Bank Capital, Borrower Power, and Loan Rates

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Abstract

We test the predictions of several recent theories of how bank capital affects the rates that banks charge their borrowers. Key to all these theories is the notion that the relative bargaining power of a bank and its borrower are critical. We find that banks with low capital are more sensitive to borrower cash flow than are banks with high capital: low-capital banks charge relatively more for borrowers with low cash flow, but offer relatively steeper discounts for borrowers with high cash flow. These effects are robust to controls for business conditions and bank fixed effects. Our results suggest that low bank capital generally toughens bank bargaining power, especially vis-a-vis low-cash-flow borrowers, but weakens bank bargaining power vis-a-vis high-cash-flow borrowers. This is consistent with Diamond and Rajan's (2000) theory of bank capital. Also, consistent with earlier work, we find that rates for borrowers with access to public debt markets are relatively unaffected by their bank's capital level, but in some specifications even these borrowers face some rate impact if their bank has low capital.

1 Introduction

The link between bank capital levels and lending behavior is critically important to policy makers seeking to oversee the health of the banking system and its impact on the wider economy. It is widely thought that, both in the early 1990s and in the subprime mortgage crisis that began in 2007, low bank capital levels caused by large credit losses led to significant cutbacks in bank lending—so-called "credit crunches". A better understanding of this link can help policy makers make better decisions for bank regulation and intervention.

Several recent theories suggest that a bank's level of equity capital should affect the bank's lending behavior. Boot, Greenbaum, and Thakor (1993) predict that banks with low capital are more likely to exploit borrowers, sacrificing reputational capital in order to preserve financial capital. Combining this with the theories of Sharpe (1990) and Rajan (1992) on bank information monopoly, this predicts that, compared to banks with high capital, banks with low capital should charge higher rates to borrowers that are more bank-dependent. By contrast, Diamond and Rajan (2000) predict that banks with low capital are very focused on obtaining cash flow quickly; thus, compared to banks with high capital, they may charge more to borrowers with low cash flow, but give big discounts to borrowers with high cash flow.

Although both Diamond and Rajan (2000) and the combined theories of Boot et al. (1993), Sharpe (1990), and Rajan (1992) examine borrower bargaining power and thus borrower bank dependence, there are key differences between them. First, Diamond and Rajan explicitly focus on borrower cash flow as the key determinant of bargaining power when dealing with a low-capital bank. By contrast, Sharpe and Rajan focus on a bank's private information about its borrower as a cause of bank dependence, so in our tests of these theories we focus on borrower access to public debt markets as our measure of bank dependence, since this should be negatively correlated with the bank's private information. Second, the two theories have different predictions about the interaction between bank capital and borrower bargaining power. In Boot et al., more borrower bargaining power reduces the bank's ability to extract rents, so that low and high capital banks should charge similar rates to a given borrower. In Diamond and Rajan, more borrower bargaining power may actually lead to concessions if the bank has low capital, which would not be the case if the bank had high capital.

In this paper, we test these different theories on a sample of loans to publicly-traded U.S. borrowers from 1987 to 2007. We find evidence that supports the cash flow theory of

Diamond and Rajan (2000) and to lesser extent supports the bank reputation and borrower bank-dependence theory of Boot, Greenbaum, and Thakor (1993), Sharpe (1990), and Rajan (1992).

We find a significantly negative relationship between a bank's capital level and the loan spread over LIBOR. This result is robust to the inclusion of firm-, loan-, and bank-specific controls, and is potentially consistent with either theory. The size is economically significant: when all controls are included, the impact of a 1% decrease in a bank's capital/asset ratio is a roughly 3 basis points increase in loan spread. Moreover, borrower cash flow has a negative impact on lending rate, which one would expect since, all else equal, higher cash flow should reduce credit risk.

We then conduct tests of Diamond and Rajan (2000). We find that although a bank's capital still has a negative impact on the spread it charges, the interaction of borrower cash flow and bank capital level has a positive impact that can offset this. In other words, low-capital banks give bigger discounts for higher cash flow than high-capital banks do, to the extent that, if cash flow is sufficiently high, they charge lower all-in spreads than high-capital banks. These results are robust to the inclusion of year dummies, a proxy for market credit spreads, and the interaction of the credit spread proxy and borrower cash flow, so they do not seem to be picking up business cycle effects that are independently correlated with bank capital levels and with the link between borrower cash flow and lending spreads. Thus, our findings are consistent with Diamond and Rajan's predictions.

Turning to Boot, Greenbaum, and Thakor (1993), Sharpe (1990), and Rajan (1992), we examine the links between bank capital, borrower bank-dependence, and loan spreads. Consistent with earlier work, we find that banks with low capital charge higher spreads, but this effect is concentrated on borrowers that are more likely to be bank-dependent; those with access to public debt markets experience no significant net impact from their lending bank's capital level. These results continue to hold when we control for the likely endogeneity of public debt market access. When we include year dummies, the market credit spread, and the market credit spread's interaction with borrower market access, bank capital has a somewhat more negative impact on loan spreads; the interaction between public debt market access and capital loses significance and magnitude, but the net impact of bank capital for borrowers with public debt market access is not significantly different from zero. These findings are somewhat consistent with Boot et al.

It is possible that the negative impact of higher bank capital on lending rates is due to selection; i.e., banks with low capital may attract riskier borrowers. Our firm controls should mitigate this concern, but it is still possible that an unobservable dimension of borrower risk is at work. There are several reasons for discounting this. First, if one predicts loan spreads on the basis of our control variables and regresses the predicted spread on bank capital, the relationship is positive, suggesting that (observably) riskier borrowers go to banks with *higher* capital. Second, our results are robust to the inclusion of bank fixed effects, so that these results are not caused by unobservable time-independent selection between a given bank and its borrowers. Third, and most important, such a selection mechanism cannot be the whole story, because it does not explain why low-capital banks give a greater discount to high-cash-flow borrowers than high-capital banks do.

Our results are robust to a number of considerations in addition to endogenous market access and selection effects. Our robustness tests include using bank z-score instead of capital so as to take both bank risk and capital into account, interacting our controls for borrowers' risk with our control for the state of the economy to account for the possibility that banks attribute a higher weight to the risk of a borrower in downturns than in good times, and clustering errors both by firm and by bank.

The upshot is that a bank's capital level has a significant impact on the rates its borrowers pay, even for our sample of borrowers with publicly-traded equity. Low capital generally increases the rates a bank charges, but low-capital banks give significant discounts to borrowers with high cash flow, consistent with Diamond and Rajan (2000). Compared to borrowers that depend on banks for external funding, borrowers with access to public debt markets face less or no impact from their bank's capital level, a finding weakly consistent with Boot et al.

Our work is related to two recent empirical papers on the importance of bank capital for loan pricing. Hubbard, Kuttner, and Palia (2002) examine the pricing of U.S. bank loans to publicly-traded firms during the period 1987 to 1992. They hypothesize that banks with low capital will charge higher rates, but only for borrowers with high switching costs. Using various proxies for borrower switching costs (largely based on Sharpe (1990) and Rajan (1992)), their findings support this hypothesis. Steffen and Wahrenburg (2008) test a similar hypothesis on a sample of U.K. loans to both public and private borrowers during the period 1996 to 2005. Like Hubbard, Kuttner, and Palia (2002), they find that banks with low capital charge higher rates to borrowers with higher switching costs, but they find that this effect is limited to economic downturns. They argue that this is consistent with banks needing financial capital more in downturns, thus leading them to consume reputational capital by charging higher spreads during these periods.[1]

Our paper differs from these earlier works in several important respects. First, our sample is more recent than Hubbard, Kuttner, and Palia (2002) and in the U.S. rather than the U.K, unlike Steffen and Wahrenburg (2008). Second, rather than relying on a dummy variable for whether bank capital is low or not, we generally use the level of capital itself, giving our tests more power. Third, unlike Hubbard, Kuttner, and Palia (2002), we control for market conditions, and, unlike either paper, we control for the endogeneity of borrower bank dependence. Fourth, and most important, we assess several hypotheses linked to the predictions of Diamond and Rajan (2000).

Our analysis of bank-dependent borrowers is also related to a recent literature which attempts to investigate the importance of banks' informational advantage vis-a-vis their borrowers. Santos and Winton (2008) find that, controlling for risk, borrowers without public debt market access pay higher rates than borrowers with such access, and this difference increases during recessions, when banks are likely to have greater information monopoly rents from bank-dependent borrowers. Schenone (2008) finds that borrowers pay higher rates before their equity IPO than after their IPO; she argues that this effect is linked to bank information monopolies. Similarly, Hale and Santos (2009) find that borrowers pay lower loan rates after they undertake their bond IPO; they argue that this decline reflects a reduction in bank information monopolies. In contrast to this literature, which focuses solely on the impact of borrowers' public market access on bank bargaining power, our paper also investigates how bargaining power varies across banks depending on their capital level.

The rest of the paper is structured as follows. Section 2 discusses the relevant theories and set out our empirical hypotheses. Section 3 discusses out data and empirical methodology. Section 4 contains our main results, and section 5 discusses some robustness tests. Section 6 concludes our paper.

[1]We discuss both papers' methodology in more detail in the next section.

2 Empirical Hypotheses

In assessing the impact of a bank's capital level on its lending decisions, our first source of predictions is Diamond and Rajan (2000). They model how a bank's loan refinancing rate varies with the bank's capital level and the borrower's cash flow situation. Compared to a bank that has adequate capital relative to assets, a bank that has low capital may extract more rents from borrowers whose cash position is relatively weak and will extract fewer rents from borrowers whose cash position is relatively strong. The intuition is that a bank with low capital is desperate to get cash to shore up its liquidity position vis-a-vis depositors and other debt holders. If the borrower's cash flow is also somewhat weak, the bank has a credible threat to liquidate the borrower to get cash; this makes the borrower willing to pay more to avoid liquidation. For borrowers with strong cash flows, however, the bank's bargaining position is weak; knowing the bank needs cash now, the borrower can extract weaker lending terms in return for paying debts earlier. This leads to the following hypothesis.

Hypothesis 1: compared to adequately capitalized banks, banks with lower capital charge higher rates for refinancing borrowers with weak cash flow and lower rates for borrowers with strong cash flow.

Tests of Hypothesis 1 are subject to a possible critique, however: the correlation between bank capital levels and lending rates may be driven by some third variable that affects both independently. For example, it may be the case that a borrower's cash flow is more important for loan pricing in recessions, when such cash is most useful in warding off default. Also, banks suffer higher credit losses in recessions, reducing their capital. This would suggest that, in recessions, bank lending rates are likely to be more strongly decreasing in borrower cash flow, and bank capital levels are more likely to be low, leading to the correlation predicted by Hypothesis 1. To test for this possibility, we need to control for the state of the economy.

Hypothesis 2: controlling for the state of the economy and its effect on the importance of borrower cash flow for loan pricing, there is no link between bank capital level, borrower cash flow, and refinancing rates for firms.

