Firm Debt Outcomes in Crises: The Role of Lending and Underwriting Relationships

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Abstract

We examine the impact of firms' relationships with banks through loans and bonds underwriting on their debt outcomes during four crises in the U.S. spanning 1989-2011. We find that while both lending and underwriting relationships increase firms' access to debt and reduce cost of debt in normal times, some of these benefits of relationships are eroded during crisis times. Our results are consistent with an increase in switching costs to relationship borrowers during crises.

JEL Classifications: G21, G30, E24

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1 Introduction

The fate of non-financial firms is inextricably linked to the health of the financial sector and the relationships they have with it. Firms often obtain loans from the same banks repeatedly, leading them to form lending relationships. Similarly, for repeat bond issues firms often engage the same banks to underwrite, leading them to form underwriting relationships. Through the informational advantage generated in both kinds of relationships, firms can access credit more easily and get better terms on it. However, during financial crises, the same relationships can hurt firms if the relationship banks do not provide loans or underwrite owing to their poor health and firms are unable to switch to other banks. Thus far, there is little research on how relationships affect firms' outcomes during crises. Moreover, even though the same banks can potentially lend as well as underwrite, we do not yet know how the two forms of relationships interact to jointly affect their client firms' credit outcomes during crises. Since lending and underwriting relationships are key features characterizing firms' interactions with financial institutions, evidence on how they individually and jointly affect firms' credit experiences is essential to understanding how non-financial firms are affected by financial crises.

In this paper, we examine the role of lending and underwriting relationships in firms' access to credit, the form that it takes, and its terms during crises. We combine data from several sources for the period 1989-2011. We use Dealscan to obtain data on syndicated loans taken by public firms. Thomson One provides data on firms' bond issues. Financial data on firms are taken from Compustat. To measure underwriting relationships correctly, we manually match lending and underwriting banks to their parent companies. Finally, we use call reports to get information about bank health.

We use our sample to ask several questions. In periods of financial crises and when relationship bank health is poor, how do lending and underwriting relationships affect firms' debt access? If firms do obtain debt, was it through the services (lending or underwriting) from their relationship bank? To what extent is this choice of bank influenced by the relationship bank health? The main challenge in this analysis is that firms that do not receive debt are comprised of both those who demanded but did not obtain debt and those who did not demand debt. To overcome this, we adopt the approach proposed by Almeida et al. (2012) to identify a subset

of firms that are likely to have a positive demand for debt. In particular, we consider firms for whom a large portion of their long term debt matures just before the start of a crisis as the subset of debt-demanding firms.

Next, we focus on the form of debt firms receive. We ask whether having a lending relationship increases the likelihood that a firm will obtain a loan from the relationship lender instead of issuing bonds. Analogously, we examine bonds versus loan choice as a function of underwriting relationships. Moreover, with universal banking, a lending bank can potentially underwrite and vice versa. Taking this into consideration, we examine the proportion of banks which previously lent (underwote) to a firm that switch to underwriting (lending) during crises. Further, we assess how this relates to banks' health. Finally, we assess the hold up problem of both kinds of relationships during crises.

Our final examination considers the effect of relationships on debt terms during crises. Theoretically, the effect can be both positive or negative. During a financial crisis, relationship banks may charge higher interest rates on loans (or higher underwriting fees) since it is difficult for firms to switch to another bank. However, they may also charge relationship client firms lower interest rates or underwriting fees relative to transaction borrowers because of the information they have gathered on the firms through the relationship. Thus, it is an empirical question as to which effect is stronger. We also examine other debt terms such as debt amount and debt maturity.

Our sample period allows us to examine firm-bank relationships and firm debt choices outcomes across four crises. Although only two of these crises originated in the banking sector (the 1990-1992 credit crunch and the 2007-2009 sub-prime lending crisis), all four of them witnessed a disruption in bank credit supply.[1] We confirm that the results are not driven solely by the Great Recession, rather we find consistency in the effect of relationship lending on firm debt outcomes across the crises.

