	49.478	52.937	-3.459	3.325***
# Observations	10,918	2,928	–	–

[a] LOANSPREAD: Loan spread over Libor at the time of the loan. AGE: Age in years. SALES: Sales in hundreds of millions dollars at 1980 prices. ASSETS: Assets in hundreds of millions dollars at 1980 prices. TANGIBLES: Property, plant and equipment plus inventories over assets. ADVERTISING: Advertising expenses over sales. R&D: Research and development expenses over sales. MKTBOOK: Market to book ratio. PROFMARGIN: Net income over sales. INTCOVERAGE: Earnings before taxes and depreciation over interest expenses. When the firm has no interest

expenses this variable is set equal to earnings before taxes and depreciation. NWCDEBT: Current assets minus current liabilities over total debt. When the firm has no debt this variable is set equal to current assets minus current liabilities. LEVERAGE: Total debt over assets. ZSCORE: Computed with quarterly data over the previous three years. STOCKVOL: Volatility (standard deviation) of the firm stock computed over the previous three years scaled by the stock price at the end of the year before the loan. RLENDINGnarrow: Dummy variable equal to 1 if the firm borrowed at least once from the lead underwriter(s) in the loan syndicate over the previous three years. RLENDINGbroad: Dummy variable equal to 1 if the firm borrowed at least once from any bank in the loan syndicate over the previous 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 hundreds of 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. LENDERS: Number of lenders in the loan syndicate. SINGLENDER: Dummy variable equals to 1 when the loan syndicate has a single lender. MATURITY: Maturity of the loan in years.
Source: Authors' computations.

Table 2

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

Variables	1	2	3	4	5	6	7
BOND	-74.537 (0.000)				-74.386 (0.000)		
PBOND		-90.244 (0.000)				-85.745 (0.000)	
MRPBOND			-101.503 (0.000)				-95.263 (0.000)
REC				19.523 (0.000)	26.247 (0.000)	31.079 (0.000)	27.797 (0.000)
REC BOND					-5.076 (0.545)		
REC PBOND						-24.771 (0.005)	
REC MRPBOND							-31.507 (0.000)
CONSTANT	237.990 (0.000)	230.747 (0.000)	226.186 (0.000)	200.831 (0.000)	233.190 (0.000)	224.845 (0.000)	220.722 (0.000)
Adjusted R^2	6.90	8.40	8.63	0.31	7.36	8.94	9.12
# observations	13,846	13,846	13,846	13,846	13,846	13,846	13,846

[a] Models estimated with robust standard errors clustered by firm. 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[a,b]

Variables	1	2	3	4	5	6
MRPBOND	-95.263	-17.436	-17.410	-38.073	-36.940	-48.649
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MRPBONDblg					37.206	34.670
					(0.000)	(0.000)
MRPBONDnrt					44.295	35.484
					(0.008)	(0.007)
REC	27.797	32.777	32.801	22.492	32.278	21.790
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
REC MRPBOND	-31.507	-21.597	-21.598	-20.212	-15.797	-16.483
	(0.000)	(0.002)	(0.002)	(0.001)	(0.037)	(0.010)
REC MRPBONDblg					6.050	8.322
					(0.663)	(0.448)
REC MRPBONDnrt					-31.824	-11.709
					(0.293)	(0.666)
LTIMRPBOND				5.027		3.692
				(0.000)		(0.007)
FIRM CONTROLS						
LAGE		-5.398	-5.401	-5.832	-4.922	-5.401
		(0.008)	(0.008)	(0.002)	(0.016)	(0.003)
LSALES		-44.221	-44.186	-18.100	-41.951	-16.152
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TANGIBLES		-30.187	-30.331	-24.483	-29.449	-24.111
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ADVERTISING		0.566	0.328	-4.591	1.484	-3.487
		(0.979)	(0.988)	(0.829)	(0.946)	(0.870)
R&D		-0.456	-0.459	-0.135	-0.488	-0.165
		(0.572)	(0.570)	(0.864)	(0.549)	(0.835)
MKTBOOK		-6.000	-5.965	-4.566	-5.713	-4.388
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PROFMARGIN		-0.240	-0.238	-0.130	-0.242	-0.135
		(0.105)	(0.107)	(0.372)	(0.105)	(0.354)
LINTCOVERAGE		-32.296	-32.260	-27.777	-32.180	-27.602
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NWCDEBT		0.002	0.002	0.003	0.001	0.002
		(0.328)	(0.327)	(0.030)	(0.355)	(0.032)
LEVERAGE		27.248	26.999	35.245	23.559	33.076
		(0.002)	(0.002)	(0.000)	(0.006)	(0.000)
ZSCORE			-0.014	-0.013	-0.014	-0.013
			(0.000)	(0.000)	(0.000)	(0.000)
LOAN CONTROLS						
CORPURPOSES				-21.801		-22.886
				(0.000)		(0.000)
REFINANCE				-16.914		-18.050
				(0.000)		(0.000)
TAKEOVER				3.161		2.154
				(0.511)		(0.655)
WORKCAPITAL				-21.380		-22.836
				(0.000)		(0.000)

