# When more information does not translate into more credit: The effect of bank holding affiliation on small businesses' credit constraints

Jaume Franquesa* David Vera †

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**Abstract**

Following Petersen & Rajan (1994), Petersen & Rajan (2002), Berger et al. (2004), we add to a growing literature on credit constraints of small businesses in the United States. Our main contribution is that—after controlling for firm and owner characteristics, relationships with lenders, and informational transparency—we show that borrowing from banks affiliated to bank holding companies increases small businesses' credit constraints. Different from previous work, we find that borrowing from informed lenders, which happened to be mostly banks affiliated to bank holding companies, increases small businesses' credit constraints. We also find that in spite of technological improvement, increases in the number of lenders a small firm works with reduces the availability of credit.

Keywords: Small Businesses Lending, Banking, Credit Constraints, Bank

* Department of Management, Kent State University
† Corresponding author. Department of Economics, Kent State University.
email: dvera@kent.edu

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# 1 Introduction

The U.S. banking system has gone through major deregulation, affecting the number of commercial banks and creating large bank networks affiliated through bank holding companies (henceforth BHCs). The importance of holding companies in the U.S. financial system has increased since the mid 1990s. For instance the U.S. Census Bureau's statistical abstract of the United States indicates that BHCs' affiliated assets tripled between 1990 and 2000.

We study from a particular angle how bank holding affiliation may affect small businesses in the United States. After controlling for different sets of variables identified in the literature as relevant and using new available information on small businesses, we determine that borrowing from a bank affiliated with a BHC increases a small business's credit constraints. Furthermore, different from previous results, we find that borrowing more from informed lenders also increases a small business's credit constraint. This result is a consequence of banks affiliated to BHCs being also providers of "informed" services.

We contribute to the literature on small business lending in several ways. First, by using the most recent data set on small businesses available from the Board of Governors of the Federal Reserve System, we are the first to study how bank holding affiliation affects small businesses' credit constraints after the recent deregulation in the banking system. For example, one of the latest and most significant changes in

bank legislation is the Riegle Neal Act of 1994 which triggered further expansion of BHCs in the United States.[1] Second, we add to the discussion on the relevance of soft information versus hard information used by banks to determine lending to small businesses. Using data on small businesses, we control for variables that proxy for soft and hard information and determine their effect on small businesses' access to credit. Thus, we have been able to determine that among the relationship and soft information variables, the importance of the length of the relationship disappears when we control for measures of the firm's risk and other hard information. We are also able to determine that certain firm-owner characteristics have a significant effect on the small business's credit constraints. We also have better controls for firm's industry based on two-digit SIC codes.

In the next section, we discuss some of the most recent and relevant literature and underlying theory. In section 3, we describe the data set and its characteristics compared to previous data sets used in the literature. In section 4, we present our empirical approach and main hypothesis. In section 5, we discuss the results, and we conclude with section 6.

[1]Another recent change in the banking legislation is the Gramm–Leach–Bliley (hereafter GLB) Financial Services Modernization Act of 1999. The GLB act allows banks, securities firms and insurance companies to affiliate through a financial holding company. According to the National Information Center, a financial holding company is "A financial entity engaged in a broad range of banking-related activities, created by the GLB Act of 1999. These activities include: insurance underwriting, securities dealing and underwriting, financial and investment advisory services, merchant banking, issuing or selling securitized interests in bank-eligible assets, and generally engaging in any non-banking activity authorized by the Bank Holding Company Act."

# 2 Related Bank Literature & Theory

The availability of data, in particular the Survey of Small Business Finance (hereafter SSBF) has provided a fertile ground for research on small businesses.[2] In this section, we discuss the most recent and closest literature to our work that provides the theoretical framework for the study of small business lending.

Using the 1987 SSBF, Petersen & Rajan (1994) provide evidence that relationships, as they named the ties between banks and small firms, can ease the flow of capital from lenders to borrowers. The intuition is that through close repetitive interaction, a firm can collect soft information about another firm, allowing the lender to more easily screen and evaluate an investment project. An important aspect of the relationship between the bank and the firm is the length of the relationship. The longer the relationship, the more information the bank has accumulated about the firm and the easier it may be for the firm to obtain credit from the lender. Although age of a firm may be important, the bank, by working closely with a firm, may have information about the firm that is not easily transferable or observable by others. Another aspect of the concept of *relationship* described by Petersen & Rajan (1994) is that when a firm obtains several services or products from a single bank, the bank learns more about the firm (e.g., sales, cash flow, etc), and can more easily assess the creditworthiness of the firm. It may also be more cost effective for a bank to provide lending to a firm if the bank already supplies several products to the firm.