Another set of hypotheses arises from the literature on bank reputation and lending incentives. Boot, Greenbaum, and Thakor (1993) predict that banks with low financial capital may sacrifice reputational capital by reneging on implicit guarantees. One such implicit guarantee is the commitment to not exploit monopoly power over borrowers. Following

Sharpe (1990) and Rajan (1992), in a single-period setting, banks can extract rents from bank-dependent borrowers through an informational hold-up mechanism: would-be competitor banks face a Winner's Curse in trying to win the business of these borrowers, and so they bid less aggressively, allowing the incumbent bank to extract rents on average. Such rents are increasing in the borrower's risk of default, as noted by Santos and Winton (2008). In a multiperiod setting, however, banks' reputation concerns may offset their incentive to exploit such rents.

Combining Boot et al. (1993) with the theories of bank rent extraction just mentioned, it follows that banks with lower financial capital should be more likely to sacrifice reputation in order to save or augment their capital. This leads to our next hypothesis.

Hypothesis 3: banks with lower capital charge higher lending rates for refinancing bank-dependent borrowers than do banks with adequate capital. For borrowers that are not bank-dependent, bank capital level has no impact on lending rates.

Although they do not lay out a theoretical justification or set of predictions, Hubbard, Kuttner, and Palia (2002) find results consistent with Hypothesis 3. In a sample of public U.S. firms from 1987 to 1992, banks with capital/assets of less than 5.5% charge higher rates for borrowers that are more likely to be bank-dependent (firms that have no debt rating, are in the smallest tercile of Compustat firms by sales or market capitalization, or borrow at spreads over the prime rate). By contrast, low-capital banks do not charge significantly different rates for borrowers that are less likely to be bank-dependent. As discussed in the next section, our tests differ from Hubbard, Kuttner, and Palia's (2002) in that we examine the continuous impact of capital rather than the impact of capital below a set cut-off, and we include controls for the state of the economy (see Hypothesis 4 below). Also, as noted in the introduction, unlike us, they do not take into account the endogeneity of borrower bank dependence (see Section 5 on robustness tests below).

Steffen and Wahrenburg (2008) outline Hypothesis 3 more clearly. Using a sample of public and private U.K. firms from 1995-2005, they find that banks with weak Tier-1 capital (less than 6.3% of assets) only charge higher rates to bank-dependent firms in recessions, precisely when potential rents and incentives to conserve financial capital are likely to be higher. Their tests differ from ours in that they use a dummy variable for low bank capital, run separate regressions for bank-dependent and non-bank-dependent firms, and run separate regressions for loans issued in expansions and loans issued in recessions. Also, they do not take into account the endogeneity of borrower bank dependence.

Tests of Hypothesis 3 are subject to the same critique we mentioned above with regards to the tests of Hypothesis 1: in a recession, bank capital levels tend to be lower, and bank-dependent firms may be relatively riskier in ways that our controls do not fully capture, leading to a spurious correlation between bank capital and bank-dependence. If controlling for the state of the economy wipes out bank capital effects, this would argue for spurious correlation as opposed to the information rent/reputation model. We have

Hypothesis 4: controlling for the state of the economy, there is no link between bank capital level, borrower bank-dependence, and the refinancing rates for firms.

3 Data, methodology and sample characterization

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 Salomon Brother's bond yields indices, Compustat, and from the Federal Reserve's Bank Call Reports.

We use LPC's Dealscan database of business loans to identify the firms that borrowed from banks and when they did so. Most but not all of the loans in this database are syndicated. 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. It is for this reason that we begin our sample in 1987. Our sample ends in June 2007. We also use the Dealscan database to obtain information on: individual loans, including the loan's spread over LIBOR, maturity, seniority status, purpose and type; the borrower, including its sector of activity, and its legal status (private or public firm); and finally, the lending syndicate, including the identity and role of the banks in the loan syndicate.

We use 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 firms 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 publicly placed.

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

We use 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.[2] 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 long-term industrial bonds to control for changes in the market's credit risk premium. We consider the indices on yields of triple-A and triple-B rated bonds because these go further back in time than the indices on the investment-grade and below-grade bonds.

Finally, we use the Reports of Condition and Income compiled by the FDIC, the Comptroller of the Currency, and the Federal Reserve System to obtain bank data, including the bank's capital-to-asset ratio, its size, profitability and risk, for the lead bank(s) in each loan syndicate. Wherever possible we get this data at bank level using Call Reports. If these reports are not available then we rely on Y9C Reports which have data at the bank holding company level.

[2]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 and dropped companies that could not be reasonably linked.

3.2 Methodology

In order to test our hypotheses, we need to determine the impact of bank capital on loan spreads, controlling for various borrowing firm, lending bank, and loan-specific characteristics. We begin with the predictions that derive from Diamond and Rajan (2000). For Hypothesis 1, our basic model of loan credit spreads is as follows:

$$\begin{aligned} LOANSPREAD_{f,l,b,t} &= c + \zeta \cdot CAPITAL_{b,t-1} + \delta \cdot CASHFLOW_{f,t-1} \quad (1) \\ &+ \eta \cdot CAPITAL_{b,t-1} \cdot CASHFLOW_{f,t-1} \\ &+ \sum_{i=1}^{I} \psi_i X_{i,l,t} + \sum_{j=1}^{J} \nu_j Y_{j,f,t-1} + \sum_{k=1}^{K} \beta_{k,t} Z_{k,b,t-1} + \epsilon_{f,t}. \quad (2) \end{aligned}$$

Here $LOANSPREAD_{f,l,b,t}$ is the spread over LIBOR of loan l of firm f from bank b at issue date t. According to Dealscan, our source of loan data, the all-in-drawn spread is a measure of the overall cost of the loan, expressed as a spread over the benchmark London interbank offering rate (LIBOR), because it takes into account both one-time and recurring fees associated with the loan. $CAPITAL_{b,t}$ is the ratio of bank b's equity capital to total assets. $CASHFLOW_{f,t}$ is one of several measures of firm f's cash flow, as described below. The $X_{i,l,t}$ represent loan-specific variables and the $Y_{j,f,t}$ represent various firm-specific variables, both of which might be expected to affect the loan's credit risk, and the $Z_{k,b,t}$ represent various bank-specific variables which might affect the rate at which the bank is willing to lend.

Hypothesis 1 asserts that ζ is negative (lower-capital banks charge strictly higher rates to low-cash-flow borrowers than higher-capital banks do), but η is positive (lower-capital banks charge lower rates for high-cash-flow borrowers than higher-capital banks do). Although Diamond and Rajan (2000) predict no relationship between borrower cash flow and lending rate for high-capital banks, their model assumes a very simple structure. In a more continuous model, higher cash flow means a lower probability of default, all else equal, and so we would expect that δ is negative.

For Hypothesis 2, we return to Equation (1) and include controls for business conditions. We examine whether inclusion of year dummies and a credit spread proxy (*BBB-AAA YIELD*, the spread between BBB and AAA bond yields) alters our results. We also include the interaction between the BBB-AAA spread and the borrower's cash flow to capture the possibility that cash flow matters more in times when credit spreads are high. If Hypothesis 2 holds, then the impact of capital and of its interaction with cash flow should now be zero.

As noted above, the borrowing firm's $CASHFLOW$ is a critical variable in our hypotheses. We use three alternative measures of cash flow: $LINTCOV$, which is the log of 1 plus the interest coverage ratio (i.e., earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by interest expense); $EBITDA\text{-}ASSET$, which is EBITDA divided by total assets; and $EBITDA\text{-}DEBT$, which is EBITDA divided by total debt. All three measures are common proxies for cash flow. Of these, $EBITDA\text{-}ASSET$ is likely to be the noisiest measure, since what matters for loan pricing in Diamond and Rajan (2000) is cash flow relative to debt payments rather than cash flow relative to total assets.

Turning to the predictions that derive from Sharpe (1990), Rajan (1992), and Boot, Greenbaum, and Thakor (1993), our basic model for Hypothesis 3 is

$$\begin{aligned} LOANSPREAD_{f,l,b,t} = c &+ \zeta \cdot CAPITAL_{b,t-1} + \delta \cdot MKT\ ACCESS_{f,t-1} \\ &+ \eta \cdot CAPITAL_{b,t-1} \cdot MKT\ ACCESS_{f,t-1} \\ &+ \sum_{i=1}^{I} \psi_i X_{i,l,t} + \sum_{j=1}^{J} \nu_j Y_{j,f,t-1} + \sum_{k=1}^{K} \beta_{k,t} Z_{k,b,t-1} + \epsilon_{f,t}. \end{aligned} \tag{3}$$

Here, $MKT\ ACCESS$ is a dummy variable that takes the value of one if the firm has access to public debt markets and zero otherwise. Because firms with such access have a broader array of sources of funds, they are likely to be less dependent on banks for financing; moreover, the fact that their debt is publicly traded reduces the amount of private information that their bank lenders have, reducing the extent to which the lenders can exploit information monopolies a la Sharpe (1990) and Rajan (1992). Hypothesis 3 predicts that δ is negative (firms with public debt market access pay lower spreads) and that ζ is negative whereas the sum of ζ and η is zero (bank capital has a decreasing impact on the rates of bank-dependent borrowers and no impact on borrowers with public debt market access).

We use three primary measures of market access: $CPRATING$, which takes the value of one if the firm has a commercial paper rating and zero otherwise; $CREDITRATING$, which takes the value of one if the firm has a public debt rating and zero otherwise; and $PBOND$, which equals one if the firm has issued a public bond in the last three years and zero otherwise. We also augment the last two of these measures by considering whether the firm's credit rating is above or below investment grade, since investment grade firms may have easier access to funds; as noted before, Rajan (1992) implies that less risky borrowers face lower information monopoly costs. In particular, we define $IGRADE$ and $BLGRADE$ as dummy variables that take the value of one if the firm's credit rating is investment grade or below investment grade, respectively, and zero otherwise; we also define $PBONDIGRADE$ and $PBONDBLGRADE$ as dummy variables that take the value of one if the firm issued public bonds in the last three years and its most recent bond was rated investment grade or below investment grade, respectively, and zero otherwise.

Following Santos and Winton (2008), 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.[3] This is consistent with earlier work that considers private placements to be closer to syndicated bank loans than to public bonds.

One possible concern with our measures of debt market access is that, as noted by Faulkender and Petersen (2006), they are endogenous; for example, larger firms are more likely to have such access. Following Faulkender and Petersen (2006) and Santos and Winton (2008), we deal with this via instrumental variables. First, we regress market access measures on a set of instruments, and then we use the predicted value of market access from this first step in our tests of Hypothesis 3. We discuss our specific instruments in Section 4 below.

To test Hypothesis 4, we expand Equation (3) and include controls for business conditions. As with Hypothesis 2 we examine whether inclusion of year dummies, the BBB-AAA yield spread, and the interaction of BBB-AAA spread and the market access dummy alters our results. Again, the interaction term is included to allow for the fact that market access may matter more in times when market conditions are poor (credit spreads are high). If Hypothesis 4 holds, then the impacts of capital and of its interaction with cash flow should be zero.