[a] Continues on the next page.

Table 3 (Continued)

Variables	1	2	3	4	5	6
CREDITLINE				-21.261		-20.712
				(0.000)		(0.000)
TERMLOAN				15.787		15.948
				(0.011)		(0.009)
BRIDGELOAN				98.385		96.776
				(0.000)		(0.000)
LLOANAMT				-21.543		-21.732
				(0.000)		(0.000)
DIVRESTRICT				17.674		16.865
				(0.000)		(0.000)
SENIOR				-16.629		-14.841
				(0.010)		(0.022)
SECURED				60.307		59.983
				(0.000)		(0.000)
RENEWAL				-6.241		-7.066
				(0.442)		(0.383)
GUARANTOR				15.377		15.402
				(0.120)		(0.119)
SPONSOR				52.686		49.984
				(0.000)		(0.000)
LLENDERS				-2.872		-3.058
				(0.232)		(0.203)
SINGLENDER				6.258		6.069
				(0.135)		(0.146)
LMATURITY				-18.808		-20.096
				(0.000)		(0.000)
CONSTANT	220.722	342.547	342.673	628.031	339.422	629.020
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	9.12	36.22	36.25	46.26	36.58	46.52
# observations	13,846	13,846	13,846	13,846	13,846	13,846

[b] Models estimated with robust standard errors clustered by firm. 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. 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. MRPBONDnr: 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. LTIMRPBOND: Log of 1 plus the number of months since the firm issued its most recent public bond. LAGE=Log(AGE). LSALES=LOG(SALES). LINTCOVERAGE=log(1+INTCOVERAGE), with INTCOVERAGE truncate at 0. LLENDER=LOG(LENDERS). LMATURITY=Log(Maturity). Variables are computed as defined in Table 1. Values in parenthesis are p values.
Source: Authors' computations.

Table 4

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

Variables	1	2	3	4	5
NYSE	0.059	0.507	0.506	0.493	0.499
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LEHMAN	0.997	0.982	0.981	0.982	0.979
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
S&P500		0.357	0.354	0.367	0.366
		(0.000)	(0.000)	(0.000)	(0.000)
OLDERFIRMS			0.067	0.061	0.063
			(0.236)	(0.281)	(0.269)
INDMKACCESSmrpbond				0.976	
				(0.000)	
INDMKACCESSpbond					0.457
					(0.016)
FIRM CONTROLS					
LAGE	0.218	0.194	0.165	0.160	0.163
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LSALES	0.299	0.232	0.231	0.220	0.223
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TANGIBLES	0.146	0.141	0.140	0.055	0.090
	(0.023)	(0.028)	(0.029)	(0.000)	(0.181)
ADVERTISING	0.984	0.770	0.763	0.703	0.743
	(0.013)	(0.059)	(0.061)	(0.422)	(0.069)
R&D	-1.160	-1.535	-1.502	-1.410	-1.428
	(0.004)	(0.000)	(0.000)	(0.001)	(0.001)
MKTBOOK	0.043	0.034	0.034	0.034	0.034
	(0.000)	(0.004)	(0.004)	(0.003)	(0.003)
PROFMARGIN	0.007	0.008	0.008	0.008	0.008
	(0.599)	(0.573)	(0.565)	(0.567)	(0.566)
LINTCOVERAGE	-0.091	-0.100	-0.098	-0.096	-0.096
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NWCDEBT	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.954)	(0.917)	(0.934)	(0.906)	(0.918)
LEVERAGE	0.381	0.382	0.387	0.377	0.383
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ZSCORE	0.001	0.001	0.001	0.001	0.001
	(0.598)	(0.500)	(0.502)	(0.525)	(0.520)
CONSTANT	-2.509	-2.390	-2.340	-2.371	-2.365
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	39.70	40.25	40.26	40.37	40.26
% of correct predictions	85.77	85.79	85.76	85.74	85.71
# observations	13,846	13,846	13,846	13,846	13,846