Three main variables characterize the relationships between the firm and the bank: the maximum length of the relationship, the nonborrowing services the firm

[2]We describe the data set in detail in section 3.

obtains from the bank and the concentration of the firm's borrowing. These relationship variables can account for soft information about a firm that can not be easily obtained by other potential lenders. Petersen & Rajan (1994) estimate the effect of relationships on the cost of capital and the availability of credit. Their main results indicate that, although relationships may not have a significant effect on the cost of capital, they do increase the availability of credit to small businesses.

Also using the 1987 SSBF and exploiting additional data from the SSBF 1993, Petersen & Rajan (2002) document two facts: First, the distance between small businesses and their lenders has been increasing over time. Second, the mean of small-business communications with lenders has changed over time. In order to document both facts, the authors generate a data set where each observation is a matched lender–borrower pair, allowing the authors to exploit the firms' multiple lending relationships (on average a firm works with two lenders). After controlling for lender type, possible selection bias, loan type, firm characteristics, informational transparency and industry type, they find that the average distance between small businesses and their lenders has increased over time. Their results on average distance are further substantiated with the finding that small firms and banks are now communicating in more impersonal ways. When looking at the communication method, they find that the more recent a firm–bank relationship is, the more likely it is they will communicate by mail or phone. In contrast, the oldest relationships are still based on personal communication. An important component of their estimates is the idea that the change in the method of communication and increasing distance are two distinct effects. That is, holding distance constant small firms and banks are

less likely to communicate in person.

Petersen & Rajan (2002) examine several possible causes of the increasing distance between small businesses and lenders and the change in the mean of communications, including bank consolidation, changes in the deposit market, changes in credit quality and growing use of information technology. The growing use of information technology seems to explain both the increasing distance between firms and banks and the change in the method of communication. According to Petersen & Rajan (2002), the use of new technologies, such as credit score models, has transformed the financial sector. The increasing use of technology and the capacity to collect and store information have given banks better access to hard processed information (for example the credit rating provided by Dun and Bradstreet), which replaces the need for personal contact and close monitoring to determine the creditworthiness of a firm. In terms of soft and hard information, the results suggest that the availability of hard information due to new technologies has changed the way banks and small businesses interact. More efficient monitoring by banks of small business loans, thanks to new technology that allows lenders to rely more on credit, financial, history and other scoring methods, can be seen in the lower cost of appraising a loan as well as the decreasing time a loan officer spends on a loan application. Also new technologies that provide timely information on the performance of a lender may reduce the potential loss of banks from borrower moral hazard.

Most recently Berger et al. (2004) also using the 1993 SSBF, look at the match between banks and small businesses. One of the main contributions of this work is that they are able to determine that bank size can have a negative effect on the

amount of lending provided by a bank to small businesses. According to the authors, small banks have advantages over large banks in collecting and using soft information. This advantage allows small banks to participate more actively in lending to small businesses. They also find that large banks when lending to small businesses, tend to operate at a greater distance, have shorter relationships and interacting in more impersonal ways with the borrower.

## 2.1 Background on the Banking System and Bank Holding Companies

The banking system has been one of the most heavily regulated industries in the United States. There have been regulations on the price of services, the type of services and the location of commercial banks. Over the last 28 years or so, many restrictions have been lifted allowing banks to expand their array of services as well as permitting easier entrance into new geographical markets.

According to the National Information Center, "A bank holding company is an entity that owns and/or controls one or more U.S. banks or one that owns, or has controlling interest in, one or more banks. A BHC may also own another bank holding company, which in turn owns or controls a bank; the company at the top of the ownership chain is called the top holder." The two types of BHCs are "one-bank" and "multibank" holding companies, which together include most of the large banks in the United States. BHCs first came to exist in the United States around 1900 as a way to avoid geographical restrictions. BHCs were mostly small and located in the Midwest. Through different stages of bank industry regulation, BHCs