The rest of the paper is organized as follows. Section 2 explains the empirical strategy. In

[1]According to the credit supply measure proposed by Becker and Ivashina (2014), all four crisis periods in our sample feature a reduction in credit supply (see Figure 2 of Becker and Ivashina (2014)), with the largest contractions occurring during the two crises which originated in the banking sector: the 1990-1992 credit crunch and the 2007-2009 sub-prime lending crisis. Further evidence of credit contraction in the individual crises has been provided by Peek and Rosengren (2000) for the 1990-1992 credit crunch, Chava and Purnanandam (2011) for the 1998 Long Term Capital Management crisis, and Ivashina and Scharfstein (2010) for the 2007-2009 sub-prime lending crisis.

section 3, we describe the data and present descriptive statistics. Section 4 discusses our main results. Section 5 concludes.

2 Data and Sample Selection

We combine data for the period 1988-2011 from three main sources: firm level data from Compustat, loan data from LPC DealScan, and public bond issue data from the Thomson One Banker new issues database.

We first identify all non-financial Compustat firms incorporated in the United States in all quarters in which they report positive assets. Next, we obtain loan level data from a March 2015 extract of DealScan. These data consist of loan contract information for dollar denominated private syndicated loans made to U.S. corporations over the period 1988 to 2012. The database covers 50-75% of the value of all commercial loans in the U.S. (Chava and Roberts (2008)).[2] Following Adrian et al. (2013), we include all loans obtained over the sample period with non-missing values for the following contract terms: maturity, amount, loan cost, loan type, and stated loan purpose. Finally, we include only loans for which the issuing firm can be mapped to Compustat using the 2012 DealScan-Compustat link dataset provided by Chava and Roberts (2008). The resulting loans database includes information on specific loan terms for new loans, notably loan amount, cost, and maturity. For our main results, we use all loans meeting the above criteria; these include both term loans and revolvers (lines of credit). In robustness tests, we further restrict our loans sample to include only term loans.

We obtain data on commercial bond issues from the Thomson One Banker's New Issues database. These data consist of bond issue details for all U.S. public bond dollar denominated issues during the period 1988-2011. We include in our sample bond issues with non-missing values for the following contract terms: amount, maturity, cost, and stated purpose. Finally, we keep only those bond issues for which the borrowing firm can be mapped to Compustat using the CUSIP identifier. We also collect bond contract terms for these new issues, notably bond amount, cost, and maturity.

For analysis, we require measures of the following: lending and underwriting relationships,

[2] Chava and Roberts (2008) report that the coverage increased to include an even greater fraction of commercial loans from 1995 onward.

bank credit supply, debt contract terms, and firm characteristics. We describe these measures below.

2.1 Relationship Measures

Since a primary goal of this paper is to establish the net benefit of relationships to firms in crisis versus normal times, meaningful relationship measures are required. Traditional measures of relationship between firm i and bank j focus on 1) the distance between the borrower and lender and/or 2) the length of the relationship, defined as the total number of past loans granted to firm i by bank j or the length of time since the first loan by bank j to firm i. Each one of these types of relationship measures is problematic. Distance between bank and firm is 1) hard to define and 2) increasingly irrelevant to the contact between borrower and lender in the context of *large* public firms borrowing from *large* commercial banks due to changes in lending technologies such as the spread in the use of credit scoring.[3] The time measures, while conveying relevant information about the extent of contact between firms and their lenders, are harder to measure accurately in a finite database. The starting point in time of the database rather than the true starting point of the relationship ultimately drives the magnitude of these time measures, unless the relationship began after the start of the data. Further, time based relationship measures are highly correlated with age making it hard to disentangle the effects of age from those of the relationship itself. We use a third type of relationship measure: concentration, measuring the *proportion* of firm debt supplied by a given bank. These concentration-based measures address the concerns stated above by providing time-independent measures that identify the extent of firm-bank contact without relying on geography.

To this end, we use relationship proxies developed in Bharath et al. (2007) to measure relationships between borrowing firms and lead lenders (or lead underwriters). We identify lead lenders on syndicated loans following Bharath et al. (2007): we categorize any bank not described in Dealscan as a "participant" as a lead lender. We identify lead underwriters as any bank designated as a "bookrunner" in the Thomson One database.

[3] Petersen and Rajan (2002) show that the "tyranny of distance" from banks is alleviated for small firms as a result of credit scoring. This allows them to take loans even from far off banks, reducing the need to invest in relationships with nearby banks. It is likely that such lending technologies reduce the importance of distance to an even greater extent for large firms and banks.