[a] 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. The dependent variable is MRPBOND: Dummy variable equal to 1 for firms whose most recent bond prior to the loan was a public bond. NYSE: Dummy variable equal to 1 for firms that trade in the NYSE. 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. S&P500: Dummy variable equal to 1 for firms that are members of the S&P500 index. OLDERFIRMS: Dummy variable equal to 1 for firms older than 20 years. INDMKACCESSmrpbond: 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. INDMKACCESSpbond: 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 PBOND. LAGE=Log(AGE). LSALES=LOG(SALES). LINTCOVERAGE=log(1+INTCOVERAGE), with INTCOVERAGE truncate at 0. Variables are computed as defined in Table 1. Values in parenthesis are T statistics.
Source: Authors' computations.

Table 5

Loan spreads for bank-dependent and non-dependent borrowers:

Second stage of instrumental variable regression[a]

Variables	1	2	3	4	5
$\widehat{MRPBOND}$	-23.405	-33.059	-34.207	-35.996	-34.437
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
REC	31.615	32.230	32.213	32.411	32.363
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
REC $\widehat{MRPBOND}$	-17.090	-21.715	-21.843	-23.095	-22.589
	(0.044)	(0.008)	(0.008)	(0.005)	(0.006)
FIRM CONTROLS					
LAGE	-5.155	-4.624	-4.566	-4.463	-4.546
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
LSALES	-43.419	-41.829	-41.653	-41.346	-41.596
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TANGIBLES	-30.213	-30.054	-30.034	-30.005	-30.032
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ADVERTISING	0.643	1.213	1.279	1.387	1.296
	(0.968)	(0.940)	(0.937)	(0.932)	(0.936)
R&D	0.643	-0.487	-0.490	-0.493	-0.490
	(0.428)	(0.415)	(0.413)	(0.411)	(0.413)
MKTBOOK	-5.923	-5.828	-5.818	-5.799	-5.814
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PROFMARGIN	-0.238	-0.237	-0.237	-0.237	-0.237
	(0.042)	(0.044)	(0.042)	(0.045)	(0.044)
LINTCOVERAGE	-32.357	-32.450	-32.516	-32.542	-32.519
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NWCDEBT	0.002	0.002	0.001	0.001	0.001
	(0.431)	(0.455)	(0.457)	(0.463)	(0.459)
LEVERAGE	27.523	28.575	28.693	28.895	28.729
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ZSCORE	-0.014	-0.014	-0.014	-0.014	-0.014
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CONSTANT	342.531	341.540	341.449	341.240	341.385
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Adjusted R^2	36.15	36.03	36.01	35.96	36.00
# observations	13,846	13,846	13,846	13,846	13,846

[a] 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. The dependent variable is LOANSPREAD: Loan spread over Libor at the time of the loan. The models in this table are the second stage of instrumental variable regressions. For the instruments used in the first stage regression of each model see Table 4. $\widehat{LPBOND}$: Fitted values for MRPBOND computed based on models in Table 4. REC: Dummy variable equal to 1 for loans borrowed during a recession. LAGE=Log(AGE). LSALES=LOG(SALES). LINTCOVERAGE=log(1+INTCOVERAGE), with INTCOVERAGE truncate at 0. Variables arse computed defined as in Table 1. Values in parenthesis are p values.
Source: Authors' computations.