evolved at times experiencing expansions (between 1900 and 1933) and at other times thriving in a more regulated environment (the 1930s and 1960s). Until the 1970s most BHCs were competing against banks and were subject to similar legal restrictions. However, in the 1970s the banking system went through a period of transformation caused by changes in monetary policy, the introduction of new products and new technologies that changed the way banks operated. Initial geographical deregulation in the mid 1980s favored the expansion of BHCs, while at the same time the number of individual banks plummeted. The 1990s was a period of further deregulation of the banking industry. One of the many changes was the Riegle Neal Act of 1994. This act has among other provisions, the Interstate Bank Holding Company acquisition provisions, which allows BHCs easier entry in states different to where they where initially headquartered. During this period, many smaller and midsized banks were unable to compete in this new BHC-dominated financial environment. Banking deregulation as well as improvements in technology have increased the growth of BHCs in the United States. For instance, as stated by the U.S. Census Bureau's Statistical Abstract of the United States, BHCs' assets tripled between 1990 and 2000. During this period, BHCs expanded nationally and invested in new types of businesses, increasing their income from service fees.[3]

## 2.2 Why Would Organizational Form Matter?

To understand why BHC affiliation may have an effect on bank lending behavior, first we need to discuss the reasons why banks become parts of a bank holding in

[3]For an extended background, see SIC 6712 Offices Bank Holding Companies available at http://www.referenceforbusiness.com/industries/Finance-Insurance-Real-Estate/Offices-Bank-Holding-Co

the first place. First of all, BHCs (particularly multibank BHCs) can take advantage of economies of scale. Banks that belong to a BHC benefit from centralized and computerized bookkeeping, auditing, advertising, marketing, personnel recruitment, group insurance and retirement programs, among other factors. For instance, one BHC estimated an acquired bank's costs diminished by an average of 30%. Additionally, the mobility of capital among bank subsidiaries allows them to spread resources as needed (Ashcraft 2006).

Another major difference between an individual bank and a bank affiliated with a BHC is that the latter can overcome legal restrictions and raise capital by means not permitted to an individual bank. Furthermore, BHC affiliation allows entry into new markets and products off limits to individual banks. Again, bank geographical deregulation played a major role in this area. Banks affiliated with a BHC have expanded to new markets offering fee-based financial advisory services related to debt and equity underwriting, loan securitization, asset management and investment sales, which could not be provided by standalone banks regardless of their size.

It has been pointed out that large banks may not be the most appropriate to engage in small-business lending (Berger et al. 2004). Small-business lending may require a significant amount of close interaction and collection of soft information. For example, a bank manager of a local branch of a large bank who does not have the final decision on a loan's approval may exert less effort in developing relationship lending with small businesses. Similarly, a manager that works for a local branch of a bank affiliated to a BHC where technology and internal services are shared and final lending decision are centralized, may also face the same incentives. Banks

affiliated with BHCs, just like large banks, will not have the appropriate organization to develop the close relationship to monitor and extend credit to small businesses. However, there is another factor that plays a significant role in a BHC-affiliated bank's decision to engage in small-business lending. A bank affiliated with a BHC is different from an individual or standalone bank in that the former may decide not to engage in small-business lending because their business scope is wider. Banks affiliated with BHCs are interested in supplying other types of financial products that may be off limits to individual banks. Even after acquiring a local bank, a BHC may decide to decrease small-business lending if the investment opportunities available through offering new products may be more profitable.

# 3 Data

The SSBF is one of the main sources of data on small businesses in the United States. The SSBF has been conducted for the years 1987, 1993, 1998 and 2003, and includes information on nonfinancial nonfarm firms with fewer than 500 employees.[4]

We use the data from the 2003 SSBF with a stratified sample by census region, urban or rural location and employment size. Additionally, the 2003 SSBF includes five different implicates, which differ in the imputed values for the missing data. The implicates allow us to adjust the estimated standard error and confidence interval to account for the variance caused by the imputations in the data. The data for the 2003 SSBF were collected between June and December 2004. The reference date for the income and balance sheet statement ranges from July 2003 to June 2004. The

[4] All the years are available from the SSBF index: `http://www.federalreserve.gov/pubs/oss/oss3/nssbftoc.htm`

timing of the survey is relevant for the interpretation of the results since significant changes in banking legislation were passed in the 1990s.[5] The original 2003 SSBF includes data on 4,240 firms where 64% of the firms had 19 or fewer employees and the average size of all firms in the sample is US$3 million.