As noted above, in testing our hypotheses we also include a number of firm-specific controls, X, and loan-specific controls, Y, that may affect a firm's risk. We begin by discussing the firm-specific variables that we use. Several of these variables are proxies for the risk of the

[3] As a practical matter, there is far less information on private placements because the SEC filing rules on public issues do not apply to private issues. This makes it hard to control for firms' private placements.

firm. $LAGE$ is the log of the firm's age in years. To compute the firm age we proxy 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 sales in hundreds of millions 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. $LEVERAGE$ 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.

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. 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.[4] NWC 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.[5] $MKTOBOOK$ 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

[4]Firms are required to report expenses with advertising only when they exceed a certain value. For this reason, this variable is sometimes 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 Section 5 we discuss what happens when we drop these variables from our models.

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

could have a negative effect on spreads if it represents additional value (over and above book value) that debt holders can partially access in the event of default.

We complement this set of firm controls with two variables linked to the firm's stock market price. $EXRET$ is the firm's excess stock return (relative to the overall market) over the last twelve months. To the extent a firm outperforms the market's required return, it should have more cushion against default and thus a lower spread. $STOCKVOL$ is the standard deviation of the firm's stock return over the past twelve months. Higher volatility indicates greater risk, and thus a higher probability of default, so we expect this to have a positive impact on spreads.

Lastly, we include dummy variables for the credit rating of the borrower and dummy variables for single-digit SIC industry groups. Credit rating agencies claim that they have access to private information on firms that is not captured by our public Compustat data. Likewise, a given industry may face additional risk factors that are not captured by our controls, so this dummy allows us to capture such risk at a very broad level.

We now discuss our loan-specific variables. We include dummy variables equal to one if the loan has restrictions on paying dividends ($DIVRESTRICT$), is senior ($SENIOR$), is secured ($SECURED$), or has 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 $LAMOUNT$, the log of loan amount in hundreds of millions 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 affect its credit spread, we include dummy variables for loans taken out for corporate purposes ($CORPURPOSES$), to repay existing debt ($DEBTREPAY$), and for working capital purposes ($WORKCAPITAL$). Similarly, we include dummy variables to account for the type of the loan—whether it is a line of credit ($CREDITLINE$) or a term loan ($TERMLOAN$).

Another loan control is $RENEWAL$, which is a dummy variable indicating whether this loan is a renewal of an existing loan. If lenders renew a loan, this may indicate that the firm is in relatively good shape, which could lead to more aggressive competition and thus a negative effect on spread. Unfortunately, this variable is often missing from Dealscan, which limits our ability to test for this effect.

We also control for the size of the loan syndicate by including the number of lead arrangers in the syndicate, $LEADBANKS$. Syndicate arrangers do not compete to extend the loan to the firm; instead, they act cooperatively, so this should not proxy for competition per se. Multiple lead arrangers may lead to free rider problems in monitoring the borrower, however, which would lead to higher spreads.

Finally, we include $RELATIONSHIP$, which is a dummy variable equal to one if the firm borrowed from the same lead arranger in the three years prior to the current loan. A relationship may give the firm the benefit of a lower spread, but it is also possible that it indicates greater information monopoly, leading to higher spreads. Bharath, Dahiya, Saunders, and Srinivasan (2008) find that the impact of a relationship on spreads is negative; however, Santos and Winton (2008) find that this effect is reversed in recessions, when information monopolies are likely to be stronger and maintaining relationships is likely to be less attractive to lenders.

We also include bank-specific controls Z that may affect banks' willingness or ability to supply funds. $LASSETS$, the log of the bank's total assets, controls for bank size. Arguably, larger banks may be better-diversified or have better access to funding markets, leading to a lower cost of funds and thus lower loan spreads relative to LIBOR. Similarly, a bank's return on assets (ROA) may proxy for improved bank financial position, again leading to a lower loan spread. Conversely, indicators of bank risk such as the volatility of return on assets ($ROAVOL$) or net loan charge offs as a fraction of assets ($CHARGEOFFS$) may mean that the bank faces a higher cost of funds or is more willing to consume reputational capital in order to build up financial capital; in either case, this would suggest a positive impact on spreads.[6]

Bank access to public debt markets would also reduce a bank's cost of funds, leading to a lower loan spread. A bank's subordinated debt as a fraction of assets ($SUBDEBT$) may

[6]We use the volatility of ROA rather than stock return because a large number of the banks in the sample do not have publicly traded shares.

act as a substitute for bank equity capital, or subordinated debt may be an indicator of bank access to public debt markets; in either case, the impact on loan spreads should be negative.

We include the bank's holdings of cash and marketable securities as a fraction of total assets ($LIQUIDITY$) as a proxy for the bank's cost of funds; banks with more liquid assets should find it easier to fund loans on the margin, again leading to lower loan spreads. Finally, we include $LIBOR$, the LIBOR rate in percent, as a proxy for overall bank cost of funds.

3.3 Sample characterization

Table 1 presents the characteristics of our sample. There are 15,985 loans in our sample. We begin with the firm controls. As is common in corporate samples, the age, size, market/book ratio, and net working capital/debt are positively skewed, with mean values much greater than median values. As an example, the median firm had sales of $760 million, whereas the mean firm had sales of $3,783 million. By contrast, profit margin is negatively skewed, with a median of 3.70% and a mean of 0.3%. Leverage has a median of 29.3%, the log of interest coverage has a median of 1.92, and tangible assets as a fraction of total assets has a median of 70.3%. Only 18.9% of firms have a commercial paper rating, but 46.9% of firms have a credit rating. 21.9% of firms issued a public bond in the last three years, and most of these issued investment-grade bonds.

Turning to the loan controls, loan amount is positively skewed, with a median of $120 million and a mean of $324 million. The median maturity is 3.5 years. Large numbers of loans are secured, senior, or have dividend restrictions, but the percentage with guarantors is small (5.4%). 22.2% of loans are term loans, and 58.8% are credit lines. 41.1% of loans are from lead arrangers that lent to the firm at least once in the last three years ($RELATIONSHIP$); the median number of lead arrangers is 1, and the mean is only slightly higher (1.17).

Finally, considering bank controls, the mean and median bank capital ratio are 7.42% and 7.48%, respectively, and the interquartile range is 2.22%. Banks are significantly larger than their borrowers: median bank assets are $210 billion, and mean bank assets are $340 billion. Return on assets has a median of 1.41% and a mean of 1.31%. By contrast, the bank risk variables (net charge offs, return on asset volatility, and Z-score) are all highly positively skewed, indicating that most banks have relatively low risk but a few have very high risk. Less than 2% of banks have subordinated debt outstanding. Average liquidity ratios are roughly

21%. Finally, the median LIBOR rate is 5.13% and the median BBB-AAA yield spread is 0.84%.

4 Results

4.1 Basic Loan Spread Determinants

Our first set of regressions reported in Table 2 investigate the relationship between loan spreads and our firm-, loan-, and bank-specific controls, including firm interest coverage and bank capital. Throughout, our regressions results reflect robust standard errors clustered by firm.

Model 1 includes all of the firm- and loan-specific controls already mentioned along with bank capital. Two points stand out: interest coverage has a significant negative impact on spreads, as one would expect from risk-based loan pricing, and bank capital has a significant negative impact on spreads, consistent with the notion that banks with lower capital charge higher rates due to liquidity concerns or to bolster financial capital at the expense of reputational capital.

Most of the other firm controls have reasonable effects on spreads. Older and larger firms have lower spreads, as do firms with more tangible assets or high recent excess stock returns. Firms with higher leverage or stock volatility have higher spreads. These results are generally consistent with those found in Santos and Winton (2008) and Hale and Santos (2009).

Moving to the loan controls, larger loans do seem to be safer loans. Other loan features seem to proxy for firm risk, as expected from the earlier literature: longer-term loans go to safer firms, whereas secured loans or loans with guarantors tend to go to riskier firms. The number of lead banks has a positive impact on loan spreads. This is consistent with the notion that more lead arrangers means less monitoring due to free-rider problems.

In Model 2, we subdivide the credit rating dummy variable into dummies for the individual ratings from AAA to CC (unrated borrowers are the omitted category). As one would expect, higher-rated firms pay lower spreads, and vice versa; the exception is the CC-rating dummy, which has a large negative impact on spreads. Given that only 0.3% of the sample is rated CC, this may reflect an outlier. Bank capital's negative impact becomes even larger and remains significant. Other changes are that firm size, age, and tangible assets lose size and significance, and other firm controls now have smaller though still significant effects. These changes are not surprising, given that ratings encapsulate some public information about firm risk.

Model 3 adds more bank-specific controls. Most coefficients are relatively unchanged; the coefficient on bank capital becomes slightly larger and remains highly significant. Of the added bank controls, net charge offs are insignificant; bank size unexpectedly has a positive impact, but this is barely significant. ROA and ROA volatility have the expected signs. AAA banks charge significantly lower spreads, whereas lower-rated banks charge higher spreads that generally increase as rating declines.

Model 4 adds liquidity, subordinated debt, and LIBOR as controls. Liquidity has an unexpectedly positive impact on spreads. This may be because banks may hold more liquidity in bad times and may charge higher rates in bad times, causing a spurious correlation. Subordinated debt has the expected negative sign, but the coefficient is quite large. Finally, LIBOR has a negative impact on spreads; this may be because LIBOR tends to be higher during economic booms, when credit spreads are lower.

Model 5 adds the BBB-AAA yield spread and year dummies to control for time-varying business conditions. Several loan control results change. Renewal loses significance, and the loan purpose of repaying debt remains negative and significant but lower in magnitude. Seniority now has a strongly negative impact.

Turning to the impact on bank controls, bank capital's impact becomes stronger, suggesting that business cycle effects actually obscure the importance of capital. Bank size now has the expected negative and significant sign. ROA volatility, subordinated debt, liquidity, and several rating dummies lose significance, suggesting that some of the earlier results are in fact due to a correlation between these variables and business conditions.

Looking ahead to our formal hypothesis tests, we reemphasize that firm interest coverage and bank capital have significant negative impacts in all of our base models. In the interests of space, in what follows, we do not report the results for the various firm-, loan-, and bank-specific controls unless they are part of the hypothesis being tested.

4.2 Bank capital and borrower cash flow

Table 3 investigates Hypothesis 1. Each of the three models uses a different firm cash flow proxy: the log of 1 plus interest coverage, EBITDA over assets, and EBITDA over debt. In all three cases, bank capital continues to have a strong negative impact, as does firm cash flow. The interaction between bank capital and firm cash flow, however, is positive and significant, so that banks with weaker capital give bigger discounts for higher borrower cash flow than banks with stronger capital. This interaction effect is least significant for $EBITDA/ASSETS$, which is not surprising, given our earlier comments on the noise in this proxy as a measure of cash flow relative to debt payments.