Table 6

Loan spreads for bank-dependent and non-dependent borrowers: Robustness checks[a]

Variables	1	2	3	4	5	6	7	8
MRPBOND	-37.225 (0.000)	-46.527 (0.000)	-34.069 (0.000)	-45.143 (0.000)	-38.339 (0.000)	-48.971 (0.000)	-38.890 (0.000)	-48.166 (0.000)
MRPBONDblg		31.544 (0.000)		36.216 (0.000)		34.871 (0.000)		30.308 (0.000)
MRPBONDnrt		20.281 (0.076)		38.045 (0.004)		35.651 (0.008)		33.068 (0.010)
REC	19.279 (0.000)	18.617 (0.000)	12.572 (0.002)	11.660 (0.004)	22.494 (0.000)	21.785 (0.000)		
REC MRPBOND	-18.959 (0.001)	-14.441 (0.027)	-20.004 (0.001)	-15.235 (0.019)	-21.092 (0.000)	-17.847 (0.005)		
REC MRPBONDblg		1.752 (0.878)		5.531 (0.614)		9.845 (0.374)		
REC MRPBONDnr		-12.550 (0.563)		-15.968 (0.561)		10.398 (0.701)		
SW							32.524 (0.000)	31.339 (0.000)
SW MRPBOND							-23.040 (0.018)	-25.051 (0.007)
SW MRPBONDblg								52.860 (0.055)
SW MRPBONDnr								7.622 (0.880)
STOCKVOL	41.930 (0.026)	42.261 (0.025)						
TSPREAD			11.420 (0.000)	11.432 (0.000)				
BBBSPREAD			41.981 (0.000)	42.794 (0.000)				
LIBOR					-1.235 (0.131)	-1.429 (0.078)		
LTIMRPBOND	4.784 (0.001)	3.796 (0.007)	4.419 (0.002)	3.029 (0.000)	5.058 (0.000)	3.708 (0.006)	4.981 (0.000)	3.620 (0.008)
FIRM CONTROLS								
LAGE	-6.528 (0.001)	-6.061 (0.002)	-6.507 (0.000)	-6.070 (0.001)	-5.991 (0.001)	-5.580 (0.002)	-5.866 (0.002)	-5.425 (0.003)
LSALES	-16.952 (0.000)	-15.408 (0.000)	-18.555 (0.000)	-16.549 (0.000)	-18.218 (0.000)	-16.264 (0.000)	-18.176 (0.000)	-16.282 (0.000)
TANGIBLES	-25.237 (0.000)	-24.872 (0.000)	-24.868 (0.000)	-24.474 (0.000)	-24.233 (0.000)	-23.818 (0.000)	-24.343 (0.000)	-24.026 (0.000)
ADVERTISING	-3.158 (0.884)	-2.176 (0.920)	-4.573 (0.830)	-3.445 (0.872)	-4.060 (0.850)	-2.867 (0.894)	-4.591 (0.829)	-3.529 (0.869)
R&D	-0.168 (0.844)	-0.194 (0.821)	-0.132 (0.868)	-0.163 (0.838)	-0.156 (0.844)	-0.190 (0.811)	-0.135 (0.864)	-0.165 (0.835)
MKTBOOK	-4.175 (0.000)	-4.031 (0.000)	-4.526 (0.000)	-4.342 (0.000)	-4.594 (0.000)	-4.419 (0.000)	-4.520 (0.000)	-4.349 (0.000)
PROFMARGIN	-0.117 (0.420)	-0.121 (0.405)	-0.123 (0.391)	-0.127 (0.375)	-0.136 (0.356)	-0.142 (0.336)	-0.126 (0.385)	-0.131 (0.366)
LINTCOVERAGE	-25.572 (0.000)	-25.446 (0.000)	-27.303 (0.000)	-27.111 (0.000)	-27.816 (0.000)	-27.646 (0.000)	-27.854 (0.000)	-27.710 (0.000)
NWCDEBT	0.002 (0.026)	0.002 (0.028)	0.002 (0.032)	0.002 (0.035)	0.003 (0.033)	0.002 (0.036)	0.003 (0.023)	0.003 (0.024)
LEVERAGE	43.908 (0.000)	41.184 (0.000)	34.413 (0.000)	32.146 (0.000)	35.411 (0.000)	33.245 (0.000)	35.585 (0.000)	33.532 (0.000)
ZSCORE	-0.013 (0.000)	-0.014 (0.000)	-0.012 (0.000)	-0.012 (0.000)	-0.013 (0.000)	-0.014 (0.000)	-0.013 (0.000)	-0.013 (0.000)
R^2	46.73	46.93	46.82	47.09	46.28	46.55	46.20	46.49
# observations	12,141	12,141	13,846	13,846	13,846	13,846	13,846	13,846