Besides the five different implicates to accurately account for missing data, the 2003 SSBF has other advantages compared to previous surveys that we exploit in our empirical approach. The 2003 SSBF includes information on whether a bank a small firm works with is affiliated to a BHC. It also include detailed information not only on the main owner, but also on the three principle owners.

Before we analyze the data, we implement several screens. First, we make sure that the firms considered are individual and not company owned. We also consider firms with positive sales and positive assets and firms for which sales are greater than profits. Also, we only consider firms for which the Dun and Bradstreet rank credit score is available. Our results are based on data for 2789 firms.

Table 1 provides descriptive statistics of the firms included in the estimation. The firms in our sample are small by several standards. For instance, the average size is around 3 million dollars and the average number of employees is 30. They have been operating for an average of 17 and 1/2 years. They have long relationships with lenders (around 13 and 1/2 years), and tend to be located closed to them (around four miles). On average, 40% of their loans come from banks affiliated with BHCs.

[5]Two major changes were the Riegle Neal Act of 1997 and Gramm-Leach-Bliley Act of 1999.

# 4 Empirical Approach

The first component of our model is an appropriate measure of a firm's credit constraints or the availability of credit to small businesses. In the literature, particularly Petersen & Rajan (1994) and Berger et al. (2004), it has been established that trade credit paid late is a good measure of a firm's credit constraints.[6] As Petersen & Rajan (1994) point out, firms rely on trade credit after cheaper alternative sources of financing, such as internal cash and borrowing from banks, have been exhausted. Furthermore, using the 1987 SSBF, Petersen & Rajan (1994), estimate an implicit annual interest rate of trade credit paid late of 44.6%, significantly higher than the loan market rate. Trade credit paid late is a good measure of a firm's credit constraint: When a firm pays trade credit late, it is actually relying more on trade credit, a very expensive source of financing. Also, besides the direct cost, there are other costs, such as loss of reputation, associated with paying trade credit late.

When looking at 2003 SSBF, we find that small businesses still rely significantly on trade credit. For instance, 66% of the firms in the sample use trade credit. Furthermore, the use of trade credit was significant; on average, 70% of purchases were made using trade credit. Trade credit denial was low, only 5% of the firms in the sample were denied trade credit in the last 3 years, more than half of these firms had 19 or fewer employees.

Our main hypothesis is that firms that borrow from banks associated with BHCs repay a higher fraction of their trade credit late and therefore are more credit con-

[6]According to SSBF 2003 questionnaire, trade credit arises when purchases are made from suppliers and payment of the bill is required after delivery (rather than before or at the time of delivery). Such purchases are sometimes called purchases on account.

strained.

In order to properly capture the effects of bank-holding affiliation on trade credit, we start by accounting for other factors that may affect small-business credit constraints. First, we estimate a similar model from existing results in the literature regarding small-businesses credit constraints. At this stage, we rely on the literature to identify the relevant variables, such as firm characteristics or lending-relationship characteristics, that capture soft information about the firm. Second, we strengthen the results by incorporating new controls, in particular variables that represent hard information about the firm. Third, we exploit new information on owners' characteristics, such as age, education and wealth. Finally, after controlling for all available variables that can affect small businesses' credit constraints, we proceed to determine how borrowing from a bank affiliated with a BHC affects a small business's credit constraints.

# 5 Estimation and Results

Since our dependent variable, percent of trade credit paid late, and several of our independent variables are expressed as percentages and thus censored at 0 or 100, the coefficients from an ordinary least square model will be biased towards zero. Therefore, we estimate a two-sided tobit model where we regress the percent of trade credit paid late on several sets of control variables.

In this initial estimate, we draw most of the control variables from the existent literature, adding a few additional control not used before. Table 2 provides detailed

definitions of the variables we used in the regression. The following model illustrates the estimated models, where we regressed the percent of trade credit paid late on different sets of variables.

$$\begin{aligned} \textit{Percent of trade credit paid late}_i = \beta_0 + \beta_1 \textit{Controls for firm's characteristics} \\ +\beta_2 \textit{Controls for relationship with lenders} + \beta_3 \textit{Controls for informational transparency} \\ + \beta_4 \textit{Controls for firm owner's characteristics} + \beta_5 \textit{Other controls} + \varepsilon_i \quad (1) \end{aligned}$$