Although this is consistent with Hypothesis 1, we can also look at the combined impact of capital, cash flow, and their interaction. As an example, consider Model 1. A borrower with $LINTCOV$ equal to 0.5 that borrows from a bank with 5% capital/assets has a combined impact of -38 basis points; for a bank with 10% capital/assets, the combined impact would be -63 basis points. Thus, the low-capital bank charges a rate that is 25 basis points higher than the high-capital bank. By contrast, if we consider a borrower with $LINTCOV$ equal to 3.5, the combined impact of capital, interest coverage, and their interaction would be -94 basis points for the low-capital bank and -90 basis points for the high-capital bank. In this case, the low-capital bank charges a rate that is 4 basis points *lower* than the high-capital bank. 18% of borrowers in our sample have interest coverage ratios that are high enough to cause this reversal.

Doing similar calculations for the other cash flow proxies shows that low-capital banks always charge higher spreads for low-cash-flow borrowers than do high-capital banks. Borrower cash flow must be high before this is completely offset. These results are consistent with Hypothesis 1.

Table 4 examines Hypothesis 1 in a different way. We take a subsample of loans from banks with either very low (less than or equal to 5% of assets) or very high capital (greater than or equal to 10% of assets). We then repeat the regressions of Table 3 with a dummy variable ($WELL\text{-}CAPITALIZED$) that equals one if capital is above 10% in place of the actual capital/assets ratio. It is immediately apparent that low-capital banks charge a higher base spread than high-capital banks (the coefficient on the well-capitalized dummy is negative), but this is strongly significant only for the interest coverage regression (Model 1) and is weakly significant for cash flow/assets (Model 2). By contrast, the interaction of cash flow and the well-capitalized dummy is always positive and significant (albeit weakly significant again for cash flow to assets); moreover, its coefficient is larger relative to that on the well-capitalized dummy than in the equivalent relationship in Table 3, suggesting that cash flow need not be as high before a low-capital bank charges less than a high-capital bank. Again, this is consistent with Hypothesis 1.

Table 5 examines Hypothesis 2. Models 1 through 3 correspond to the same models in Table 3, but with year dummies, the BBB-AAA yield spread, and the interaction of the BBB-AAA spread and borrower cash flow included. The BBB-AAA spread's impact is positive and highly significant in all three models, which is as expected — banks charge higher spreads when market credit spreads are high. Its interaction with cash flow is negative and significant (save for cash flow/assets in Model 2), which is also as expected — cash flow is more important for loan pricing, hence has a bigger negative impact on spread, when credit spreads are high. Nevertheless, in all three cases, the direct impact of bank capital is highly significant and more negative than in Table 3, and the interaction of capital and cash flow is positive and highly significant. Thus, Hypothesis 2 is rejected: controlling for economic conditions does not eliminate the effects of bank capital, borrower cash flow, and their interaction on loan spreads.

Overall, our results suggest that the predictions of Diamond and Rajan (2000) hold: relative to banks with high capital, banks with low capital charge higher rates for borrowers with low cash flow, but this effect steadily declines with borrower cash flow, so that results may be reversed for borrowers with very high cash flow.

4.3 Capital and borrower bank-dependence

We now turn to the question of how bank capital affects borrowers that either do or do not have access to public debt markets. In Table 6, we examine Hypothesis 3, using our three indicators for market access: whether the borrower has a commercial paper rating, whether the borrower has a credit rating, and whether the borrower has issued a public bond at least once in the last three years (Models 1, 2, and 4). As noted earlier, we also split up firms with credit ratings into above and below investment grade (Model 3), and firms that have issued public bonds into those whose most recent public bond was above or below investment grade (Model 5). Finally, to avoid multicolinearity, in all models we drop the individual ratings dummies from the firm controls.

The first thing to note is that, in Models 1, 2, and 4, the direct impact of bank capital on loan spreads is negative and significant. The simple market access dummies have significant negative impacts as well. The interaction of capital and market access, however, is positive and significant, and its coefficient is roughly equal to the coefficient on capital alone in magnitude. The implication is that, for firms that are bank dependent, less bank capital means a higher loan spread, whereas for firms with public debt market access, the net impact of capital is much smaller. At the bottom of the table, we report p-values for the hypothesis that this net impact is equal to zero; as can be seen, we cannot reject this hypothesis in any of the cases. These results are consistent with Hypothesis 3: bank capital only affects borrowers that are bank dependent.

When we split borrowers with public debt market access into those that are above and below investment grade, however, differences emerge. In both Models 3 and 5, bank capital still has a significant negative impact on loan spreads, and this effect is almost completely offset for investment-grade borrowers, but there is no significant offset for below-investment-grade borrowers, even though they have access to public debt markets. Nevertheless, the interaction between market access and bank capital still has a positive albeit insignificant impact for the below-investment-grade borrowers, and we cannot reject the null hypothesis that the net impact of bank capital is zero for these borrowers. Being an investment-grade borrower gives a much lower loan spread than being a borrower without bond market access, whereas being a below-investment-grade borrower has no significant impact on spread. These results suggest that, among firms with access to public debt markets, investment-grade borrowers face sufficient competition such that their bank's capital ratio has no impact on the loan spread they pay, whereas below-investment-grade borrowers are charged more by low-capital banks but not as much more as borrowers without market access. This is consistent with Hypothesis 3 to the extent that investment-grade borrowers are not dependent on banks and below-investment-grade borrowers are somewhat dependent on banks.

Until now, we have been taking a firm's access to public debt markets as exogenous, but as we noted in Section 3.2 above, such access depends on firm characteristics, making it endogenous. To correct for this, we follow the two-step procedure of Santos and Winton (2008): first, we do a probit analysis of the determinants of bond market access, including several instruments that are not part of our firm controls, then we use the predicted value of bond market access in a second-stage regression that is analogous to those in Table 6. The instruments we use are whether a firm is included in the S&P 500, whether a firm's shares trade on the NYSE, whether a firm's outstanding bond issues are large enough to merit inclusion in Lehmann's Corporate Bond Index, and whether the firm's age is above the sample median. As discussed in Faulkender and Petersen (2006) and Santos and Winton (2008), these variables correlate with public debt market access but should not have a direct impact on spreads over and above that induced by our other firm controls.

We report the second-stage results of this procedure in Table 7. Because we do not have instruments for above- or below-investment grade status, we are unable to do tests analogous to Models 3 and 5 of Table 6; thus, Models 1, 2, and 3 of Table 7 correspond to Models 1, 2, and 4 of Table 6.

It is immediate that the results of Table 6 hold even more strongly now. Bank capital has a bigger and highly significant negative impact on lending rates. Similarly, the negative impact on loan rates of public debt market access is bigger and more significant than before. Finally, the positive impact of the interaction between bank capital and public debt market access is much larger and highly significant in its own right, so that in all cases it more than offsets the negative direct impact of bank capital. Indeed, in Model 3, the interaction term is so large that the net impact of bank capital for borrowers with public debt market access is positive with a p-value of 0.046.

In Table 8, we consider how these results are affected when we control for the state of the economy. To that end we add year dummies, the BBB-AAA yield spread, and this spread's interaction with the relevant market access dummy to our model of loan spreads. Models 1 through 3 correspond to Models 1 through 3 of Table 7 with these additional controls. In all cases, the BBB-AAA yield spread has a positive and significant impact on loan spreads, as one would expect, but this is more than offset for firms with access to the commercial paper market and firms that have recently issued investment-grade public bonds. The direct impact of bank capital is still significantly negative and of similar or greater size as in Table 7. The interaction of bank capital and public debt market access continues to be positive, and, although it is now smaller than in Table 7 and insignificant, we cannot reject the hypothesis that the net impact of bank capital on firms with public debt market access is zero. These results weakly support

Hypothesis 3 and reject Hypothesis: bank capital has a negative impact on lending rates for borrowers without public debt market access, and this effect does not seem to be driven by business conditions. In other words, our results weakly support the predictions of combined theories of Boot et al. (1993), Sharpe (1990), and Rajan (1992).

5 Robustness tests

In this section, we report the results of several robustness tests of our basic results. As we will see, most of our results remain unchanged.

5.1 Firm-bank selection effects

Our result that bank capital typically has a strong negative impact on loan spreads may be driven by some form of selection. In particular, it is possible that unobservably riskier borrowers seek out low-capital banks, or that banks with low capital are those that have taken on riskier borrowers and suffered losses as a result.

In Table 9 we do a first-cut examination of this issue, comparing at the observable characteristics of borrowers at banks with less than 5% capital/assets to borrowers at banks with greater than 10% capital/assets. We see that, across these two extreme subsamples of banks, there are a number of significant differences. Borrowers at the low-capital banks are younger, smaller, more highly levered, have lower market/book ratios, lower interest coverage, and lower net working capital than borrowers of high-capital banks. All of these go in the direction of higher risk for borrowers of low-capital banks. On the other hand, these borrowers have higher tangible assets and similar stock return volatility compared to borrowers of high-capital banks, and they have higher values of the other cash flow measures (cash flow/assets and cash flow/debt). Also, the loans of the borrowers at low-capital banks are less likely to be secured or have a guarantor (which tends to suggest lower risk, since riskier loans are more likely to be secured or have guarantors), and are less likely to have dividend restrictions.

Turning to the bank characteristics, the low-capital banks are smaller, have lower ROA, higher ROA volatility, higher charge offs, and lower z-scores than the high-capital banks, all of which is consistent with the low-capital banks facing greater risk.

To the extent this analysis suggests that low capital banks may in fact have observably riskier borrowers, we would expect that firms with higher predicted loan spreads (based on firm and loan characteristics) are associated with lower bank capital; that is, regressing predicted loan spread on bank capital should give a negative coefficient to bank capital. In unreported results, we do this, and find that the coefficient on bank capital is always positive. Thus, selection on observable risk does not seem to drive the negative relationship between loan spreads and bank capital.

Of course, it is possible that our results on bank capital are due to selection along some unobservable dimension of borrower risk. Our next robustness test is to include bank fixed effects so as to control for bank-specific differences in capital and in loan portfolio risk. Tables 10 and 11 add bank fixed effects to the tests of Tables 5 and 8, respectively. Table 10 shows that Hypothesis 1 still holds, and Hypothesis 2 is still rejected; indeed, coefficients are slightly larger than they were in Table 5.

Now consider Table 11. The direct impact of bank capital is still negative and significant, though slightly smaller than in Table 8. Again, the impact of public debt market access is negative and in one case significant. However, the interaction of capital and access has a smaller impact than in Table 8, and, in the case of Model 1 (where having a commercial paper rating proxies for access), the hypothesis that the net impact of capital on borrowers with public debt market access is zero is rejected at the 10% level of significance. Nevertheless, these results are generally consistent with Hypothesis 3 and reject Hypothesis 4: bank capital has a negative impact on loan rates, and this is not driven by business conditions.

Our use of bank fixed effects corrects for differences in average levels of capital across banks, but it does not correct for shifts in a given bank's capital level over time. Thus, it is still possible that a bank whose capital is lower than its usual level has riskier-than-usual loans. Nevertheless, even if banks with lower-than-usual capital attract riskier borrowers, this does not explain our result that low-capital banks charge high-cash-flow borrowers lower spreads than high-capital banks do. Thus, selection cannot be the whole story.