[a] Models estimated with robust standard errors clustered by firm. Included in the regressions but not shown in the table are also a constant, the set of LOAN CONTROLS used in Table 3, and dummy variables for the issuer's sector of activity as defined by SIC one-digit code. 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. MRPBONDnr: 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. LTIMRPBOND: Log of 1 plus the number of months since the firm issued its most recent public bond. LAGE=Log(AGE). LSALES=LOG(SALES). LINTCOVERAGE=log(1+INTCOVERAGE), with INTCOVERAGE truncate at 0. LLENDER=LOG(LENDERS). LMATURITY=Log(Maturity). SW: Stock and Watson's Experimental Coincident Recession Index (XRIC) on the month of the loan. TSPREAD: Treasury yield curve slope computed as the difference between the 30 and 5 year Treasury bonds. BBBSPREAD: Spread of new triple-B rated bonds over new triple-A rated bonds. Variables are computed as defined in Table 1. Values in parenthesis are p values.
Source: Authors' computations.

Table 7

Loan spreads for bank-dependent and non-dependent borrowers: Additional robustness checks[a]

Variables	1	2	3	4	5	6	7	8
MRPBOND	-37.922 (0.000)	-48.945 (0.000)			-41.276 (0.000)	-49.966 (0.000)	-30.483 (0.000)	-38.041 (0.000)
MRPBONDblg		35.875 (0.000)				33.253 (0.000)		22.039 (0.011
MRPBONDnrt		35.771 (0.007)				48.413 (0.014)		43.084 (0.066)
REC	11.023 (0.064)	9.859 (0.102)	22.067 (0.000)	21.555 (0.000)	21.646 (0.000)	20.931 (0.000)	32.663 (0.000)	31.918 (0.000)
REC MRPBOND	-21.171 (0.000)	-16.281 (0.011)			-22.574 (0.000)	-18.269 (0.008)	-34.210 (0.000)	-33.837 (0.000)
REC MRPBONDblg		3.433 (0.763)				11.214 (0.317)		16.651 (0.151)
REC MRPBONDnr		-12.506 (0.636)				-27.817 (0.361)		17.085 (0.708)
PBOND			-18.324 (0.029)	-33.729 (0.000)				
PBONDblg				30.480 (0.000)				
PBONDnrt				31.940 (0.004)				
REC PBOND			-11.301 (0.068)	-15.119 (0.023)				
REC PBONDblg				29.628 (0.009)				
REC PBONDnr				-23.645 (0.322)				
RLENDINGnarrow					-5.652 (0.030)	-5.808 (0.023)		
RlENDINGbroad							-5.643 (0.016)	-5.957 (0.011)
LTIMRPBOND	5.038 (0.000)	3.702 (0.006)	3.552 (0.008)	2.758 (0.034)	5.247 (0.000)	3.565 (0.011)	3.516 (0.028)	2.757 (0.090)
FIRM CONTROLS								
LAGE	-5.788 (0.002)	-5.350 (0.004)	-6.442 (0.001)	-5.777 (0.002)	-6.481 (0.001)	-6.0278 (0.001)	-6.513 (0.009)	-6.396 (0.008)
LSALES	-18.023 (0.000)	-16.047 (0.000)	-19.756 (0.000)	-16.946 (0.000)	-16.019 (0.000)	-14.083 (0.000)	-12.713 (0.000)	-11.287 (0.000)
TANGIBLES	-24.297 (0.000)	-23.920 (0.000)	-24.565 (0.000)	-23.463 (0.000)	-26.580 (0.000)	-25.983 (0.000)	-22.850 (0.004)	-22.981 (0.004)
ADVERTISING	-4.287 (0.840)	-3.120 (0.884)	-5.467 (0.794)	-3.974 (0.852)	-3.417 (0.874)	-2.825 (0.895)	-6.908 (0.254)	-7.021 (0.225)
R&D	-0.148 (0.851)	-0.180 (0.820)	-0.104 (0.894)	-0.148 (0.850)	-0.173 (0.829)	-0.184 (0.818)	-0.133 (0.648)	-0.124 (0.667)
MKTBOOK	-4.488 (0.000)	-4.303 (0.000)	-4.692 (0.000)	-4.425 (0.000)	-4.856 (0.000)	-4.673 (0.000)	-6.418	-6.218
PROFMARGIN	-0.133 (0.359)	-0.139 (0.341)	-0.130 (0.368)	-0.135 (0.350)	-0.144 (0.329)	-0.146 (0.320)	-0.250 (0.032)	-0.246 (0.035)
LINTCOVERAGE	-27.708 (0.000)	-27.524 (0.000)	-27.593 (0.000)	-27.533 (0.000)	-27.827 (0.000)	-27.594 (0.000)	-26.379 (0.000)	-26.012 (0.000)
NWCDEBT	0.003 (0.019)	0.003 (0.020)	0.003 (0.024)	0.003 (0.028)	0.002 (0.034)	0.002 (0.037)	0.003 (0.003)	0.003 (0.001)
LEVERAGE	30.124 (0.002)	27.708 (0.004)	34.144 (0.000)	30.389 (0.001)	34.944 (0.000)	33.339 (0.000)	23.088 (0.052)	22.664 (0.056)
REC LEVERAGE	35.606 (0.043)	37.004 (0.038)						
ZSCORE	-0.013 (0.000)	-0.013 (0.000)	-0.013 (0.000)	-0.013 (0.000)	-0.014 (0.000)	-0.014 (0.000)	-0.013 (0.017)	-0.013 (0.018)
R^2	46.31	46.57	46.09	46.49	47.23	47.53	52.20	52.58
# observations	13,846	13,846	13,846	13,846	14,774	14,774	66,967	66,967