The first column in Table 3 shows an initial estimation of our model where we take into account the variables identified in the literature as determinants of a firm's credit constraints. In line with the literature, we find that among the firm's characteristics, firm's sales growth decreases the firm's credit constraints. Firm's growth remains significant throughout the different specifications of our model. We also find that although they have the expected sign, firm's size and age are not significant.[7] The return over assets does not appear to have an effect on trade credit paid late. Among the controls for relationship with lenders, the outside debt ratio has the expected sign, but it is not significant in this first estimation. We find that in this initial estimation (Model 1, Table 3) the length of the relationship has a negative and significant effect on the trade credit paid late. In line with the literature, this result suggests that the longer a firm works with a lender, the more the firm is to access credit. Among the other variables included under relationship with lenders, the number of lenders has a significant effect and it increases the fraction of trade

[7]The log of number of workers was used as an alternative measure of size, but the results did not vary.

credit paid late. This result suggests that working with many lenders may actually increase a small business's credit constraints. As the number of lenders increases, the relationship with the lenders is not as a strong as if the firm had concentrated on one or two lending providers. Additionally, a low-quality firm may need to work with more than one institution when the first bank denies credit. This result, in line with Petersen & Rajan (1994), suggests that small businesses will be better off when working with few lenders. The effect of the number of lenders on trade credit remained significant throughout the different specifications. Average distance, which has been found to be relevant in previous studies, has the expected sign but was insignificant. The result is in line with Petersen & Rajan (2002), who find that the distance between small firms and lenders has increased over time. The increasing distance between small firms and lenders, which was explained by lenders' use of better technology, has been lately reinforced by the further deregulation in the banking system. Another control, the measure of bank concentration has the expected sign—higher concentration reduces the firm's credit constraint—but it is not significant. We tried the alternative measures of banking concentration provided in the SSBF, but the result remained unchanged.

In Columns 2 and 3 of Table 3, we have included additional controls in each set of variables. Under the controls for characteristics of the firm, the Dun and Bradstreet rating has a negative and significant effect on the percent of trade credit paid late. As expected, the higher the rating, the less credit constraint a firm has. The other variable included in this set, the urban-area dummy, has the expected sign but is not significant. Also under controls for firm's owner characteristics, we have

included main owner delinquency and wealth of main owner. As we can see, the firm's owner characteristics have significant effects on the firm's credit constraints. The delinquency of the main owner tends to increase the credit constraint, while the wealth of the main owner diminishes it (although the effect is only significant at 10%).

As we can see in Columns 2 and 3 of Table 3, the importance of the length of the relationship weakens as we control for hard information on the firms (Dun and Bradstreet rating) and the firm's owner (the delinquency rate of the main owner and main owner's wealth). That is, the inclusion of hard information dominates the importance of the length of the relationship, a proxy for soft information. This result suggests that credit-risk information on the firm and the owner, when available, overrules the length of the relationship with a lender.

In Columns 2 and 3, we have also included an additional variable under controls for relationships with lenders, the fraction of loans from informed lenders. This additional control is the fraction of loans from institutions that provide at least one informational financial service to the firm. According to Petersen & Rajan (1994) informational services include cash management, banker acceptances, factoring, sales financing, pension-fund management, trust services and credit card processing. The assumption is that when a lending institution provides an informational service to a small firm, it will be able to collect more information about the firm and therefore will be able to more clearly asses the profitability of a loan to this firm. An important finding in the literature has been that as the fraction of lending from informed lenders increases, small firms' credit constraints decrease. Our results in Columns 2 and 3

of Table 3 show the opposite effect: In our sample the more a firm borrows from informed lenders, the more credit constraint the firm faces. This is a rather puzzling result compared to what has been previously reported in the literature. However, it is explained by the fact that the informed lenders are also banks affiliated with BHCs as we show in the next section.

## 5.1 Effect of Bank Holding Affiliation on Small Business Credit Constraints

To estimate how bank holding affiliation affects small businesses' credit constraints, we estimate the following model.

$$\begin{aligned} \%\ of\ trade\ credit\ paid\ late_i = \beta_0 &+ \beta_1 Controls\ for\ investment\ opportunities \\ &+ \beta_2 Controls\ for\ credit\ risks + \beta_3 Control\ for\ relationship\ with\ lenders \\ &+ \beta_4 Controls\ for\ informational\ transparency + \beta_5 Other\ controls \\ &+ \beta_6 Owners'\ characteristics + \beta_7\ \%\ of\ lending\ from\ banks\ affiliated\ with\ a\ BHC + \varepsilon_i \end{aligned} \tag{2}$$