First, to measure the strength of a relationship between a given borrower and lender in a given quarter, we define a continuous measure as the percentage of the borrower's loans over the five year period prior to the given quarter accounted for by the given lender. We measure this percentage using both the number of loans granted and the loan amounts. We calculate these measures as:

$$LendRel(Cont)_{i,j,t} = \frac{\text{\$ Amount of loans to borrower } i \text{ by bank } j \text{ over the period } t-20 \text{ to } t-1}{\text{Total \$ amount of loans to borrower } i \text{ over the period } t-20 \text{ to } t-1}$$

where the index i refers to the borrower, j refers to the lender, and t refers to time measured in quarters.

In addition, we define a binary measure capturing the *existence* of a relationship as follows: $LendRel(Dummy)_{i,j,t}$ equals one if $LendRel(Amount)_{i,j,t} > 0$ for any j in period t and zero otherwise. We calculate the above two measures for every firm-bank pair in our sample. We aggregate these firm-bank pair measures to the level of firm using the following measures:

$$LendRel(Max)_{i,t} = \max_j \text{LendRel(Cont)}_{i,j,t}$$

Note that this measure captures the maximal reliance firm i has on a single bank for borrowing in the past 20 quarters.

$$LendRel(HHI)_{i,t} = \sum_j w_{j,i,t}^2$$

where $w_{j,i,t}$ represents the proportion of lending to firm i in the past 20 quarters by bank j. This measure captures how concentrated firm i's borrowing is over its lenders.

We define an analogous set of measures for a firm's underwriting relationships. These measures are defined as follows:

$$UWRel(Cont)_{i,j,t} = \frac{\text{\$ Amount of borrower } i\text{'s bonds underwritten by bank } j \text{ over the period } t-20 \text{ to } t-1}{\text{Total \$ amount of bonds issued by borrower } i \text{ over the period } t-20 \text{ to } t-1}$$

where the index i refers to the borrower, j refers to the underwriting bank, and t refers to time measured in quarters.

In addition, we define a binary measure capturing the *existence* of a relationship as follows:

$UWRel(Dummy)_{i,j,t}$ equals one if $UWRel(Cont)_{i,j,t} > 0$ for any j in period t and zero otherwise. We calculate the above two measures for every firm-bank pair in our sample. We aggregate these firm-bank pair measures to the level of firm using the following measures:

$$UWRel(Max)_{i,t} = \max_{j} \text{UWRel(Cont)}_{i,j,t}$$

Note that this measure captures the maximal reliance firm i has on a single bank for underwriting its bonds in the past 20 quarters.

$$UWRel(HHI)_{i,t} = \sum_{j} w_{j,i,t}^2$$

where $w_{j,i,t}$ represents the proportion of underwriting of firm i's bonds in the past 20 quarters by bank j. This measure captures how concentrated firm i's bond issuance is over its underwriters.

Bank Credit Supply Shock Measures

We identify bank credit supply shocks using two variables. Our preferred measure of reduced aggregate bank credit is an indicator taking the value one during financial crises as identified by Berger and Bouwman (2013); we denote this variable $crisis_{BB}$. We prefer the Berger-Bouwman measure because of its focus on distress in the financial sector specifically, as opposed to other crisis indicators which are based on the timing of the slowdown of the real sector. Our sample period includes four financial crises allowing for a comparison of the causes and consequences of loan/bond substitution between normal and crisis times. We include the following four periods of crisis in our sample: 1) *Credit Crunch* (1990:Q1-1992:Q4), 2) *Russian debt crisis and Long-Term Capital Management bailout* (1998:Q3-1998:Q4), 3) *Bursting of the dot.com bubble and September 11 terrorist attack* (2000:Q2-2002:Q3), and 4)*Sub-prime lending crisis* (2007:Q3-2009:Q4).[4] Two of the crisis periods captured by the $crisis_{BB}$ indicator originated in the banking sector (the credit crunch and the sub-prime lending crisis), while the other two crisis periods originated in other markets, outside of the banking sector. We use the Berger-Bouwman

[4]These crises are identified using a combination of crisis dates used in the literature, financial indicators, newspaper articles, and subjective judgment. For a detailed discussion of dating financial crises, see Chapter 7 of Berger and Bouwman (2015).

crisis dates to separate our sample into four crisis periods and three normal periods.[5]

For robustness, we additionally use NBER designated recession periods (denoted $crisis_{NBER}$) to measure aggregate banking sector credit supply.