5.2 Substituting bank z-score for capital in our tests

Another concern is that the capital/assets ratio is a very crude measure of a bank's capital adequacy, because it does not incorporate the risk of the bank's operations; a bank that has capital/assets of 4% but invests mostly in T-bills may be less risky than a bank that has a higher capital/assets ratio but invests mostly in risky loans. To control for this possibility, Tables 12 and 13 substitute a bank's z-score rather for its capital ratio. Z-score measures how many standard deviations of ROA are needed to bring a bank's capital ratio to zero; thus, it indicates how thick or thin the bank's capital cushion is relative to its earnings risk. In Table 12, results are roughly consistent with those for Table 5: the direct impact of bank z-score is negative and significant, as is that for borrower cash flow (except for cash flow to debt), but the interaction is positive and significant. The results in Table 13 are roughly consistent with those from Table 8: z-score has a negative direct impact, and the offset for firms with market access is insignificant and smaller in magnitude. The one caveat is that now, the impact of capital is not significant when market access is measured by having a bond rating (Model 2).

5.3 Clustering simultaneously by firm and by bank

Throughout the paper standard errors are adjusted for clustering by firm. Since banks extend multiple loans each year this could lead the error terms in our regression to be clustered by bank as well as by firm. To address this issue, we follow Petersen (2006) and rerun our core regressions with clustering by bank as well as by firm. The results of this test are reported in Tables 14 and 15. Once again, our results continue to support Hypothesis 1, weakly support Hypothesis 3, and reject Hypotheses 2 and 4: capital and cash flow matter, even with economic conditions taken into account, but the impact of market access is muted.

5.4 Other robustness tests

Both the theory of Boot, Greenbaum, and Thakor (1993) and that of Diamond and Rajan (2000) assume that a loan is made by a single bank. However, as we noted above, many of the loans in our sample are syndicated. This is less of a problem than might appear because more than 83% of our loans have a single lead arranger. As discussed by Dennis and Mullineaux (2000) and Sufi (2007), in a syndicated loan, the bank that is the lead arranger sets the loan terms and rate on behalf of the rest of the syndicate. The lead arranger is also responsible for ongoing monitoring of the loan terms and the borrower's condition. In addition, Sufi (2007) finds evidence that loan terms are chosen so as to improve the lead arranger's incentives to monitor the borrower. In other words, the lead arranger of a syndicated loan plays the role of the single-bank lenders in those theories. Since the vast majority of loans in our sample have only one lead arranger, this is a reasonable assumption. Further, limiting our sample to loans with only one lead arranger does not affect our key findings in any meaningful way.[7]

Lastly, our tests consider a large set of controls to account for the risk of borrowers. In addition, we investigate the robustness of our findings when we account for the state of the economy. In doing so, we allowed for the importance of our controls for the borrower cash flow and for the importance of our proxy of the borrower access to the bond market to vary over the business cycle by adding the interaction of these variables with our control for the state of the economy $BBBSPD$. We did not allow for a similar variation on our controls for borrowers' risk even though banks may attribute a higher weight to the risk of a borrower in downturns than in good times. To account for this concern we added to the loan pricing models we use to test hypotheses 2 and 4 the interaction of $BBBSPD$ with our key controls for borrower risk, $LEVERAGE$, $STOCKVOL$, $PROFMARGIN$, $TANGIBLES$, and $LSALES$. Most of these interaction variables come out significant and with the expected sign, confirming that banks assign more weight to risky borrowers in downturns than in good times. More importantly, adding this set of controls does not affect in any meaningful way the results of our tests on hypotheses 2 and 4, which we report in Tables 5 and 8, respectively.[8]

6 Final remarks

Our paper examines the link between a bank's capital level and the rate it charges its borrowers, and how this link is affected by the borrower's relative bargaining power. Our results strongly support the predictions of Diamond and Rajan (2000): bank capital's impact depends on the cash flow position of the borrower, with low-cash-flow borrowers having little bargaining power, and high-cash-flow borrowers having greater bargaining power, vis-a-vis low-capital banks. Our work also provides some support for the bank reputation model of Boot, Greenbaum, and Thakor (1993) as applied to Sharpe (1990) and Rajan (1992): banks with low capital charge

[7]When we limit our sample to single arranger loans we continue to find similar results to those reported in Table 5, which tests hypothesis 2, and to those reported in Table 8, which tests hypothesis 4. There is one difference in the tests of hypothesis 4: the interaction between $CAPITAL$ and our proxy for borrower access to the bond market, $RATING$, is now positive and significant, but as before we cannot reject that the sum of this interaction with $CAPITAL$ is equal to zero, in other words, that bank capital has not effect on borrowers with access to the bond market. These results are available from the authors upon request.

[8]The results with these additional controls are available from the authors upon request.

significantly lower rates to borrowers that do not have access to public debt markets, whereas the impact of bank capital on borrowers that have such access is generally insignificant once controls for business conditions are imposed.

These results are of more than academic interest. First of all, the impact of capital is economically significant: a swing of 5% in capital/assets leads to an impact of roughly 15 basis points in most specifications. Moreover, recall that all of these borrowers have publicly-traded equity. To find that lower bank capital has significant effects on these borrowers suggests that the effects on borrowers that are privately-held are even greater.[9]

[9] Again, Schenone's (2008) work suggests that privately-held borrowers are subject to greater bank lock-in effects than publicly-traded borrowers.

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Table 1 Sample characterization[a]

Variables	Quartiles First	Quartiles Median	Quartiles Third	Mean	Std deviatiob
LOANSPREAD	65	150	250	170.775	124.383
		FIRM CONTROLS			
AGE	7	14	35	21.101	16.981
SALES	2.601	7.601	27.914	37.830	112.585
LEVERAGE	0.166	0.293	0.417	0.306	0.207
MKTOBOOK	1.139	1.445	1.992	1.785	1.307
PROMARGIN	0.006	0.037	0.071	0.003	0.233
LINTCOV	1.399	1.921	2.589	2.040	1.122
NWC	0.060	0.461	1.362	7.100	82.852
TANGIBLES	0.455	0.703	0.970	0.719	0.358
R&D	0	0	0.015	0.021	0.055
ADVERTISING	0	0	0.005	0.011	0.042
STOCKVOL	18.745	26.541	38.434	31.632	20.028
EXRET	-0.574	0.369	1.404	0.449	2.430
CPRATING				0.189	
CREDITRATING				0.469	
AAA				0.005	
AA				0.020	
A				0.104	
BBB				0.143	
BB				0.127	
B				0.064	
CCC				0.003	
CC				0.003	
PBOND				0.219	
PBONDIGRADE				0.137	
PBONDBGRADE				0.054	
EBITDA-ASSET	0.089	0.130	0.177	0.128	0.110
EBITDA-DEBT	0.220	0.395	0.783	1.333	4.414
		LOAN CONTROLS			
AMOUNT	0.250	1.200	3.500	3.235	6.404
MATURITY	1.5	3.5	5	3.968	27.558
RENEWAL				0.011	
SECURED				0.467	
SENIOR				0.958	
DIVRESTRICTION				0.470	
GUARANTOR				0.054	
CORPURPOSES				0.296	
DEBTREPAY				0.213	
WORKCAPITAL				0.184	
TERMLOAN				0.222	
CREDITLINE				0.588	
RELATIONSHIP				0.411	
LEADBANKS	1	1	1	1.174	
		BANK CONTROLS			
CAPITAL	6.219	7.416	8.438	7.479	1.593
ASSETS	349.814	2104.87	6141.02	3400.46	3736.54
ROA	0.877	1.412	1.798	1.307	0.858
CHARGEOFFS	0.3575	0.741	1.266	1.235	1.975
ROAVOL	0.584	0.932	1.267	1.227	1.356
ZSCORE	5.104	8.181	12.994	11.088	8.868
SUBDEBT	0.014	0.019	0.025	0.018	0.009
LIQUIDITY	0.164	0.207	0.259	0.213	0.085
AAA				0.012	
AA				0.164	
A				0.463	
BBB				0.023	
BB				0.001	
B				0.000	
LIBOR	2.794	5.130	5.700	4.472	2.009
BBB-AAA YIELD	0.607	0.839	1.102	0.931	0.459

[a] Number of observations (loans) in the sample is 15985. LOANSPREAD: Loan spread over LIBOR at origination. AGE: Age of the borrower in years. SALES: Sales of the borrower in 100 million dollars. LEVERAGE: Debt over assets. MKTOBOOK: market to book value. PROFMARGIN: Net income over sales. LINTCOV:

log of interest coverage truncated at 0. NWC: Net working capital. TANGIBLES: Share of the borrower's assets in tangibles. R&D: Research and development expenses over sales. ADVERTISING: Advertising expenses over sales. STOCKVOL: Standard deviation of the borrower's stock return. EXRET: Return on the borrower's stock over the market return. AMOUNT: Loan amount in 100 million dollars. MATURITY: Maturity of the loan in years. RENEWAL: Dummy variable equal to 1 if the loan is a renewal. SECURED: Dummy variable equal to 1 if the loan is secured. SENIOR: Dummy variable equal to 1 if the loan is senior. DIVIDENDREST: Dummy variable equal to 1 is the borrower becomes subject to dividend restrictions. GUARANTOR: Dummy variable equal to 1 if the borrower has a guarantor. CORPURPOSES: Dummy variable equal to 1 if the loan is for corporate purposes. DEBTREPAY: Dummy variable equal to 1 if the loan is to repay existing debt. WORK-CAPITAL: Dummy variable equal to 1 if the loan is for working capital.. TERMLOAN: Dummy variable equal to 1 for term loans. CREDITLINE: Dummy variable equal to 1 for lines of credit. CAPITAL: Equity capital over assets. ASSETS: Bank assets in 100 million dollars. ROAVOL: Standard deviation of the quarterly ROA computed over the last three years. CHARGEOFFS: Net charge offs over assets. ROA: net income over assets. ZSCORE: The ZSCORE of the bank computed with quarterly data over the previous three years. SUBDEBT: Subdebt over assets. LIQUIDITY: Cash plus securities over assets. CPRATING: Dummy variable equal to 1 if the borrower (bank) has a commercial paper rating. CREDITRATING: Dummy variable equal to 1 if the borrower (bank) has a credit rating. LIBOR: LIBOR (3 month) at the time of the loan origination. BBB-AAA YIELD: Slope of the bond yield curve computed as the difference between Salomon Brother's yield indices of triple-A and triple-B new industrial long-term-rated bonds. RELATIONSHIP: Dummy variable equal to 1 is the firm borrowed from the lead bank at least once in the three years before to the current loan. LEADBANKS: Number of lead banks in the syndicate. EBITDA-ASSET: Ratio of EBITDA over assets. EBITDA-DEBT: Ratio of EBITDA over debt. BBB-AAA YIELD: Difference between the yield on triple B and triple A rated bonds on the date of the loan issue. IGRADE: Dummy variable equal to 1 if the borrower is rated investment grade. BLGRADE: Dummy variable equal to 1 if the borrower is rated below grade. PBOND: Dummy variable equal to 1 if the borrower issued at least once in the public bond market in the three years prior to the loan. PBONDIGRADED: Dummy variable equal to 1 if the borrower issued at least once in the public bond market in the three years prior to the loan and its most recent bond was rated investment grade. PBONGLGRADE: Dummy variable equal to 1 if the borrower issued at least once in the public bond market in the three years prior to the loan and its most recent bond was rated below grade.