We are interested in the coefficient on the percent of lending provided by banks affiliated with a BHC. As discussed in Brickley et al. (2003), the concentration of the bank's ownership has implications on the bank's lending behavior. For instance, a manager that works for a local branch of a nationwide bank may not have enough incentive to develop relationships with small businesses if the final lending decision

does not depend on the local manager. The result will also apply to banks affiliated with BHCs where the ownership is not at the bank level and therefore the final lending decisions may also be centralized. However, even banks that are more loosely linked to a BHC may not be as involved in small business lending.[8] For instance, banks affiliated with BHCs have a larger business scope (underwriting debt and equity, loan securitization, underwriting commercial paper, treasury management), which may affect how much they are involved in small-business lending.

The last column in Table 3 shows the final estimation. After we have included all the sets of variables, we control for the share of lending from banks affiliated with BHCs. Our finding is that the higher the share of lending a small business has from banks affiliated with a BHC, the higher the percent of trade credit paid late, and therefore the greater the firm's credit constraints. It is also the case that banks affiliated with a BHC are also the main providers of informational services. In fact the correlation between the fraction of lending from banks affiliated to BHC and the fraction of loans from informed lenders is 74%, which implies that most of the informed services providers are also bank holding affiliates.

## 5.2 Does Bank Size Matter?

It is important to point out that we do not control for bank size because this information is not available in the 2003 SSBF. Therefore, if bank size and BHC affiliation are positively correlated, then we may be capturing the size effect documented by

[8] According to the FDIC "A BHC directly or indirectly or acting through one or more other persons owns, controls, or has power to vote 25 per centum or more of any class of voting securities of the bank."

Berger et al. (2004). According to Berger et al. (2004), bank size significantly affects small business credit constraints. Even though we cannot control for bank size, we provide several pieces of evidence that implicate BHC affiliation, not size, as the driver of our results.

First, when we include a variable that measures the percent of lending provided by commercial banks (whether these are affiliated or not with a BHC), together with percent of lending from bank holding affiliates, we find that BHC affiliation is still positive and significant.

Second, Berger et al. (2004) use the data from the 1993 SSBF, which preceeded the Riegel–Neal Act when bank holding affiliation was not entirely deregulated in the United States. For instance, according to the Federal Reserve Board Annual Report—Banking Supervision and Regulation—at the end of 2005, there were 5,860 U.S. BHCs in operation, of which 5,154 were top tier. These BHCs "controlled 6,160 insured commercial banks and held approximately 96% of all insured commercial assets in the United States." If the expansion of BHCs is such that today's banks of any size are associated with BHCs, then we are capturing the effect of the type of the financial organization more than another specific characteristic of the lender such as size.

Furthermore, even though we do not have access to the lending banks' sizes in our sample, we can look at how bank size and BHC affiliation are correlated. We have access to data on bank size (measured as total assets) and BHC affiliation from the commercial bank call reports available at the Federal Reserve Bank of

Chicago website for 2003.[9] We find that the correlation between bank size and BHC affiliation is 0.01 when we look at all banks. When we break banks by size, using the $95^{\text{th}}$ percentile as a cutoff for small banks, the correlation between size and BHC affiliation is 0.074 for banks bellow the cutoff (considered small banks) and about 0.076 for those above the cutoff.[10] We also estimate a probit model where we regressed a bank-holding-affiliation dummy set to one if the bank is in a BHC and zero otherwise on bank size. We find that the coefficient on size is $2.66x10^{(}-09)$ with a p-value of 0.193. These results reinforce our inference that the effect of BHC affiliation is different from the bank size effect previously identified in the literature.

# 6 Conclusion

We have made several contributions to the literature. First, our results suggest that lending to small firms is still a special business where a close relationship between lenders and borrowers may be important, but where the availability of hard information about a firm dominates the availability of soft information implicit in variables such as the length of the relationship. This result also suggests that new technologies that offer a closer monitoring of small firms' credit (eliminating the need for close business–lender relationship), such as a credit score, may improve the flow of credit to small firms. The effect of the number of lenders on small businesses' credit availability is important because it suggests that small firms will be better off

[9] `http://www.chicagofed.org/economic_research_and_data/commercial_bank_data.cfm`

[10] The $95^{\text{th}}$ percentile is the standard cutoff used in the literature. Additionally, when alternative cutoffs are used, the results remain unchanged.

when working with fewer lenders.