[a] Models estimated with robust standard errors clustered by firm. Included in the regressions but not shown in the table are also a constant, the set of LOAN CONTROLS used in Table 3, and dummy variables for the issuer's sector of activity as defined by SIC one-digit code. 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. MRPBONDnr: 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. PBOND: Dummy variable equal to 1 for firms that issued public bonds prior to the loan. PBONDblg: Dummy variable equal to 1 for firms that issued below-grade rated public bonds prior to the loan. The rating classification is based on the last public bond of the firm. PBONDnr: Dummy variable equal to 1 for firms that issued non rated public bonds prior to the loan. The rating classification is based on the last public bond of the firm. LTIMRPBOND: Log of 1 plus the number of months since the firm issued its most recent public bond. LAGE=Log(AGE). LSALES=LOG(SALES). LINTCOVERAGE=log(1+INTCOVERAGE), with INTCOVERAGE truncate at 0. LLENDER=LOG(LENDERS). LMATURITY=Log(Maturity). Variables are computed as defined in Table 1. Values in parenthesis are p values.
Source: Authors' computations.

Table 8

Loan spreads for bank-dependent and non-dependent borrowers: One facility per loan deal[a]

Variables	1	2	3	4	5	6	7	8
MRPBOND	-38.111 (0.000)	-46.261 (0.000)	-46.145 (0.000)	-43.840 (0.000)	-47.714 (0.000)	-45.553 (0.000)	-47.800 (0.000)	-48.651 (0.000)
MRPBONDblg		33.297 (0.000)	29.618 (0.000)	35.157 (0.000)	33.802 (0.000)	29.611 (0.000)	34.301 (0.000)	31.202 (0.000)
MRPBONDnrt		39.209 (0.001)	26.032 (0.022)	42.459 (0.000)	38.964 (0.001)	36.400 (0.001)	39.063 (0.001)	38.425 (0.001)
REC	20.350 (0.000)	19.704 (0.000)	17.330 (0.000)	11.141 (0.005)	19.601 (0.000)		13.103 (0.035)	19.961 (0.000)
REC MRPBOND	-18.634 (0.001)	-15.600 (0.006)	-13.384 (0.021)	-14.401 (0.012)	-16.414 (0.004)		-14.723 (0.011)	-16.046 (0.005)
REC MRPBONDblg		7.372 (0.522)	4.540 (0.711)	5.024 (0.661)	7.414 (0.524)		2.814 (0.814)	10.568 (0.361)
REC MRPBONDnrt		-8.554 (0.783)	-17.653 (0.469)	-13.302 (0.661)	-11.232 (0.708)		-13.160 (0.660)	-10.849 (0.728)
SW						29.241 (0.000)		
SW MRPBOND						-22.905 (0.010)		
SW MRPBONDblg						44.229 (0.060)		
SW MRPBONDnt						21.372 (0.705)		
STOCKVOL			40.212 (0.038)					
TSPREAD				10.717 (0.000)				
BBBSPREAD				35.672 (0.000)				
LIBOR					-2.060 (0.009)			
RLENDING								-5.993 (0.015)
LTIMRPBOND	5.210 (0.000)	3.649 (0.006)	4.027 (0.003)	3.116 (0.020)	3.893 (0.003)	3.514 (0.007)	3.923 (0.003)	4.122 (0.002)
FIRM CONTROLS								
LAGE	-8.881 (0.000)	-8.476 (0.000)	-8.575 (0.000)	-9.054 (0.000)	-8.999 (0.000)	-8.517 (0.000)	-8.724 (0.000)	-8.781 (0.000)