Table 2 Loan spreads and bank capital-to-asset ratio[a]

Variables	1	2	3	4	5
FIRM CONTROLS					
LAGE	-3.256**	0.001	-0.583	-1.083	-2.995**
	(2.10)	(0.00)	(0.40)	(0.75)	(2.09)
LSALES	-8.141***	-3.442**	-4.009***	-4.936***	-5.196***
	(5.37)	(2.21)	(2.58)	(3.18)	(3.37)
LEVERAGE	51.295***	35.705***	34.832***	34.634***	32.799***
	(7.02)	(5.16)	(5.08)	(5.04)	(4.87)
MKTOBOOK	-6.668***	-5.525***	-5.457***	-5.180***	-4.849***
	(9.24)	(8.04)	(7.94)	(7.46)	(7.13)
PROFMARGIN	-14.742**	-13.343**	-13.966**	-12.207**	-10.521*
	(2.38)	(2.16)	(2.26)	(2.00)	(1.77)
LINTCOV	-13.698***	-12.974***	-13.217***	-13.423***	-13.668***
	(10.93)	(10.62)	(10.69)	(10.92)	(11.12)
NWC	0.002	-0.011**	-0.011**	-0.010*	-0.009
	(0.31)	(2.16)	(2.09)	(1.89)	(1.58)
TANGIBLES	-7.762**	-3.277	-1.921	-2.206	-1.456
	(2.05)	(0.91)	(0.53)	(0.61)	(0.41)
R&D	-44.436*	-32.391	-25.561	-34.808	-45.538*
	(1.79)	(1.31)	(1.03)	(1.41)	(1.90)
ADERTISING	-20.686	-17.058	-16.471	-17.677	-16.386
	(0.85)	(0.75)	(0.75)	(0.79)	(0.74)
STOCKVOL	1.557***	1.556***	1.534***	1.524***	1.487***
	(16.79)	(17.12)	(16.98)	(16.97)	(15.79)
EXRET	-2.363***	-2.625***	-2.754***	-3.188***	-3.284***
	(3.75)	(4.31)	(4.49)	(5.00)	(5.01)
AAA		-15.957*	-15.549*	-17.626**	-15.188
		(1.79)	(1.74)	(2.03)	(1.64)
AA		-46.577***	-45.782***	-46.223***	-40.920***
		(8.53)	(8.21)	(8.04)	(6.82)
A		-51.432***	-50.519***	-51.341***	-48.966***
		(12.44)	(12.21)	(12.27)	(11.76)
BBB		-27.521***	-27.437***	-28.030***	-27.024***
		(7.43)	(7.44)	(7.56)	(7.44)
BB		11.096***	10.831***	10.160**	10.382***
		(2.71)	(2.66)	(2.52)	(2.65)
B		36.022***	35.239***	35.255***	34.867***
		(5.94)	(5.88)	(5.93)	(5.92)
CCC		48.100**	47.694**	45.082**	47.114**
		(2.27)	(2.26)	(2.15)	(2.25)
CC		-66.621***	-66.932***	-70.655***	-66.161***
		(2.64)	(2.65)	(2.80)	(2.63)
LOAN CONTROLS					
LAMOUNT	-13.499***	-13.636***	-14.137***	-13.574***	-13.650***
	(12.46)	(12.63)	(13.08)	(12.54)	(12.96)
LMATURITY	-10.761***	-12.943***	-12.661***	-11.975***	-11.706***
	(6.30)	(7.74)	(7.56)	(7.07)	(6.97)
RENEWAL	-16.484**	-17.078**	-14.884**	-20.633***	-3.576
	(2.28)	(2.39)	(2.06)	(2.85)	(0.48)
SECURED	57.463***	51.038***	51.520***	50.276***	49.329***
	(22.13)	(19.84)	(20.25)	(19.84)	(19.64)
SENIOR	-6.608	-6.690	-9.681**	-5.886	-20.587***
	(1.36)	(1.40)	(2.01)	(1.22)	(3.83)
DIVIDENDREST	3.228	-0.107	-0.218	-1.253	0.699
	(1.39)	(0.05)	(0.10)	(0.55)	(0.30)

[a] Continues on the next page.

Table 2 Continued [a]

Variables	1	2	3	4	5
GUARANTOR	19.793***	17.532***	15.375***	12.097**	7.169
	(3.94)	(3.64)	(3.16)	(2.47)	(1.48)
CORPURPOSES	-2.765	-7.174***	-7.373***	-9.373***	-11.424***
	(1.04)	(2.82)	(2.90)	(3.68)	(4.45)
DEBTREPAY	-23.782***	-25.819***	-24.263***	-22.402***	-16.946***
	(8.88)	(9.76)	(9.22)	(8.37)	(6.44)
WORKCAPITAL	-10.598***	-14.379***	-15.414***	-18.613***	-23.521***
	(3.85)	(5.29)	(5.73)	(7.02)	(8.73)
TERMLOAN	64.556***	57.128***	56.517***	56.559***	55.478***
	(17.23)	(15.53)	(15.47)	(15.50)	(15.42)
CREDITLINE	16.889***	12.655***	12.694***	13.204***	13.446***
	(6.51)	(4.94)	(4.96)	(5.16)	(5.26)
LEADBANKS	13.804***	13.024***	11.089***	7.818***	1.907
	(4.74)	(4.45)	(3.77)	(2.68)	(0.62)
RELATIONSHIP	-0.509	-0.039	0.117	0.643	0.699
	(0.28)	(0.02)	(0.07)	(0.37)	(0.40)
<u>BANK CONTROLS</u>					
CAPITAL	-1.580**	-1.782***	-1.875***	-2.161***	-2.726***
	(2.47)	(2.81)	(2.83)	(3.25)	(3.74)
LASSETS			1.114*	1.962***	-2.116**
			(1.69)	(2.62)	(2.49)
ROAVOL			1.707**	1.934**	-0.091
			(2.07)	(2.27)	(0.11)
CHARGEOFFS			-0.006	0.593	-0.180
			(0.01)	(1.07)	(0.32)
ROA			-2.267**	-2.854**	-3.647***
			(2.07)	(2.53)	(3.32)
AAA			-15.308***	-13.490**	-7.368
			(2.59)	(2.24)	(1.30)
AA			11.419***	8.874***	-2.598
			(3.96)	(3.05)	(0.86)
A			10.587***	7.804***	-5.659**
			(4.13)	(2.95)	(2.08)
BBB			11.569*	9.233	-4.860
			(1.81)	(1.43)	(0.74)
BB			22.972	19.465	22.909
			(1.32)	(1.09)	(1.25)
B			83.784***	83.595***	95.160***
			(5.99)	(4.88)	(4.99)
LIQUIDITY				31.235**	9.521
				(2.41)	(0.74)
SUBDEBT				-404.819***	-93.488
				(3.22)	(0.73)
LIBOR				-4.398***	-4.075**
				(7.26)	(2.33)
<u>BUSINESS CONTROLS</u>					
BBB-AAA YIELD					14.723**
					(2.56)
YEAR DUMMIES					IN
Constant	159.409***	162.501***	158.644***	178.687***	252.595***
	(9.07)	(9.36)	(8.89)	(9.50)	(5.12)
Observations	15985	15985	15985	15985	15985
R-squared	0.55	0.57	0.57	0.58	0.59

[a] Models estimated with robust standard errors and clustered by firm to correct for correlation across observations of a given firm. The dependent variable is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. 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. Robust t statistics in parentheses.

Table 3 Testing hypothesis 1: Borrowers' cashflow and bank capital[a]

Variables	1	2	3
CAPITAL	-5.829***	-3.622***	-2.723***
	(4.24)	(3.84)	(3.87)
LINTCOV	-27.655***		
	(6.35)		
LINTCOV x CAPITAL	1.853***		
	(3.33)		
EBITDA-ASSET		-198.365***	
		(4.90)	
EBITDA-ASSET x CAPITAL		9.203*	
		(1.74)	
EBITDA-DEBT			-2.659***
			(3.21)
EBITDA-DEBT x CAPITAL			0.272***
			(2.59)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
Constant	209.158***	169.452***	145.067***
	(9.85)	(8.44)	(7.72)
Observations	15985	15985	15985
R-squared	0.58	0.58	0.57

[a] Models estimated with robust standard errors and clustered by firm to correct for correlation across observations of a given firm. The dependent variable is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Robust t statistics in parentheses.

Table 4 Testing hypothesis 1: Comparing well– and under–capitalized banks' loan pricing[a]

Variables	1	2	3
WELL-CAPITALIZED[b]	-37.661**	-23.801*	-13.805
	(2.17)	(1.66)	(1.22)
LINTCOV	-26.198***		
	(5.04)		
LINTCOV x WELL-CAPITALIZED[b]	15.715**		
	(2.55)		
EBITDA-ASSET		-174.671***	
		(3.50)	
EBITDA-ASSET x WELL-CAPITALIZED[b]		99.286*	
		(1.70)	
EBITDA-DEBT			-3.274***
			(3.02)
EBITDA-DEBT x WELL-CAPITALIZED[b]			3.971***
			(3.01)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
Constant	216.411***	189.712***	159.348***
	(4.87)	(4.50)	(3.71)
Observations	1801	1801	1801
R-squared	0.57	0.56	0.56

[a] Models estimated on the sample of loans taken out from under and well capitalized banks. A bank is considered undercapitalized if its capital-to-asset ratio is less or equal than 5%. A bank is considered well-capitalized if it has a capital-to-asset ratio is higher or equal to 10%. Models estimated with robust standard errors and clustered by firm to correct for correlation across observations of a given firm. The dependent variable is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Bank capital not included in BANK CONTROLS. Robust t statistics in parentheses.

[b] Dummy variable equal to 1 for loans taken out from well capitalized banks.

Table 5 Testing hypothesis 2: Controlling for the state of the economy[a]

Variables	1	2	3
CAPITAL	-6.541***	-4.386***	-3.135***
	(4.75)	(4.37)	(4.15)
LINTCOV	-20.903***		
	(4.74)		
LINTCOV x CAPITAL	1.847***		
	(3.45)		
EBITDA-ASSET		-216.297***	
		(5.28)	
EBITDA-ASSET x CAPITAL		14.593***	
		(2.73)	
EBITDA-DEBT			-1.388
			(1.58)
EBITDA-DEBT x CAPITAL			0.280***
			(2.70)
BBB-AAA YIELD	30.250***	18.924***	15.741***
	(4.28)	(2.89)	(2.70)
LINTCOV x BBB-AAA YIELD	-7.801***		
	(4.43)		
EBITDA-ASSET x BBB-AAA YIELD		-24.362	
		(1.11)	
EBITDA-DEBT x BBB-AAA YIELD			-1.481***
			(4.35)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
YEAR DUMMIES	IN	IN	IN
Constant	273.677***	238.332***	214.760***
	(5.49)	(4.77)	(4.26)
Observations	15985	15985	15985
R-squared	0.59	0.59	0.58

[a] Models estimated with robust standard errors and clustered by firm to correct for correlation across observations of a given firm. The dependent variable is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. We control for the state of the economy by adding the slope of the bond yield curve $BBB - AAAYIELD$ and year dummies. Robust t statistics in parentheses.