Second, our main result indicates that BHC affiliation increases small businesses' credit constraints. That is, small businesses that borrow from banks affiliated with BHCs tend to rely more on trade credit paid late. This result is in line with previous work that indicates that factors such as type of bank organization have a significant effect on the availability of credit to small businesses (Brickley et al. 2003). An important feature of BHCs (particularly multibank BHCs) is centralized organizational control and consolidation of assets. Similar to a large bank, a bank affiliated with a BHC, because of the extra layers of bureaucracy, may find it difficult to engage in lending to small businesses (DeYoung et al. 1999, Keeton 1995). In particular, because of centralized organizational control, banks affiliated with BHCs may find it hard to engage in relationship lending, lending based on soft information, which may be important for many small businesses.

It is important to point out, though, that over time the availability of hard information about firms as well as new technologies can allow banks to screen small businesses. However, large banks and banks affiliated with BHCs may not be able to establish relationship lending, which may be important for the smallest and most informationally opaque businesses. Our results also show that borrowing more from informed lenders, which happened to be mostly banks affiliated with BHCs, increases small businesses' credit constraints. This leads us to an alternative explanation: Banks affiliated with BHCs are interested in other types of clients and other types of financial services, which they can offer due to the regulatory framework, instead of lending to small businesses. For example, banks affiliated with BHCs have been able

to expand their business to areas that include fee-based financial advisory services related to underwriting debt and equity, loan securitization, underwriting commercial paper and treasury management. They also participate actively in mortgage banking, investment banking and asset management. Our results suggest that the adverse effect of BHC affiliation on small business lending is not only caused by the type of organization (with centralized decision making), but also by the types of businesses a bank affiliated to a BHC is involved in.

An important policy implication is that the evolution of the banking system has allowed banks to move into different financial services, leaving a significant number of small firms without the credit they need. Therefore, there is a role for institutions that focus on small-business lending.

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Table 1: **Summary Statistics**

| Independent Variable | Mean | Std. Dev. |
|---|---|---|
| Firm's age in years | 17.52 | 12.41 |
| Firm's assets in millions of $ | 2.71 | 9.32 |
| Firm's number of employees | 30.75 | 56.05 |
| Firm's sales growth | 0.33 | 0.87 |
| Return over assets | 3.16 | 64.45 |
| Outside debt ratio | 0.86 | 5.58 |
| Max. length of the relationship in years | 13.57 | 11.10 |
| Fraction of loans from inf. lenders | 37.51 | 44.02 |
| Average distance from lenders in miles | 3.97 | 2.09 |
| Number of lenders | 1.26 | 1.48 |
| Dun and Bradstreet rating | 3.87 | 1.45 |
| % of lending from bank holding | 42.51 | 46.49 |
| Ownership share of main owner | 76.19 | 26.99 |
| Wealth of main owner in thousands of $ | 607.139 | 1,868.95 |

Table 2: **Definition of variables**

| Variable | Definition |
|---|---|
| Firms' age | Natural log of age of the firm in years |
| Firms' assets | Natural log of assets of the firm on the current date |
| Firm's sales growth | One if firm's sales grew over the last year, zero otherwise |
| Firm's delinquent obligation | Delinquent obligations of 60 or more days from suppliers.<br>1= None<br>2= One<br>3= Two<br>4= Three or more |
| Dun & Bradstreet Rank Credit Score: | 1 - most risky; 6 least risky |
| Corporation dummy | One if firm is a corporation zero, otherwise |
| Return over assets | Net income after interest payments plus taxes over assets |
| Outside debt | total loans +owner credit card + business credit card<br>- family loans over total liabilities |
| Business credit card dummy | One if firm has business credit card, zero otherwise |
| Maximum length of the relationship | Number of years of the longest financial relationship |

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Table 2: **Definition of variables**

| Variable | Definition |
|---|---|
| Number of informed lenders [11] | Number of financial institutions the business work with that provide at least one "informational" services |
| Average distance from lenders | Average calculated from the latitude and longitude of the location of the firm headquarters and of the branch of the institutions used by the firm |
| Number of lenders | Number of lenders that account for at least 10% of borrowing |
| % equity owned by largest shareholder | |
| Records dummy | One if firm used records to fill the survey, zero otherwise survey |
| Business credit card | One if firm's manager uses a business credit card, zero otherwise survey |
| Banking market concentration | 2003 Commercial bank deposit herfindahl index of MSA or county where firm's is headquarter |
| | $1 : 0 < Herfindahl < 1000$ |
| | $2 : 0 < Herfindahl < 1000$ |
| | $3 : 1800 =< Herfindahl$ |

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[11] Following Petersen & Rajan (1994) informational services include: cash management, banker acceptances, factoring, sales financing, pension fund management, trust services, credit card processing. Total loans includes lines of credit, mortgage loans, vehicle loans, equipment loans, capital leases, other loans.