Finally, we measure individual bank health using Call Report data for banks. Specifically, we calculate the following measures of bank health:

$$NPLRatio_{j,t} = \frac{\text{Non-Performing Loans}_{j,t}}{TotalLoans_{j,t}}$$

note that Non-Performing Loans is defined as the sum of loans past due 90 days and non-accrual loans.

$$CapRatio_{j,t} = \frac{\text{Total Equity Capital}_{j,t}}{\text{Total Assets}_{j,t}}$$

$$Zscore_{j,t} = \frac{\text{ROA}_{j,t} + \text{Capital}^{\cdot}\text{Ratio}_{j,t}}{\text{Standard Deviation of ROA}}$$

Loan and Bond Contract Terms

We examine the effects of loan/bond substitution on debt contract terms, namely cost, amount, and maturity. The cost of debt for loans is defined as the "drawn all-in spread" (henceforth AIS) reported for each loan in the LPC database. The AIS provides a standard measure of the overall cost of a loan and is expressed as a spread (in basis points) over the benchmark London interbank offering rate (LIBOR).[6] For bonds, we obtain cost, defined as the spread (in basis points) between the bond interest rate and the interest rate on the treasury bond of matching maturity, from Thomson One Banker.

In addition to cost, we obtain maturity information, measured in months, for both loans and bond issues from LPC and Thomson One Banker, respectively. Finally, we obtain loan and bond amounts from their respective sources.

[5]Crisis periods are dated according to Berger and Bouwman (2013) and normal periods are defined as the time period between the end of the last crisis and the beginning of the current crisis. Note that for the first normal times period begins following the 1990-1992 crisis.

[6]The AIS is defined as the coupon spread, plus any annual fee, plus any up-front fee divided by the maturity of the loan. See Berg et al. (2016) for a detailed explanation of the AIS spread and its merits as a measure of overall loan cost.

Firm Characteristics

Several firm characteristics have been found in the literature to systematically affect a firm's choice of debt structure (see, for example, Denis and Mihov (2003) and Rauh and Sufi (2010)). We follow the definitions of Adrian et al. (2013) for measures of these known determinants. We include two proxies for information asymmetry: firm size measured as log of real assets and tangibility, defined as (net property, plant, and equipment) / (total assets). In addition, we include Tobin's Q as a proxy for a firm's investment opportunity. Tobin's Q is calculated as (assets + market value of equity - book value of common equity - deferred taxes) / (total assets). We control for a firm's project quality with measures of credit rating and profitability. Following Adrian et al. (2013), we define a firm's credit rating by converting its S&P Domestic Long Term Issuer Credit Rating to an integer value ranging from 1 for a rating of D to 22 for a rating of AAA. The quarterly credit rating is given by the monthly rating assigned during the last month of each quarter. Profitability is defined as (operating income before depreciation) / (total assets). Finally, we control for firm leverage, defined as (debt in current liabilities + long-term debt) / (total assets). All firm characteristics are measured at a quarterly frequency and lagged by one quarter from the quarter of debt issue when included as controls.

3 Empirical Methodology

3.1 How do Lending and Underwriting Relationships Affect the Availability of Debt in Crisis vs. Normal Times?

To examine this question, we estimate a linear probability model on a stacked cross-section of firms, one cross section for each of the four crisis periods. For each firm in each crisis period, the dependent variable takes on the value one if the firm received debt, either in the form of a loan or a bond, during that crisis period. In one analysis, we include all firms (non-financial, with positive assets, incorporated in the US) for which Compustat data is available in a given crisis period. In a second analysis, we only include firms for which at least 20% of their long term debt expires in the quarter before the crisis begins in an attempt to narrow the universe of firms to those who have positive demand for debt in the crisis period. For both samples, the

stacked cross-section includes one observation per firm per crisis period. We then regress the debt indicator variable on the lending relationship and underwriting relationship status of the firm, firm level control variables, and crisis period fixed effects. Specifically, we estimate the following model:

$$\begin{aligned} \text{I(Debt)}_{i,t} = \beta_0 + \beta_1 I(LendRel)_{i,t} + \beta_2 I(LendRel)_{i,t} \times Lendrel(Cont)_{i,t} \\ + \beta_3 I(UWRel)_{i,t} + \beta_4 I(UWRel)_{i,t} \times UWRel(Cont)_{i,t} \\ + \beta_5 X_{i,t}^{\text{precrisis}} + \gamma_t + \epsilon_{it} \end{aligned} \tag{3.1}$$

where $X^{\text{precrisis}}$ represents a vector of firm characteristics measured the quarter before the crisis and γ_t represents a crisis fixed effect to account for the common experience of firms in each of the four crises included in the sample. Note that we include a relationship indicator variable to separate those firms that have relationships (either lending or underwriting) from those that do not. We also include an interaction term between the relationship indicator and a continuous measure of relationship intensity to allow for a differential effect of relationships on the receipt of debt in crisis by the level of intensity of the relationship.