Table 6 Testing hypothesis 3: Borrowers' bank dependency and bank capital[a]

Variables	1	2	3	4	5
CAPITAL	-2.469***	-2.894***	-2.799***	-2.340***	-2.251***
	(3.42)	(3.42)	(3.31)	(3.17)	(3.15)
CPRATING	-57.882***				
	(5.25)				
CPRATING x CAPITAL	3.111**				
	(2.13)				
CREDITRATING		-19.165*			
		(1.88)			
CREDITRATING x CAPITAL		2.475*			
		(1.88)			
IGRADE			-53.093***		
			(5.03)		
BLGRADE			7.293		
			(0.50)		
IGRADE x CAPITAL			2.542**		
			(1.99)		
BLGRADE x CAPITAL			1.436		
			(0.73)		
PBOND				-19.161*	
				(1.68)	
PBOND x CAPITAL				2.134	
				(1.43)	
PBONDIGRADE					-35.950***
					(2.93)
PBONDBGRADE					2.159
					(0.09)
PBONDIGRADE x CAPITAL					2.777*
					(1.69)
PBONDBGRADE x CAPITAL					1.515
					(0.44)
FIRM CONTROLS[b]	IN	IN	IN	IN	IN
LOAN CONTROLS	IN	IN	IN	IN	IN
BANK CONTROLS	IN	IN	IN	IN	IN
Constant	179.348***	184.994***	187.177***	179.656***	178.041***
	(9.21)	(9.22)	(9.41)	(9.30)	(9.21)
Observations	15985	15985	15985	15985	15985
R-squared	0.57	0.56	0.57	0.56	0.56
p value for H0:					
CAP + CAP x MKT ACCESS[c] = 0	(0.633)	(0.692)	(0.798)	(0.881)	(0.741)
			(0.444)		(0.827)

[a] Models estimated with robust standard errors and clustered by firm to correct for correlation across observations of a given firm. The dependent variable is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Robust t statistics in parentheses.
[b] FIRM CONTROLS do not include in this table our set of dummy variables for the firm credit rating.
[c] CAP is the bank's equity capital ratio (CAPITAL). MKT ACCESS is equal to CPRATING in column 1,

CREDITRATING in column 2, IGRADE and BGRADE in column 3, PBOND in column 4, and PBONDIGRADE PBONDBGRADE in column 5.

Table 7 Testing hypothesis 3: Borrowers' bank dependency and bank capital
Second stage of a two-stage procedure[a]

Variables	1	2	3
CAPITAL	-2.711***	-3.329***	-3.115***
	(3.53)	(3.57)	(3.92)
$\widehat{CPRATING}$	-96.788***		
	(6.86)		
$\widehat{CPRATING}$ x CAPITAL	4.321***		
	(2.59)		
$\widehat{CREDITRATING}$		-28.652**	
		(2.04)	
$\widehat{CREDITRATING}$ x CAPITAL		3.702**	
		(2.28)	
$\widehat{PBOND}$			-56.497***
			(3.49)
$\widehat{PBOND}$ x CAPITAL			6.621***
			(3.23)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
Constant	178.511***	189.960***	189.427***
	(8.99)	(9.25)	(9.60)
Observations	15985	15985	15985
R-squared	0.57	0.56	0.56
p value for H0:			
CAP + CAP x MKT ACCESS = 0	(0.246)	(0.754)	(0.046)

[a] This table reports the second stage results of a two stage procedure. The variables $\hat{\cdot}$ are the predicted variables from the first stage. The first stage estimates the likelihood of each firm not being bank dependent, that is, having a commercial paper rating (first stage of Model 1); having a credit rating (first stage of Model 2), and have issued a public bond at least once in the three years prior tot he loan (first stage of Model 3), respectively. The instruments considered on the first stage are: $S\&P500$ (whether the firm is in the S&P500 index), $NYSE$ (whether the firm is listed in the NYSE), $LEHMAN$ (whether the firm's bond issue was included in the Lehman bond index), $OLDFIRM$ (whether the firm was older than 14 years – the median age of the firms in the sample), and $INDUSTRYACCESS$ (percentage of the firms in the same industry (as defined by the two-digit SIC code) that have access to the bond market. Models estimated with robust standard errors and clustered by firm to correct for correlation across observations of a given firm. The dependent variable in the second stage is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Robust t statistics in parentheses.

Table 8 Testing hypothesis 4: Controlling for the state of the economy
Second stage of a two-stage procedure[a]

Variables	1	2	3
CAPITAL	-3.277***	-3.276***	-3.550***
	(4.07)	(3.48)	(4.25)
$\widehat{CPRATING}$	-43.235***		
	(2.90)		
$\widehat{CPRATING}$ x CAPITAL	1.876		
	(1.12)		
$\widehat{CREDITRATING}$		-13.208	
		(0.88)	
$\widehat{CREDITRATING}$ x CAPITAL		1.299	
		(0.80)	
$\widehat{PBOND}$			-19.474
			(1.14)
$\widehat{PBOND}$ x CAPITAL			4.414**
			(2.19)
BBB-AAA YIELD	19.959***	11.729*	18.685***
	(3.31)	(1.84)	(3.03)
$\widehat{CPRATING}$ x BBB-AAA YIELD	-30.473***		
	(5.90)		
$\widehat{CREDITRATING}$ x BBB-AAA YIELD		5.696	
		(1.05)	
$\widehat{PBOND}$ x BBB-AAA YIELD			-21.376***
			(3.49)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
YEAR DUMMIES	IN	IN	IN
Constant	252.137***	260.240***	261.471***
	(5.12)	(5.24)	(5.29)
Observations	15985	15985	15985
R-squared	0.58	0.57	0.57
p value for H0:			
CAP + CAP x MKT ACCESS = 0	(0.343)	(0.121)	(0.622)

[a] This table reports the second stage results of a two stage procedure. The variables $\widehat{\ }$ are the predicted variables from the first stage. The first stage estimates the likelihood of each firm not being bank dependent, that is, having a commercial paper rating (first stage of Model 1); having a credit rating (first stage of Model 2), and have issued a public bond at least once in the three years prior tot he loan (first stage of Model 3), respectively. The instruments considered on the first stage are: $S\&P500$ (whether the firm is in the S&P500 index), $NYSE$ (whether the firm is listed in the NYSE), $LEHMAN$ (whether the firm's bond issue was included in the Lehman bond index), $OLDFIRM$ (whether the firm was older than 14 years – the median age of the firms in the sample), and $INDUSTRYACCESS$ (percentage of the firms in the same industry (as defined by the two-digit SIC code) that have access to the bond market. Models estimated with robust standard errors and clustered by firm to correct for correlation across observations of a given firm. The dependent variable in the second stage is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Robust t statistics in parentheses.

Table 9 Borrowers of under- versus borrowers of well-capitalized banks[a]

Variables	Borrowers of banks: Under-capitalized	Borrowers of banks: Well capitalized	Difference	T Statistic
LOANSPREAD	213.547	190.589	-22.958**	2.23
FIRM CONTROLS				
AGE	16.822	20.025	3.203***	3.04
SALES	15.972	28.058	12.086***	3.08
LEVERAGE	0.356	0.280	-0.076***	4.33
MKTOBOOK	1.498	1.786	0.288***	4.55
PROMARGIN	0.006	-0.038	-0.044***	3.16
LINTCOV	1.710	1.958	0.248***	3.10
NWC	2.343	5.987	3.644***	3.77
TANGIBLES	0.780	0.685	-0.095***	3.60
R&D	0.021	0.040	0.018***	4.23
ADVERTISING	0.011	0.010	-0.001	0.35
STOCKVOL	0.033	0.035	0.002	1.38
EXRET	0.0003	0.0005	0.0002	1.20
CPRATING	0.118	0.129	0.011	0.45
CREDITRATING	0.359	0.357	-0.002	0.04
IGRADE	0.194	0.203	0.009	0.27
BGRADE	0.165	0.155	-0.010	0.36
PBOND	0.187	0.167	-0.020	0.71
PBONDIGRADE	0.103	0.094	-0.009	0.43
PBONDBGRADE	0.071	0.033	-0.038**	2.31
EBITDA-ASSET	0.126	0.099	-0.027***	2.84
EBITDA-DEBT	1.377	1.171	-0.206	0.62
LOAN CONTROLS				
AMOUNT	2.073	2.312	0.239	0.60
MATURITY	3.664	3.438	-0.226	1.57
RENEWAL	0.0001	0.011	0.011**	2.39
SECURED	0.441	0.566	0.125***	3.70
SENIOR	0.970	0.971	0.001	0.04
DIVRESTRICTION	0.042	0.553	0.511***	23.55
GUARANTOR	0.0001	0.067	0.067***	6.78
CORPURPOSES	0.266	0.326	0.060**	2.04
DEBTREPAY	0.258	0.206	-0.052*	1.71
WORKCAPITAL	0.178	0.213	0.035	1.45
TERMLOAN	0.273	0.241	-0.032	1.44
CREDITLINE	0.544	0.599	0.055**	2.27
RELATIONSHIP	0.359	0.309	-0.050	1.41
LEADBANKS	1.017	1.146	0.129***	7.39
BANK CONTROLS				
CAPITAL	4.617	10.874	6.257***	151.31
ASSETS	738.91	1906.18	1167.27***	10.21
ROA	0.0004	0.001	0.001***	11.64
CHARGEOFFS	0.003	0.002	-0.001***	4.81
ROAVOL	0.004	0.001	-0.003***	13.47
ZSCORE	3.199	18.075	14.876***	28.76
SUBDEBT	0.015	0.017	0.002**	2.63
LIQUIDITY	0.237	0.238	0.001	0.08
AAA	0.093	0.003	-0.090***	5.91
AA	0.116	0.118	0.002	0.10
A	0.093	0.554	0.461***	16.31
BBB	0.020	0.021	0.001	0.16
BB	0.005	0.003	-0.002	0.49
B	0.0001	0.003	0.002	1.34

[a] See Table 1 for definitions of all variables reported in the table.