LSALES	-17.275 (0.000)	-15.471 (0.000)	-14.732 (0.000)	-15.925 (0.000)	-14.745 (0.000)	-15.587 (0.000)	-14.515 (0.000)	-14.320 (0.000)
TANGIBLES	-22.519 (0.000)	-22.136 (0.000)	-21.594 (0.000)	-22.668 (0.000)	-19.669 (0.000)	-22.162 (0.000)	-20.048 (0.000)	-20.628 (0.000)
ADVERTISING	5.704 (0.800)	6.575 (0.769)	7.069 (0.752)	6.462 (0.769)	9.979 (0.641)	6.352 (0.777)	9.361 (0.656)	-8.155 (0.113)
R&D	-0.412 (0.622)	-0.435 (0.602)	-0.574 (0.512)	-0.433 (0.597)	-0.559 (0.479)	-0.427 (0.608)	-0.533 (0.492)	-0.094 (0.793)
MKTBOOK	-4.186 (0.000)	-4.044 (0.000)	-3.508 (0.000)	-4.010 (0.000)	-4.081 (0.000)	-3.988 (0.000)	-4.001 (0.000)	-4.046 (0.000)
PROFMARGIN	-0.145 (0.374)	-0.149 (0.358)	-0.154 (0.325)	-0.143 (0.365)	-0.169 (0.310)	-0.144 (0.372)	-0.162 (0.317)	-0.096 (0.352)
LINTCOVERAGE	-27.517 (0.000)	-27.377 (0.000)	-25.302 (0.000)	-26.099 (0.000)	-27.117 (0.000)	-27.444 (0.000)	-27.033 (0.000)	-27.281 (0.000)
NWCDEBT	0.003 (0.005)	0.003 (0.005)	0.002 (0.006)	0.002 (0.005)	0.003 (0.005)	0.003 (0.003)	0.003 (0.003)	0.003 (0.004)
LEVERAGE	44.994 (0.000)	42.339 (0.000)	48.610 (0.000)	41.347 (0.000)	42.419 (0.000)	42.986 (0.000)	38.289 (0.000)	43.952 (0.000)
REC LEVERAGE							20.941 (0.275)	
ZSCORE	-0.011 (0.000)	-0.011 (0.000)	-0.013 (0.000)	-0.010 (0.002)	-0.012 (0.000)	-0.011 (0.001)	-0.012 (0.000)	-0.011 (0.000)
R^2	46.88	47.13	46.77	47.55	46.70	47.13	46.92	47.24
# observations	9,857	9,857	8,633	9,857	9,857	9,857	9,857	9,857

[a] Models estimated with robust standard errors clustered by firm. Included in the regressions but not shown in the table are also a constant, the set of LOAN CONTROLS used in Table 3, and dummy variables for the issuer's sector of activity as defined by SIC one-digit code. The models of this table are estimated on a sample made of one facility per loan deal. In the case of deals with multiple facilities, we select the facility for this sample randomly. 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. MRPBONDnr: 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. LTIMRPBOND: Log of 1 plus the number of months since the firm issued its most recent public bond. LAGE=Log(AGE). LSALES=LOG(SALES). LINTCOVERAGE=log(1+INTCOVERAGE), with INTCOVERAGE truncate at 0. LLENDER=LOG(LENDERS). LMATURITY=Log(Maturity). SW: Stock and Watson's Experimental Coincident Recession Index (XRIC) on the month of the loan. TSPREAD: Treasury yield curve slope computed as the difference between the 30 and 5 year Treasury bonds. BBBSPREAD: Spread of new triple-B rated bonds over new triple-A rated bonds. Variables are computed as defined in Table 1. Values in parenthesis are p values.
Source: Authors' computations.