Note that we also estimate the model above on a normal times sample. This sample includes a stacked cross section with one cross section for each normal times period. The normal times periods are defined as the quarters between the end of one crisis and the start of the next crisis. Note that the normal times stacked cross-section includes three cross-sections of firms, one for each of the three normal periods in the sample. We compare the coefficient estimates of $\beta_1, \beta_2, \beta_3$, and β_4 between the crisis and normal times sample. [7]

3.2 How do Lending and Underwriting Relationships Affect the Type of Debt in Crisis vs. Normal Times?

To address this question, we estimate a linear probability model on an unbalanced panel of firm-quarter observations, where inclusion in the sample is conditional on a firm either issuing a bond or obtaining a loan in a given quarter t. The dependent variable takes the value 1 if the

[7] Note that due to data limitations, we cannot include the period before the 1990-1992 crisis. We also do not include the period after the 2007 - 2009 crisis.

firm issued a bond and takes the value 0 if a firm issued a loan in a given quarter. We regress the debt type indicator on relationship variables, crisis indicators, the interaction between the two, and firm level control variables. Specifically, we estimate the following model:

$$\begin{aligned}
\text{I(Bond)}_{i,t} = \beta_0 + \beta_1 I(Crisis)_t + \beta_2 I(LendRel)_{i,t} + \beta_3 I(LendRel)_{i,t} \times Lendrel(Cont)_{i,t} \\
+\beta_4 I(LendRel)_{i,t} \times I(Crisis)_t + \beta_5 I(LendRel)_{i,t} \times LendRel(Cont)_{i,t} \times I(Crisis)_t \\
\beta_6 I(UWRel)_{i,t} + \beta_7 I(UWRel)_{i,t} \times UWRel(Cont)_{i,t} \\
+\beta_8 I(UWRel)_{i,t} \times I(Crisis)_t + \beta_9 I(UWRel)_{i,t} \times UWRel(Cont)_{i,t} \times I(Crisis)_t \\
+\beta_{10} X_{i,t-1} + \tau_t + \epsilon_{it}
\end{aligned} \tag{3.2}$$

where $I(Crisis)_t$ is an indicator variable taking the value 1 during a crisis period as identified by Berger and Bouwman (2013), $X_{i,t-1}$ is a vector of lagged firm characteristics, and τ_t represents year fixed effects. Note that we include a relationship indicator variable to separate those firms that have relationships (either lending or underwriting) from those that do not. We also include an interaction term between the relationship indicator and a continuous measure of relationship intensity to allow for a differential effect of relationships on the receipt of debt in crisis by the level of intensity of the relationship. Finally, we interact the various relationship measures with the crisis measures to allow for a differential effect of relationships on debt type in crisis.

3.3 How do Lending and Underwriting Relationships Affect Loan and Bond Contract Terms in Crisis vs. Normal Times?

To address this question, we estimate an OLS model on an unbalanced panel of firm-quarter observations, where inclusion in the sample is conditional on a firm either issuing a bond or obtaining a loan in a given quarter t. The dependent variable is a debt contract term (either the interest rate, the maturity, or the amount) for a debt issue (loan or bond) in a given quarter. We regress the debt contract terms on relationship variables, crisis indicators, the interaction between the two, and firm level control variables. We estimate the model separately for loans

and for bonds. Specifically, we estimate the following model:

$$\begin{aligned} Y_{i,t} = \beta_0 + \beta_1 I(Crisis)_t + \beta_2 I(LendRel)_{i,t} + \beta_3 I(LendRel)_{i,t} \times Lendrel(Cont)_{i,t} \\ +\beta_4 I(LendRel)_{i,t} \times I(Crisis)_t + \beta_5 I(LendRel)_{i,t} \times LendRel(Cont)_{i,t} \times I(Crisis)_t \\ \beta_6 I(UWRel)_{i,t} + \beta_7 I(UWRel)_{i,t} \times UWRel(Cont)_{i,t} \\ +\beta_8 I(UWRel)_{i,t} \times I(Crisis)_t + \beta_9 I(UWRel)_{i,t} \times UWRel(Cont)_{i,t} \times I(Crisis)_t \\ +\beta_{10} X_{i,t-1} + \tau_t + \epsilon_{i,t} \end{aligned} \tag{3.3}$$

where $Y_{i,t}$ represents a debt contract term (interest rate, maturity, or amount), $I(Crisis)_t$ is an indicator variable taking the value 1 during a crisis period as identified by Berger and Bouwman (2013), $X_{i,t-1}$ is a vector of lagged firm characteristics, and τ_t represents year fixed effects. Note that we include a relationship indicator variable to separate those firms that have relationships (either lending or underwriting) from those that do not. We also include an interaction term between the relationship indicator and a continuous measure of relationship intensity to allow for a differential effect of relationships on the receipt of debt in crisis by the level of intensity of the relationship. Finally, we interact the various relationship measures with the crisis measures to allow for a differential effect of relationships on debt terms in crisis.

3.4 How do Lending and Underwriting Relationships Affect Bank/Firm Matching for Lending/Underwriting in Crisis vs. Normal Times?

To address this question, we observe the pairing of firms and banks for both loan issuance and bond underwriting. Using a linear probability model, we compare firm-bank pairs for which the bank provided (or underwrote) a loan (or bond) to the firm to those firm-bank pairs where the firm did not receive debt from the bank. For this exercise, we includes all firm-quarters in which a firm received a loan or issued a bond. These debt-receiving firms are then paired with the set of potential lenders (or underwriters) in that quarter to create an unbalanced panel dataset. Using this panel, we regress the dependent variable, which takes the value one for firm-bank pairs for which the bank issued (or underwrote) debt to the firm in a given quarter and zero for other pairs, on lending relationships, underwriting relationships, year fixed effects,

crisis indicators, firm characteristics, bank characteristics, and individual bank health, and interactions between relationship measures and bank health measures. In this framework, we can isolate the effect of a bank's individual health on it relationship borrowers. We estimate the following model separately for loan and bond issues.

$$\begin{aligned} I(Debt)_{i,j,t} = \beta_0 + \beta_1 BH_{j,t} + \beta_2 I(LendRel)_{i,j,t} + \beta_3 I(LendRel)_{i,j,t} \times Lendrel(Cont)_{i,j,t} \\ +\beta_4 I(LendRel)_{i,j,t} \times BH_{j,t} + \beta_5 I(LendRel)_{i,j,t} \times LendRel(Cont)_{i,t} \times BH_{j,t} \\ \beta_6 I(UWRel)_{i,j,t} + \beta_7 I(UWRel)_{i,j,t} \times UWRel(Cont)_{i,j,t} \\ +\beta_8 I(UWRel)_{i,j,t} \times BH_{j,t} + \beta_9 I(UWRel)_{i,j,t} \times UWRel(Cont)_{i,j,t} \times BH_{j,t} \\ +\beta_{10} X_{i,t-1} + \tau_t + \epsilon_{i,t} \end{aligned} \tag{3.4}$$

where the index j represents the lender and $BH_{j,t}$ measures bank health of bank j at time t.

4 Results

Table 1 below presents coefficient estimates from the linear probability model described in section 3.1 relating the receipt of debt in either form to the lending and underwriting relationships of the firm. Separate models are estimated on normal times and crisis times sub-samples. Each sample contains stacked cross sections of either crises or normal periods, with a firm appearing once in every crisis or normal period episode. The model includes measures of relationship intensity, firm level controls, and time period fixed effects.

The results in Table 1 demonstrate that lending relationships increase the likelihood of receiving debt (either a loan or a bond) in both crisis and normal times. This is demonstrate by the positive and significant coefficient on the lending relationship indicator in the first row of the table. Firms that have borrowed from a bank in the last five years are more likely to receive a loan, in both crisis and normal times, than firms that have no lending relationships. However, in crisis periods, the likelihood of receiving debt, either a loan or a bond, decreases with the intensity of the relationship. This is evident in the negative and

statistically significant coefficient on the interaction term between the presence of a lending relationship and its intensity, shown in the second row of the table. Conditional on having a relationship, the stronger the reliance on a single bank, the lower the likelihood of receiving debt in crisis. This result is consistent with higher costs of switching lenders in crises compared to normal times.