Table 10 Testing hypothesis 2: Adding bank fixed effects[a]

Variables	1	2	3
CAPITAL	-7.250***	-4.721***	-3.222***
	(4.75)	(4.10)	(3.28)
LINTCOV	-22.444***		
	(4.92)		
LINTCOV x CAPITAL	2.151***		
	(3.82)		
EBITDA-ASSET		-240.560***	
		(5.65)	
EBITDA-ASSET x CAPITAL		19.970***	
		(3.59)	
EBITDA-DEBT			-1.674*
			(1.95)
EBITDA-DEBT x CAPITAL			0.321***
			(3.08)
BBB-AAA YIELD	34.016***	21.897***	18.764***
	(4.75)	(3.33)	(3.22)
LINTCOV x BBB-AAA YIELD	-8.170***		
	(4.57)		
EBITDA-ASSET x BBB-AAA YIELD		-26.308	
		(1.23)	
EBITDA-DEBT x BBB-AAA YIELD			-1.429***
			(4.28)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
YEAR DUMMIES	IN	IN	IN
Constant	245.006***	207.199***	181.586***
	(6.53)	(5.78)	(5.10)
Observations	15985	15985	15985
R-squared	0.62	0.61	0.61

[a] Models estimated with robust standard errors, clustered by firm, and with bank fixed effects. The dependent variable is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Robust t statistics in parentheses.

Table 11 Testing Hypothesis 4: Adding bank fixed effects
Second stage of a two-stage procedure[a]

Variables	1	2	3
CAPITAL	-2.932***	-2.839**	-3.180***
	(2.84)	(2.36)	(3.02)
$\widehat{CPRATING}$	-34.643**		
	(2.07)		
$\widehat{CPRATING}$ x CAPITAL	-0.195		
	(0.10)		
$\widehat{CREDITRATING}$		-18.967	
		(1.14)	
$\widehat{CREDITRATING}$ x CAPITAL		0.879	
		(0.46)	
$\widehat{PBOND}$			-17.557
			(0.94)
$\widehat{PBOND}$ x CAPITAL			3.677*
			(1.65)
BBB-AAA YIELD	22.767***	13.054**	20.965***
	(3.77)	(2.03)	(3.40)
$\widehat{CPRATING}$ x BBB-AAA YIELD	-29.458***		
	(5.54)		
$\widehat{CREDITRATING}$ x BBB-AAA YIELD		8.458	
		(1.52)	
$\widehat{PBOND}$ x BBB-AAA YIELD			-19.254***
			(3.13)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
YEAR DUMMIES	IN	IN	IN
Constant	230.889***	228.245***	236.675***
	(6.41)	(6.28)	(6.60)
Observations	15985	15985	15985
R-squared	0.60	0.60	0.60
p value for H0:			
CAP + CAP x MKT ACCESS = 0	(0.083)	(0.208)	(0.808)

[a] This table reports the second stage results of a two stage procedure. The variables $\widehat{\cdot}$ are the predicted variables from the first stage. The first stage estimates the likelihood of each firm not being bank dependent, that is, having a commercial paper rating (first stage of Model 1); having a credit rating (first stage of Model 2), and have issued a public bond at least once in the three years prior tot he loan (first stage of Model 3), respectively. The instruments considered on the first stage are: $S\&P500$ (whether the firm is in the S&P500 index), $NYSE$ (whether the firm is listed in the NYSE), $LEHMAN$ (whether the firm's bond issue was included in the Lehman bond index), $OLDFIRM$ (whether the firm was older than 14 years – the median age of the firms in the sample), and $INDUSTRYACCESS$ (percentage of the firms in the same industry (as defined by the two-digit SIC code) that have access to the bond market. Models estimated with robust standard errors, clustered by firm to correct for correlation across observations of a given firm, and with bank fixed effects. The dependent variable in the second stage is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Robust t statistics in parentheses.

Table 12 Testing hypothesis 2: Borrowers' cashflow and banks' ZSCORE[a]

Variables	1	2	3
ZSCORE	-0.795***	-0.650***	-0.381***
	(2.87)	(3.01)	(2.90)
LINTCOV	-10.067***		
	(4.15)		
LINTCOV x ZSCORE	0.225**		
	(2.07)		
EBITDA-ASSET		-160.025***	
		(5.48)	
EBITDA-ASSET x ZSCORE		2.751**	
		(2.04)	
EBITDA-DEBT			0.203
			(0.49)
EBITDA-DEBT x ZSCORE			0.041**
			(2.48)
BBB-AAA YIELD	27.706***	15.494**	15.017***
	(3.90)	(2.37)	(2.58)
LINTCOV x BBB-AAA YIELD	-6.911***		
	(3.87)		
EBITDA-ASSET x BBB-AAA YIELD		-0.580	
		(0.03)	
EBITDA-DEBT x BBB-AAA YIELD			-1.417***
			(4.07)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
YEAR DUMMIES	IN	IN	IN
Constant	228.353***	209.906***	191.936***
	(4.59)	(4.19)	(3.79)
Observations	15985	15985	15985
R-squared	0.59	0.59	0.58

[a] Models estimated with robust standard errors and clustered by firm to correct for correlation across observations of a given firm. The dependent variable is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Robust t statistics in parentheses.

Table 13 Testing hypothesis 4: Borrowers' bank dependency and banks' ZSCORE
Second stage of a two-stage procedure[a]

Variables	1	2	3
ZSCORE	-0.482***	-0.219	-0.385**
	(3.31)	(1.13)	(2.55)
$\widehat{CPRATING}$	-34.208***		
	(3.51)		
$\widehat{CPRATING}$ x ZSCORE	0.326		
	(1.10)		
$\widehat{CREDITRATING}$		1.147	
		(0.11)	
$\widehat{CREDITRATING}$ x ZSCORE		-0.307	
		(1.04)	
$\widehat{PBOND}$			10.430
			(1.10)
$\widehat{PBOND}$ x ZSCORE			0.165
			(0.50)
BBB-AAA YIELD	19.347***	11.173*	17.987***
	(3.21)	(1.75)	(2.92)
$\widehat{CPRATING}$ x BBB-AAA YIELD	-29.185***		
	(5.64)		
$\widehat{CREDITRATING}$ x BBB-AAA YIELD		5.624	
		(1.04)	
$\widehat{PBOND}$ x BBB-AAA YIELD			-20.361***
			(3.30)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
YEAR DUMMIES	IN	IN	IN
Constant	228.047***	232.538***	233.334***
	(4.62)	(4.67)	(4.71)
Observations	15985	15985	15985
R-squared	0.58	0.57	0.57
p value for H0:			
CAP + CAP x MKT ACCESS = 0	(0.516)	(0.006)	(0.411)

[a] This table reports the second stage results of a two stage procedure. The variables $\widehat{}$ are the predicted variables from the first stage. The first stage estimates the likelihood of each firm not being bank dependent, that is, having a commercial paper rating (first stage of Model 1); having a credit rating (first stage of Model 2), and have issued a public bond at least once in the three years prior tot he loan (first stage of Model 3), respectively. The instruments considered on the first stage are: $S\&P500$ (whether the firm is in the S&P500 index), $NYSE$ (whether the firm is listed in the NYSE), $LEHMAN$ (whether the firm's bond issue was included in the Lehman bond index), $OLDFIRM$ (whether the firm was older than 14 years – the median age of the firms in the sample), and $INDUSTRYACCESS$ (percentage of the firms in the same industry (as defined by the two-digit SIC code) that have access to the bond market. Models estimated with robust standard errors, clustered by firm to correct for correlation across observations of a given firm. The dependent variable in the second stage is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Robust t statistics in parentheses.

Table 14 Testing hypothesis 2: Clustering by borrower and by bank[a]

Variables	1	2	3
CAPITAL	-6.541***	-4.386***	-3.135***
	(4.15)	(4.15)	(3.19)
LINTCOV	-20.903***		
	(3.81)		
LINTCOV x CAPITAL	1.847***		
	(3.31)		
EBITDA-ASSET		-216.297***	
		(3.74)	
EBITDA-ASSET x CAPITAL		14.593***	
		(2.87)	
EBITDA-DEBT			-1.388*
			(1.78)
EBITDA-DEBT x CAPITAL			0.280***
			(2.95)
BBB-AAA YIELD	30.250***	18.924**	15.741***
	(3.81)	(2.46)	(2.96)
LINTCOV x BBB-AAA YIELD	-7.801***		
	(3.12)		
EBITDA-ASSET x BBB-AAA YIELD		-24.362	
		(0.76)	
EBITDA-DEBT x BBB-AAA YIELD			-1.481***
			(4.51)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
YEAR DUMMIES	IN	IN	IN
Constant	273.677***	238.332***	214.760***
	(5.49)	(4.60)	(4.24)
Observations	15985	15985	15985
R-squared	0.59	0.59	0.58

[a] Models estimated with robust standard errors, clustered by firm and by bank. The dependent variable is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Robust t statistics in parentheses.

Table 15 Testing hypothesis 4: Clustering by borower and by bank
Second stage of a two-stage procedure[a]

Variables	1	2	3
CAPITAL	-3.277***	-3.276***	-3.550***
	(3.09)	(3.09)	(3.77)
$\widehat{CPRATING}$	-43.235**		
	(2.06)		
$\widehat{CPRATING}$ x CAPITAL	1.876		
	(1.03)		
$\widehat{CREDITRATING}$		-13.208	
		(0.87)	
$\widehat{CREDITRATING}$ x CAPITAL		1.299	
		(0.72)	
$\widehat{PBOND}$			-19.474
			(0.98)
$\widehat{PBOND}$ x CAPITAL			4.414**
			(2.26)
BBB-AAA YIELD	19.959***	11.729**	18.685***
	(3.45)	(2.06)	(3.21)
$\widehat{CPRATING}$ x BBB-AAA YIELD	-30.473***		
	(5.98)		
$\widehat{CREDITRATING}$ x BBB-AAA YIELD		5.696	
		(1.15)	
$\widehat{PBOND}$ x BBB-AAA YIELD			-21.376***
			(3.26)
FIRM CONTROLS	IN	IN	IN
LOAN CONTROLS	IN	IN	IN
BANK CONTROLS	IN	IN	IN
YEAR DUMMIES	IN	IN	IN
Constant	252.137***	260.240***	261.471***
	(5.05)	(5.34)	(5.30)
Observations	15985	15985	15985
R-squared	0.58	0.57	0.57
p value for H0:			
CAP + CAP x MKT ACCESS = 0	(0.356)	(0.211)	(0.655)

[a] This table reports the second stage results of a two stage procedure. The variables $\hat{}$ are the predicted variables from the first stage. The first stage estimates the likelihood of each firm not being bank dependent, that is, having a commercial paper rating (first stage of Model 1); having a credit rating (first stage of Model 2), and have issued a public bond at least once in the three years prior tot he loan (first stage of Model 3), respectively. The instruments considered on the first stage are: $S\&P500$ (whether the firm is in the S&P500 index), $NYSE$ (whether the firm is listed in the NYSE), $LEHMAN$ (whether the firm's bond issue was included in the Lehman bond index), $OLDFIRM$ (whether the firm was older than 14 years – the median age of the firms in the sample), and $INDUSTRYACCESS$ (percentage of the firms in the same industry (as defined by the two-digit SIC code) that have access to the bond market. Models estimated with robust standard errors, clustered by firm and by bank. The dependent variable in the second stage is LOANSPREAD: Loan spread over LIBOR at the time of the loan origination. See Table 1 for the definitions of all controls included in the models. 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. Robust t statistics in parentheses.