Table 2: **Definition of variables**

| Variable | Definition |
|---|---|
| wgted average age of owners | weighted average age of individual owners weighted by ownership shares |
| wgted avg education level of owners | weighted average education of individual owners weighted by ownership shares |
| Wealth of main owner | log(1+wealth), where wealth is home equity + net worth excluding home equity and firm value |
| | |

Source: Most of the definitions are from the 2003 Survey of Small Business Finances Technical Codebook. Authors recoded variables needed for the estimation

Table 3: **% of Trade Credit Paid Late**

| Independent Variable | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| Controls for characteristics of the firm | | | | |
| Firm's age | -0.15 | 0.00 | -0.04 | -0.02 |
| | (0.17) | (0.16) | (0.16) | (0.16) |
| Firm's assets | -0.51 | -1.01 | -1.15 | -0.99 |
| | (1.03) | (1.02) | (1.03) | (1.02) |
| Firm's sales growth | -3.35 | -3.86+ | -4.10* | -3.84+ |
| | (2.04) | (1.98) | (1.97) | (1.98) |
| Return over assets | 0.05 | 0.05 | 0.05 | 0.06 |
| | (0.05) | (0.05) | (0.05) | (0.05) |
| Dun and Bradstreet rating | | -8.49** | -8.57** | -8.56** |
| | | (1.13) | (1.14) | (1.14) |
| Urban area dummy | | -2.92 | -3.33 | -3.71 |
| | | (4.18) | (4.16) | (4.18) |
| Professionally managed dummy | | | 8.34 | 8.62 |
| | | | (5.34) | (5.32) |
| Controls for relationship with lenders | | | | |
| Outside debt ratio | -0.86 | -0.98 | -1.04 | -1.12+ |
| | (0.72) | (0.65) | (0.65) | (0.65) |
| Max. length of the relationship | -0.46* | -0.30+ | -0.29 | -0.28 |
| | (0.18) | (0.18) | (0.18) | (0.18) |
| Fraction of loans from inf. lenders | | 0.11** | 0.11** | |
| | | (0.04) | (0.04) | |
| Average distance from lenders | 0.25 | 0.60 | 0.61 | 0.53 |
| | (0.79) | (0.78) | (0.78) | (0.77) |

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Table 3: **% of Trade Credit Paid Late**

| Independent Variable | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| Number of lenders | 8.63** | 6.47** | 6.50** | 5.80** |
| | (1.22) | (1.23) | (1.23) | (1.30) |
| Banking market concentration | -3.68 | -4.33 | -4.37 | -3.91 |
| | (2.72) | (2.77) | (2.76) | (2.78) |
| Controls for informational transparency | | | | |
| Records dummy | -3.66 | -0.03 | -0.46 | -0.36 |
| | (3.28) | (3.17) | (3.18) | (3.17) |
| Business credit card | -4.67 | -0.43 | -0.18 | 0.24 |
| | (3.34) | (3.26) | (3.26) | (3.25) |
| Controls for firm's owner characteristics | | | | |
| Main owner delinquency | | 32.74** | 33.27** | 34.27** |
| | | (6.46) | (6.41) | (6.49) |
| Wealth of main owner | | | -0.82+ | -0.79+ |
| | | | (0.48) | (0.47) |
| Controls for bank holding affiliation | | | | |
| % of lending from bank holding | | | | 0.11** |
| | | | | (0.04) |
| | (22.56) | (22.18) | (22.59) | (22.38) |
| Observations | 2789 | 2789 | 2789 | 2789 |

Robust standard errors in parentheses. + significant at 10%; * significant at 5%; ** significant at 1%

Each model includes firm's industry dummies based on two-digit SIC codes, Corporation dummy, Ownership share of main owner, Professionally managed dummy.