Underwriting relationships only appear to increase the likelihood of receiving debt, through either a loan or a bond, in times of crisis. Note that the coefficient on the indicator variable for the presence of an underwriting relationship is positive and significant only in crisis times and is indistinguishable from zero during normal times. In crisis times, firms are aided by having an underwriting relationship. However, similar to the results for lending relationships, the likelihood of receiving debt decreases with the intensity of the relationship. This suggests that increased switching costs in crisis make it harder for firms to switch to a new underwriter than during normal times.

The results in Table 1 demonstrate that relationship benefits weaken in crisis, for both lending and underwriting relationships.

5 Conclusion

This is a first and preliminary draft of the paper. In a future version, we will build on our current work in three significant ways. First, we will add a complete set of results for all hypotheses. Second, we will account for the possible endogeneity of relationships by using distance as an instrumental variable. Third, we will account for M&A activity of firms and banks that can be disruptive to lending relationships.

Table 1: Debt Availability by Lending and Underwriting Relationship Status, Crisis and Normal Times

	(1)	(2)	(3)	(4)
Crisis vs. Normal Times	Normal	Normal	Crisis	Crisis
Sub-Sample	All Firms	Firms With > 20% LT Debt Maturing	All Firms	Firms With > 20% LT Debt Maturing
I(Lend. Rel)	0.305*	0.585**	0.270**	0.276
	(0.071)	(0.099)	(0.056)	(0.134)
I(Lend. Rel) x Lend Rel Intensity	-0.197	-0.302*	-0.144*	-0.271***
	(0.101)	(0.090)	(0.050)	(0.033)
I(UW Rel)	0.098	0.051	0.242**	0.270***
	(0.043)	(0.055)	(0.058)	(0.043)
I(UW Rel) x UW Rel Intensity	-0.055	-0.027	-0.234*	-0.217*
	(0.050)	(0.048)	(0.086)	(0.077)
Size	0.056**	0.046**	0.049*	0.037**
	(0.008)	(0.009)	(0.016)	(0.010)
Leverage	0.001*	0.001	0.000	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Tangibility	0.053	0.082**	0.056	0.051
	(0.025)	(0.016)	(0.030)	(0.041)
Profitability	-0.000*	-0.000*	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.291**	0.288**	0.079	0.081
	(0.032)	(0.056)	(0.108)	(0.128)
Time Period Fixed Effects	Yes	Yes	Yes	Yes
Observations	16,736	8,029	21,490	10,055
R-squared	0.314	0.229	0.252	0.193

Notes: This table presents coefficient estimates from a stacked cross-section linear probability models of the likelihood of firms receiving debt, in the form of either a loan or a bond, during crises and normal times. The regressions include measures of lending and underwriting relationships. The model includes an indicator variable for the presence of a relationship, either lending or underwriting, as well as a continuous measure of relationship intensity. The continuous relationship measure is defined as the percentage of lending (underwriting) received over the past five years from the bank providing the highest percentage of lending (underwriting) to the firm over the same period. The normal times samples, in columns (1) and (2), include one observation per firm per normal period, for each of the three normal periods in the sample. Normal periods are defined as the period between the end of one crisis, dated according to Berger and Bouwman (2013) and the start of the next. The crisis samples, in columns (3) and (4), include one observation per firm per crisis period, for each of the four crisis periods (dated according to Berger and Bouwman 2013) in the sample. The dependent variable takes the value 1 if a firm has issued a bond or received a loan during a given period and 0 otherwise. In columns (1) and (3), all Compustat firms are included in the sample, while in columns (2) and (4), only the subset of firms for which at least 20% of their long term debt is maturing in the quarter before the start of the crisis. Firm level controls are measured as of the last quarter before the start of the crisis for the crisis sub-samples. For the normal times sub-sample, firm characteristics are measured as of the first quarter of the normal period. The sample is created by combining data from DealScan, Thomson One Banker, and Compustat and includes publicly traded firms observed over the period 1990:Q1-2011:Q4. Section 2 provides more detail about the data sources. Robust standard errors clustered by time period are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

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